STATE OF VERMONT
AGENCY OF TRANSPORTATION

Scoping Report

FOR

Readsboro BF 0102(16)

VT ROUTE 100, BRIDGE 25 OVER THE DEERFIELD RIVER

October 18, 2013

Table of Contents

Table of Contents **2**

I. Site Information **3**

Need 3

Traffic 3

Design Speed 4

Design Criteria 4

Inspection Report Summary 5

Hydraulics 5

Utilities 5

Right Of Way 6

Resources 6

Biological: 6

Hazardous Materials: 6

Historic: 6

Archeological: 6

II. Maintenance of Traffic **6**

Option 1: Temporary Bridge 7

Option 2: Phased Construction 7

Option 3: Off-Site Detour 7

III. Alternatives Discussion **8**

Alternative 1: No Action 8

Alternative 2: Rehabilitation 8

Alternative 3: New Structure 9

IV. Alternatives Summary **12**

V. Cost Matrix **13**

VI. Conclusion **15**

VII. Appendices **15**

I. Site Information

Bridge 25 is located on VT Route 100 just as it enters the center of town. It is approximately 0.1 miles east of the junction with TH-2, Tunnel St. Most of the bridge is on a tangent with a curve at the east end and the west approach is fairly straight with good sight distance. The east approach is on a curve, but sight distance is fairly good. There are Town Roads near each end 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 Major Collector (State Highway)
Bridge Type	3 span, continuous 2 girder, with cast-in-place deck Cast-in-place concrete abutments and piers.
Bridge Length	340 feet, with two 105 ft. spans and a 130 ft. span.
Year Built	1954
Ownership	State of Vermont

Need

Bridge 25 carries VT Route 100 across the Deerfield River. The following is a list of deficiencies of Bridge 25:

1. The bridge is rated as structurally deficient.

2. The deck rating is 3 (Serious) and the Superstructure rating is 4 (Poor). A critical maintenance report has been made for this bridge, identifying the poor condition of the deck and superstructure (see Appendix).

3. The existing bridge railing and transitions are rated as 0 (Does Not Meet Current Standard).

4. The roadway alignment east of the bridge is substandard due to K value, sight distance, and horizontal geometry. On the west side, K value on the approach is substandard.

Traffic

A traffic study of this site was performed by the Vermont Agency of Transportation. The traffic volumes are projected for the years 2016 and 2036.

TRAFFIC DATA	2016	2036
AADT	1000	1100
DHV	110	120
ADTT	140	200
%T	16.3	21.2
%D	52	52

Design Speed

The current design speed on the bridge and east of the bridge is 40 mph. The speed changes to 25 mph at the west end of the bridge. The Town has indicated that some discussion has occurred regarding a speed reduction to 25 mph on the bridge. VTrans has a process for speed limit changes that includes a traffic engineering study for reviewing the current speeds being driven and an analysis of crash data, existing geometry and character of the area, among other criteria. At this time, the design speed is 40 mph.

Design Criteria

The design standards for this bridge project are the Vermont State Standards, dated October 22, 1997. Minimum standards are based on ADT of 1,100 and a design speed of 40 mph for a Rural Major Collector.

Design Criteria	Source	Existing Condition	Minimum Standard	Comment
Approach Lane and Shoulder Widths	VSS Table 5.3	11'/4' (30')	10'/4' (28')[1]	
Bridge Lane and Shoulder Widths	VSS Section 5.7	11'/3.25' (28.5'), plus sidewalk	4'/10'/10'/4' (28')[1]	
Clear Zone Distance	VSS Table 5.5	No known issues in project area	12' fill 10' cut	
Banking	VSS Section 5.13	Varies	8% (max) 6% max. at side road	
Speed		40 mph	40 mph (Design)	
Horizontal Alignment	AASHTO Green Book Table 3-10b	R = 11,500' (West approach), R = 715' (East approach)	For R=715', bank req'd would be 7.0%	Substandard Curve, East Approach
Vertical Grade	VSS Table 5.6	Max. 3% on west approach, max. 1.67% on east approach.	10% (max) for rolling terrain	
K Values for Vertical Curves	VSS Table 5.1	Crest curve on bridge K=561. Sag curve on west approach K=473, sag curve on east approach K=52	60 crest / 60 sag	Substandard. 50' Sag curve on east approach
Vertical Clearance Issues	VSS Section 5.8	None noted	14'-3" (min)	
Stopping Sight Distance	VSS Table 5.1	1309' on bridge 473' on west approach 262' on east approach	275'	Substandard, east approach
Bicycle/Pedestrian Criteria	VSS Table 5.8	2.5' – 3' shoulder	3' Shoulder	
Bridge Railing	Structures Design Manual Section 13	Inspector's rating is "0", indicating not meeting current standards.	TL-4	Substandard
Hydraulics	VTrans Hydraulics Section	Meets standard	Pass Q_{50} Flood with 1.0 ft. freeboard	
Structural Capacity	Structures Manual, Chapter 3.4.1	Structurally Deficient	HL-93	Substandard

1. The Vermont State Standards call for a 9/2 width for this project. A 10/4 width will be used because it is required for shared bicycle use with >10% truck traffic (Table 5.8) and it is required to meet Highway Safety and Design Engineering Instruction HSDEI 11-004 for minimum width.

Inspection Report Summary

Deck Rating	3 Serious
Superstructure Rating	4 Poor
Substructure Rating	6 Satisfactory
Channel Rating	8 Very Good
Deficiency Status of Structure	SD Structurally Deficient
Scour Condition:	8 Stable for Scour

From latest inspection report:

"04/16/2012 This inspection is a Servi-lift inspection (fracture critical inspection) that was postponed due to Tropical Storm Irene during 2011. Please refer to the inspection report dated on 06/08/2011 for other information missing from this report. Stringer beams 1-3 of span No.3 are in need of web reinforcement. Floor beam #7 needs repair to a crack on south end connection plate. The south end connection plate of floor beam No.1 of span No.1 needs repair to a vertical crack. Local failures may occur anytime and anywhere along both sides of the centerline of all three span areas (especially bays 2 and 3) without notice. Please refer to Critical Maintenance Report dated on 04/16/2012. PLB

06/08/2011 The deck is in need of full replacement. The bridge guard rails on both sides are in need of painting and repairs. Miscellaneous steel repairs are needed on a few members throughout. PLB"

Hydraulics

A Preliminary Hydraulics Report was done for this project and can be seen in the Appendix. The existing bridge meets the hydraulic standard of passing the 50 year storm event (Q_{50}) with one foot of freeboard below the low beam elevation of the bridge. In fact, there would be nearly 30 ft. of freeboard during the 500 year event. The preliminary hydraulics report recommends, if a full bridge replacement is chosen, that a clear span normal to the river of at least 130 ft. be provided to satisfy the Vermont ANR's Bank Full Width criteria.

Utilities

The only aerial electric lines over the bridge are lines that supply power to the lights on the bridge. There are, however, aerial utilities near both ends of the existing bridge, including 3-phase power near the east end. Due to the length of the span at this location, these lines will need to be relocated to accommodate cranes during the construction phase.

There are also municipal wastewater lines near each end of the bridge, but they do not cross the bridge. Further review of the impact on these lines will occur to determine whether they will be impacted by the project.

The Town of Readsboro is currently in the process of replacing an existing 6 inch diameter water line with a new 12 inch line attached to the north side of the bridge. The Town is aware of the bridge project being planned and that the water line will need to be relocated during the bridge project.

Known utilities are shown on drawings in the appendix.

Right Of Way

The existing 6-Rod Right-of-Way is plotted on the Layout Sheet. It appears that all existing elements of the bridge are within the Right-of-Way.

Resources

The environmental resources present at this project are shown on the Existing Conditions Layout Sheet, and are as follows:

Biological:

The initial resource identification indicates that the river is the only regulated natural resource in the immediate project area.

Hazardous Materials:

According to the Vermont Agency of Natural Resources (VANR) Vermont Hazardous Sites List, there have been a number of hazardous waste sites in the community, but only two that have not been closed by VANR. They are not in the project vicinity and are not expected to impact the project.

Historic:

From the initial historic resources identification: "Bridge 25 is a historic bridge, significant for its 1954 metal tube railing. It also serves as a gateway to a historic village, with an abutting historic property at the NW corner of the bridge. These properties also qualify as Section 4(f) resources."

Archeological:

There are areas of archeological sensitivity present in the general area around Bridge 25. These areas are shown in the appendix and need to be avoided. The resources include the remains of a granite foundation, sluice way, and wooden crib dam.

II. Maintenance of Traffic

The Vermont Agency of Transportation has developed 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 prefabricated 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

A one lane temporary bridge could potentially be placed on either side of the existing bridge from a constructability standpoint, however potential archaeological sensitivities in the Northeast quadrant and an historic property in the Northwest quadrant make the north side of the bridge less desirable than the south side. A temporary bridge on the north side was not considered. Due to the length of the river crossing at Bridge 25, the cost of a temporary bridge would be significant.

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 to adjacent property owners and resources.

Construction on Bridge 25, whether rehabilitation or replacement, would be very difficult to accomplish by phasing. There are two main girders spanning the abutments and piers. Extensive and costly temporary supports would be required before half the bridge could be dismantled. If the deck only was to be replaced, phasing could be considered, but since the superstructure rating is 4 (poor), phasing was not considered for this project.

Option 3: Off-Site Detour

This option would close the bridge and reroute traffic onto an offsite detour on State highways. The proposed detour would be:

West on VT 100
North on VT 8
East on VT. 9 to Wilmington
South and west on VT 100 through Jacksonville and Whitingham to Readsboro.

The total end to end distance, from one end of Bridge 25 to the other via the detour, would be a total of approximately 32.2 miles, all on State highway. The normal route through Readsboro, between Jacksonville and Heartwellville, is 13.5 miles. The detour route between those two locations would be 18.6 miles, an addition of 5.1 miles. A map of the detour route can be found in the appendix.

There are no easy options for bypasses for this project. Local traffic could go south on Tunnel St, TH-33, into Massachusetts, however, due to a bridge closure in Monroe, further travel southward would be necessary. This by pass is approximately 34 miles end to end, making it longer than the State detour route. If the Monroe Bridge is back in service in time, the bypass could be shortened to approximately 15 miles. The bypass route is not shown since it does not offer any advantage over the proposed State detour.

An off-site detour would impact the Twin Valley “MOOver”, which is a free on-demand bus service which travels between Readsboro and Brattleboro, with many stops in between.

Since there is a sidewalk on the existing bridge, a means of transporting pedestrians around the closure should be considered. A temporary pedestrian bridge is probably not feasible due to the length of the span. A regularly scheduled shuttle in addition to the MOOver may be feasible.

Currently, fire coverage is provided within the Town of Readsboro by the Town fire dept., located just west of the bridge on School St. For service east of the bridge, mutual aid from Whitingham could provide coverage. The Town may want to consider innovative ways to provide coverage east of the bridge during closure periods, such as temporarily housing emergency apparatus on the east side. Ambulance service is provided from Whitingham, so the same issues will exist for coverage during any closure. Service from North Adams, MA may also be an option. The State may be able to assist in providing special accommodations. Hospitals are located in Bennington, Brattleboro, Pittsfield, MA, and North Adams, MA.

This option would eliminate the need for a temporary bridge, which would significantly decrease cost and time of construction, cost and time of Right of Way acquisition, and potential resource impacts.

III. Alternatives Discussion

Bridge 25 is structurally deficient with undesirable deck and superstructure ratings and substandard railings.

Alternative 1: No Action

This alternative leaves the bridge in its current condition. The deck is in serious condition, rated 3, and the superstructure is rated 4 (poor). These ratings are considered too low to remain in place without any work being done on them. A "No Action" choice assumes that the bridge can stay in place for another 10 years without major work being required. This is not feasible. From the standpoint of safety, economics, and convenience, this alternative is not recommended and will not be developed further.

Alternative 2: Rehabilitation

A rehabilitation alternative would have to include deck, superstructure, and rail replacement as a minimum. Minor surface repairs to the piers and abutments would also be included.

The existing deck matches approximately what is required to meet the current standard for lane and shoulder width, so it is assumed that the piers and abutments are sufficient to accept a new superstructure. The deck and superstructure could be replaced with a multiple steel or concrete girder system that provides some of the redundancy missing from the current configuration. Modifications to the tops of abutments and piers would be required so that loads could land in locations different than the existing.

This alternative would resolve all deficient issues on the bridge. The horizontal and vertical curve on the east approach would not be corrected, but nearly meets the standards as is.

Since there is a sidewalk on the south side of the existing bridge and on each end of the bridge, a sidewalk will be proposed for the new construction. The new deck width would be approximately the same as the existing. In this alternative, the bridge and approach rail would be replaced.

Traffic could be maintained by using either the off-site detour or the temporary bridge. If a closure is used, consideration could be given to placing one lane of the new deck and

superstructure, and opening that lane to alternating one-way traffic with periodic delays while the other lane is completed.

This alternative would add approximately 40 years to the service life of the bridge.

Alternative 3: New Structure

This alternative considers the replacement of all bridge components; substructure, superstructure, deck, sidewalk, and railing; resolves all substandard issues concerning the bridge; and provides the full 80 year service life estimated for new bridge construction.

a. Alignment

The horizontal alignment is straight and ideal on the bridge and on the western approach. The east approach is substandard. It has a horizontal curve with a 715 ft. radius and very slight banking where banking of approximately 7% would be required to meet standard for the current speed limit. A 7% bank would exceed the maximum banking allowed at the two side roads.

The vertical alignment on the bridge and west of the bridge meets the standard. K values and sight distance on a very short vertical curve on the east approach are substandard.

Because there are no easy options for maintenance of traffic, alternatives for bridge replacement both on the existing alignment and off the alignment were considered. An off alignment alternative allows consideration of building one lane off alignment while maintaining traffic on the bridge, and then closing the bridge to complete the second lane using the off-site detour. This method cuts some time off what otherwise would be a full project completed with traffic on the off-site detour, and avoids a costly temporary bridge. Construction of the new bridge in two phases is not ideal, as the safety of the public and the workers is compromised and the costs and duration of the project are increased. After consideration of several configurations of off-alignment alternatives, the off-alignment concept was discarded due to the following:

- New three span bridge on a new alignment to the south (downstream).

  Advantages: Allows traffic to be maintained on the existing bridge while one lane of the new bridge is built, shortens duration of closure and off-site detour. Meets hydraulics, pier construction can begin before bridge is closed. Allows slight improvement to curve on east approach.

  Disadvantages: Requires Right of Way, introduces new substandard horizontal curves, does not bring east approach curves up to standard.

- New three span bridge on a new alignment to the north (upstream).

  Advantages: Allows traffic to be maintained on the existing bridge while one lane of the new bridge is built, shortens the duration of closure and off-site detour. Meets hydraulics, pier construction can begin before bridge is closed. Allows some improvement to curve on the east approach.

  Disadvantages: Requires Right of Way, introduces new substandard horizontal curves, does not bring east approach curves up to standard. Impacts an archaeologically sensitive area, and impacts an historic property and house.

- New curved bridge on a new alignment to the south (downstream).

  A curved bridge introduces complexities both in design and construction. This was considered in an attempt to improve the curve on the east approach. Whether one or three span, the existing bridge cannot remain in service after the beginning of work on a curved alignment, and a new substandard curve is introduced on the west approach. The curve on the east approach is improved but remains substandard.

If a one span bridge is used, all the same disadvantages apply, plus a very large retaining condition comes into play at the abutments. It seems apparent that a new alignment will not allow sufficient improvement to meet standards for the existing east approach and introduces new curves that are not desirable. It does not seem reasonable to re-align the bridge, which will remain for some 80+ years to address a temporary traffic maintenance issue during the construction phase. Put together with Right of Way requirements and impacts to resources, the off-alignment alternatives were not further developed for comparison.

b. Bridge Width

The new bridge width would have lanes and shoulders of 4-10-10-4 with a 5 ft. raised sidewalk on the south side. This width would be approximately the same as the existing.

c. Bridge Length and Skew

The existing bridge is 340 ft. long with three spans; the center span being 130 ft. The Preliminary Hydraulics Report indicates that the bridge meets the hydraulic standard. A new single span would require a clearspan of 130 ft. perpendicular to the river, and a new three span structure would need 90 ft. clear between piers to provide an adequate bank full width as determined by the ANR model.

Two new-structure alternatives were reviewed:

1. A new single span bridge with a skew of 42 degrees on existing alignment. A roadway span of 187 ft. would be required. The existing substandard curve on the east approach would remain.
2. A new three span bridge with a skew of 42 degrees on the existing alignment. The roadway span required would be 136 ft. between piers, with a total span of 357 ft. Again, the existing substandard curve on the east approach does not get corrected.

Note that the existing skew of 42 degrees is very close to the range of skew that can cause damage or injury during snow plowing operations. Referring to SEI 08-003, new abutments and piers should be built in the accepted range of skew. Rehabilitated bridges, where abutments and piers are kept, can be exempted from this requirement, and should have delineators installed to the satisfaction of the District.

d. Superstructure

A little over 12 ft. of vertical clearance is available between the river at Q_{50} and low beam, so there will be no hydraulic constraints on superstructure depth. Due to the span, the typical PBUs and NEXT beams will not be used on this project. Deeper concrete or steel girders will be appropriate. A multiple-member configuration should be used to provide redundancy. The type and configuration of superstructure will be determined later.

e. Substructure

Typically, integral abutments would be the first choice on a full replacement project. In this case, there is evidence of very hard material or possible bedrock that could inhibit the installation of piles for integral abutments. Another type of substructure that could be considered is a mechanically stabilized earth wall. Piles would not be required, and some of the work could take place before the existing bridge is closed. The abutments could be between existing abutments and existing piers. It is possible that bedrock will be encountered if a pier is installed in the river.

f. Maintenance of Traffic

There are two possibilities for maintenance of traffic. Any of the alternatives reviewed could use the off-site detour. A temporary bridge could also be used on the south side of the bridge.

g. Community Concerns

The Town offered a detailed and thorough response to the Community Input Questionnaire. Items to consider and coordinate are as follows:

- *"The Town would like to review guardrail styles available to them."* In regard to the guardrail styles available, there are few bridge rail styles available for a historic situation. The most likely rail to be used is Standard S-352A, Bridge Railing, Galvanized Steel Tubing/Concrete Combination.
- *"Keep streetlights and use oversize conduit for feed-lines. The Town would like to review light fixture styles available to them."* It is the policy of the State that lights, fixtures, conduit, and all associated costs including power costs are provided by the Town, starting at the electrical pole. The State reserves the right to review the lighting system for compliance with safety standards. A maintenance agreement will be required with the Town for maintenance and costs of power, etc.
- *"Add brackets to the guardrail such that the Town may install planters."* Due to safety concerns, brackets will not be allowed.
- It is understood that the Town has expressed verbally and in the Town Plan a desire to reduce speed on the bridge. At this time, it is the intent of the design to meet standards for 40 mph wherever possible. (Not all standards can be met for 40 mph on the roadway approaches off the ends of the bridge). If a speed reduction is felt to be appropriate, a traffic engineering study should be coordinated with VTrans Highway Safety and Design. This can and should take place outside of this bridge project.
- The Town will need to make arrangements during construction to accommodate the Town water main that is on the bridge. The Town should be directed to complete the permit process with the permits and utilities section of VTrans.

IV. Alternatives Summary

Based on the existing site conditions, bridge condition, and recommendations from hydraulics, there are five viable alternatives:

Alternative 2: Replace Deck and Superstructure with Off-site detour
Alternative 3a: New Single Span Structure with Off-site detour
Alternative 3b: New Single Span Structure with Temporary Bridge
Alternative 3c: New Three Span Structure with Off-site Detour
Alternative 3d: New Three Span Structure with Temporary Bridge

V. Cost Matrix[1]

Readsboro BF 0102(16)		Do Nothing	Alt 2	Alt 3a	Alt 3b	Alt 3c	Alt 3d
			New Deck and Superstructure	New One Span Structure	New One Span Structure	New Three Span Structure	New Three Span Structure
			Offsite Detour	Offsite Detour	Temporary Bridge	Offsite Detour	Temporary Bridge
COST	Bridge Cost	$0	$1,700,000	$3,200,000	$3,200,000	$2,900,000	$2,900,000
	Removal of Structure	$0	$350,000	$550,000	$550,000	$550,000	$550,000
	Roadway	$0	$605,000	$911,000	$911,000	$1,140,000	$1,140,000
	Maintenance of Traffic	$0	$35,000	$65,000	$1,300,000	$65,000	$1,300,000
	Construction Costs	$0	$2,690,000	$4,726,000	$5,961,000	$4,655,000	$5,890,000
	Construction Engineering + Contingencies	$0	$538,000	$1,370,000	$1,729,000	$1,350,000	$1,708,000
	Total Construction Costs w CEC	**$0**	**$3,228,000**	**$6, 096,000**	**$7,690,000**	**$6,000,000**	**$7,598,000**
	Preliminary Engineering[2]	**$0**	**$548,000**	**$1,066,000**	**$1,345,000**	**$1,050,000**	**$1,330,000**
	Right of Way	**$0**	**$0**	**$0**	**$345,000**	**$0**	**$354,000**
	Total Project Costs	$0	$3,776,000	$7,162,000	$9,380,000	$7,050,000	$9,282,000
	Annualized Costs	$0	$94,400	$89,500	117,250	$88,150	$116,000
SCHEDULING	Project Development Duration[3]	NA	2 years	2 years	4 years	2 years	4 years
	Construction Duration	NA	3 months	2 years	3 years	2 years	3 years
	Closure Duration (If Applicable)	NA	3 weeks	3 months	N/A	3 months	N/A
ENGINEERING	Typical Section - Roadway (feet)	30'	30’	30'	30'	30'	30’
	Typical Section - Bridge (feet)	3.25’-11’-11’-3.25’-5.5	4-10-10-4-5.5	4-10-10-4-5.5	4-10-10-4-5.5	4-10-10-4-5.5	4-10-10-4-5.5
	Geometric Design Criteria	No Change	Substandard Approaches	Substandard Approaches	Substandard Approaches	Substandard Approaches	Substandard Approaches
	Traffic Safety	No Change	Improved	Improved	Improved	Improved	Improved
	Alignment Change	No	No	No	No	No	No
	Bicycle Access	No Change	No Change	No Change	No Change	No Change	No Change
	Hydraulic Performance	No Change	No Change	No Change	No Change	No Change	No Change

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

Readsboro BF 0102(16)		Do Nothing	Alt 2	Alt 3a	Alt 3b	Alt 3c	Alt 3d
			New Deck and Superstructure	New One Span Structure	New One Span Structure	New Three Span Structure	New Three Span Structure
			Offsite Detour	Offsite Detour	Temporary Bridge	Offsite Detour	Temporary Bridge
	Pedestrian Access	No Change	No Change	No Change	No Change	No Change	No Change
	Utility	No Change	Relocation	Relocation	Relocation	Relocation	Relocation
OTHER	ROW Acquisition	No	No	No	Yes	No	Yes
	Road Closure	No	Yes	Yes	No	Yes	No
	Design Life	5-10 years	40 years	80 years	80 years	80 years	80 Years

VI. Conclusion

A**lternative 2** is recommended; replace the deck and superstructure while maintaining traffic on an offsite detour for a 3 week period.

Discussion

The annualized cost for a superstructure and deck replacement is approximately the same as the complete replacement options utilizing the detour. It also has a shorter project development time. Since the substructure is rated as satisfactory, it is reasonable to assume that it has 40 years of life remaining. Additionally, the structure can pass the Q_{50} design flow and the site has been identified as stable for scour. By choosing a deck and superstructure replacement, the closure duration can be reduced, the very high cost of a temporary bridge can be avoided, and the cost of new substructures can be saved for additional critical projects. Special considerations will be required for emergency services if a closure is used. Prefabricated superstructure elements should be considered to minimize the closure period. The scope of work should include minor surface repairs as necessary to the abutments and piers, and the stone fill protection indicated in the Preliminary Hydraulics Report. Based on the information available, additional scour mitigation measures are not anticipated. The final hydraulic report will contain scour calculations.

VII. Appendices

- Site Pictures
- Town Map
- Bridge Inspection Report
- Critical Maintenance Report - 2012
- Hydraulics Memo
- Preliminary Geotechnical Information
- Natural Resources ID
- Archeology Memo
- Historic Memo
- Detour Map
- Community Input
- Plans
    - Existing Conditions
    - Proposed Typical Sections
    - Proposed Layouts
    - Proposed Profiles
    - Downstream Temporary Bridge

Bridge 25 Looking West

Bridge 25 Looking East

Delaminating Deck


Secondary Member Crack

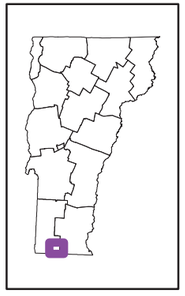
Scale 1:52,598

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

READSBORO, VT 100, BR 25

Produced by:
Mapping Unit
Vermont Agency of Transportation
August 2011



READSBORO
BENNINGTON COUNTY
DISTRICT # 1

STRUCTURE INSPECTION, INVENTORY and APPRAISAL SHEET

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

Inspection Report for READSBORO **bridge no.:** 00025 **District:** 1

Located on: VT 00100 ML **over** W BRANCH DEERFIEL **approximately** 5.2 MI N JCT. VT.8 **Owner:** 01 STATE-OWNED

CONDITION

Deck Rating: 3 SERIOUS

Superstructure Rating: 4 POOR

Substructure Rating: 6 SATISFACTORY

Channel Rating: 8 VERY GOOD

Culvert Rating: N NOT APPLICABLE

Federal Str. Number: 200102002502092

Federal Sufficiency Rating: 056.8

Deficiency Status of Structure: SD

AGE and SERVICE

Year Built: 1954 **Year Reconstructed:** 0000

Service On: 5 HIGHWAY-PEDESTRIAN

Service Under: 5 WATERWAY

Lanes On the Structure: 02

Lanes Under the Structure: 00

Bypass, Detour Length (miles): 05

ADT: 000990 **% Truck ADT:** 06

Year of ADT: 1998

GEOMETRIC DATA

Length of Maximum Span (ft): 0130

Structure Length (ft): 000340

Lt Curb/Sidewalk Width (ft): 2

Rt Curb/Sidewalk Width (ft): 5.8

Bridge Rdwy Width Curb-to-Curb (ft): 28.6

Deck Width Out-to-Out (ft): 38.7

Appr. Roadway Width (ft): 030

Skew: 45

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: 3 SPN CONT RIV 2 GIR

Number of Approach Spans: 0000 **Number of Main Spans:** 003

Kind of Material and/or Design: 4 STEEL CONTINUOUS

Deck Structure Type: 1 CONCRETE CIP

Type of Wearing Surface: 0 NOT APPLICABLE

Type of Membrane 0 NONE

Deck Protection: 0 NONE

APPRAISAL *AS COMPARED TO FEDERAL STANDARDS

Bridge Railings: 0 DOES NOT MEET CURRENT STANDARD

Transitions: 0 DOES NOT MEET CURRENT STANDARD

Approach Guardrail: 1 MEETS CURRENT STANDARD

Approach Guardrail Ends: 1 MEETS CURRENT STANDARD

Structural Evaluation: 4 MEETS MINIMUM TOLERABLE CRITERIA

Deck Geometry: 5 BETTER THAN MINIMUM TOLERABLE CRITERIA

Underclearances Vertical and Horizontal: N NOT APPLICABLE

Waterway Adequacy: 8 SLIGHT CHANCE OF OVERTOPPING ROADWAY

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: 4 H 20

INSPECTION and CROSS REFERENCE

X-Ref. Route:

Insp. Date: 062011 **Insp. Freq. (months)** 24 **X-Ref. BrNum:**

INSPECTION SUMMARY and NEEDS

04/16/2012 This inspection is a Servi-Lift inspection (fracture critical inspection) that was postponed due to Tropical Storm Irene during 2011. Please refer to the inspection report dated on 06/08/2011 for other information missing from this report. Stringer beams 1-3 of span No.3 are in need of web reinforcement. Floor beam #7 needs repair to a crack on south end connection plate. The south end connection plate of floor beam No.1 of span No.1 needs repair to a vertical crack. Local failures may occur anytime and anywhere along both sides of the centerline of all three span areas (especially bays 2 and 3) without notice. Please refer to Critical Maintenance Report dated on 04/16/2012. PLB

06/08/2011 The deck is in need of full replacement. The bridge guard rails on both sides are in need of painting and repairs. Miscellaneous steel repairs are needed on a few members throughout. PLB

BRIDGE INSPECTION - CRITICAL MAINTENANCE REPORT

READSBORO	VT 100	25	1	W. BR.DEERFIELD RIV.	3 SP RIVETED GRD
TOWN	ROUTE	BRIDGE	DISTRICT	FEATURE CROSSED	TYPE OF STRUCTURE

PROBLEMS FOUND:

DECK

ACTION TAKEN:

1. Deck Repair Needed — **Large and thick delams w/ broken rebar**
   Location: — **Bays 2 and 3 of spans 2 and 3.**
   Est. quantity — **2 areas**
   Urgency of repair coding: — **Critical**

_____

_____

_____

_____

_____

_____

DTA's INITIALS & DATE _____

SUPERSTRUCTURE

ACTION TAKEN:

1. Repair Stringer Beam — **Holes in lower web.**
   Location: — **1-3 of span No.3**
   Est. Quantity — **3**
   Urgency of Repair Coding: — **Semi-Critical**

2. Repair — **Connection plates**
   Location: — **So. side of end flr. beams in spans 1 & 3**
   Est. quantity - Each: — **2**
   Urgency of Repair Coding: — **Semi-Critical**

_____

_____

_____

_____

_____

_____

DTA's INITIALS & DATE _____

BRIDGE INSPECTION - CRITICAL MAINTENANCE REPORT

READSBORO	VT 100	25	1	W. BR.DEERFIELD RIV.	3 SP RIVETED GRD
TOWN	ROUTE	BRIDGE	DISTRICT	FEATURE CROSSED	TYPE OF STRUCTURE

Note: **Critical** (Immediate action required) **Semi-Critical** (Timely action required) **Needs to be Addressed**

Inspector(s) : **Peter Bergeron and Justin White**
Inspection Date : **04/16/12**

Inspector(s) Comments :

Large delaminations in bays 2 or 3 of spans 2 and 3 are in need of added support to prevent local break through. Stringer beams 1 thru 3 of span 3 are in need of reinforcement along the lower web areas. Connection plates on the south side of the both end floor beams are in need of repairs.

Return a copy of this form to Structures Section and Director of Operations after repairs have been completed.

Signature: _____

Structures Program Manager Date

Bill Sargent, OPS District 6
Tod Kimball, FHWA
NBIS File via PMT and Inspector

VTrans
Bridge Management Inspection Unit

Printed on 9/18/2013

VT AGENCY OF TRANSPORTATION PROGRAM DEVELOPMENT DIVISION

HYDRAULICS UNIT

TO: Chris Williams, Structures Project Manager

FROM: Jake San Antonio, Hydraulics Project Engineer (VHB)
via Nick Wark, VTrans Hydraulic Engineer

DATE: June 13, 2012

SUBJECT: READSBORO - BF-0102(16), VT 100 BR 25 over the DEERFIELD RIVER

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 1954 based on available information. The bridge is a 2-lane 3-span continuous rivet 2 girder bridge. The total width of bridge is approximately 37 feet normal to the roadway. The total span for the structure between the abutment faces is approximately 340 feet, normal to the roadway. The clear spans between the piers and abutment faces are approximately 102 (normal to roadway) feet, and the clear span between piers is approximately 129 feet (normal to roadway). The existing bridge has a skew of approximately 42 degrees to the river at this location. The total existing superstructure depth is approximately 12.5 feet based on record plans. The existing abutments and piers were constructed of concrete with unknown foundations. These abutments and piers are orientated parallel with the stream channel at this location. The approximate maximum height to the bottom of the superstructure to the streambed varies but is approximately 55 feet on the upstream side. The structure is located on an incised channel having a sandy-gravelly streambed with large boulders. The bridge is located on the Deerfield River approximately 700 feet upstream of the confluence with the West Branch of the Deerfield River. The bridge will pass the Q_{50} storm event and all larger events based on our preliminary project HEC-RAS model. The existing bridge meets the hydraulic standard. We did not evaluate the scour for the existing conditions or any proposed bridge configurations as part of the preliminary design. Scour calculations will be performed during final hydraulics.

Recommendations

The bridge option selection criteria should be to provide a bridge opening that does not restrict the bank full width, nor provide an unrealistic widening, of the existing channel, or create any worse backwater flooding conditions than the existing conditions. The VANR Bank Full Width (BFW) equation estimates the width to be approximately 132 feet, but the actual field conditions have varying bank full stream widths within the study reach between 80 to 90 feet.

It has been assumed that if the existing bridge is replaced a replacement structure will be located in the existing roadway alignment having the same basic surface geometry based on the site constraints. For a replacement structure, we have anticipated that the proposed abutments will be vertical face concrete abutments with 3H:2V sloped stone fill scour protection placed in front of the abutments.

Based on our analysis, the designer has flexibility on the bridge design to meet eh hydraulic standards. One option would be to use a replacement bridge having a single 175-foot clear span (130-feet normal to the stream channel) between the abutment faces. For this option with a low

beam elevation of 1215.4, this analysis predicted a freeboard of 29.8 for the Q_{500} event. The designer would have flexibility on the low beam elevation given the significant freeboard. The proposed opening is narrower than the existing structure but has a wider center clear span and will not constrict the stream channel's bank full width based on the current BFW conditions. This proposed structure option will also provide approximately 37.0 feet of freeboard at the Q_{50} design storm event and meet the hydraulic design standard.

Another option would be to keep the bridge as a 3 span structure. For this option we would recommend that the pier placement not encroach any further on the channel, and that the piers not get any wider unless they are placed above the floodplain. The piers should also be aligned parallel with the river channel. This proposed structure will also provide approximately 36.3 feet of freeboard at the Q_{50} design storm event and meet the hydraulic design standard. Figure 2, attached depicts this option.

As noted above, scour was not reviewed during the preliminary design. However based on the velocities from the analyses, it is anticipated that Type 4 Stone Fill will be necessary for armoring the abutments and disturbed channel banks near the replacement structure. Stone fill sizing will be verified during final hydraulic design.

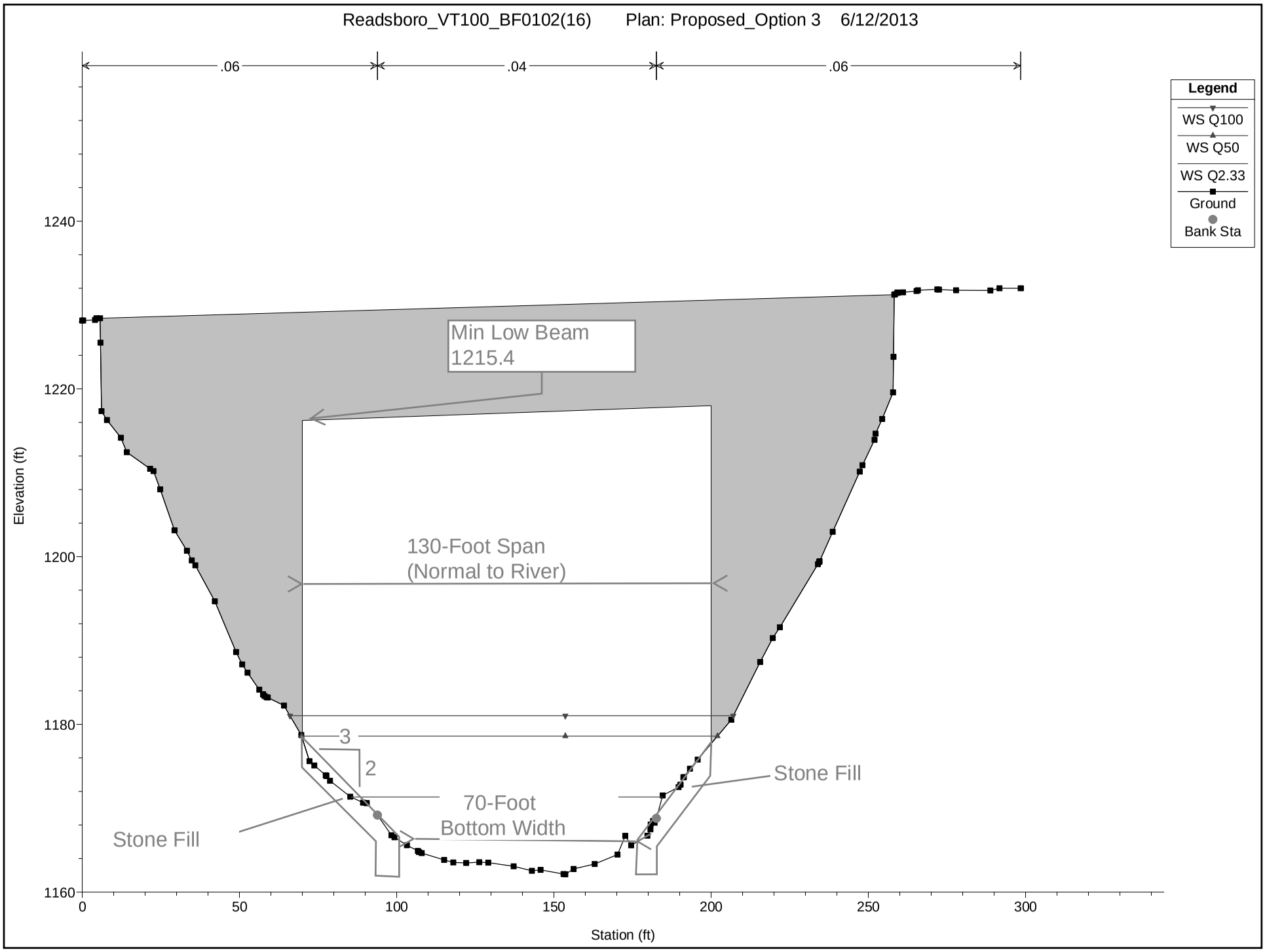
Temporary Bridge

As part of this analysis we did not size a temporary bridge. If a temporary bridge is determined to be necessary let us know and we will work with you to size one.

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

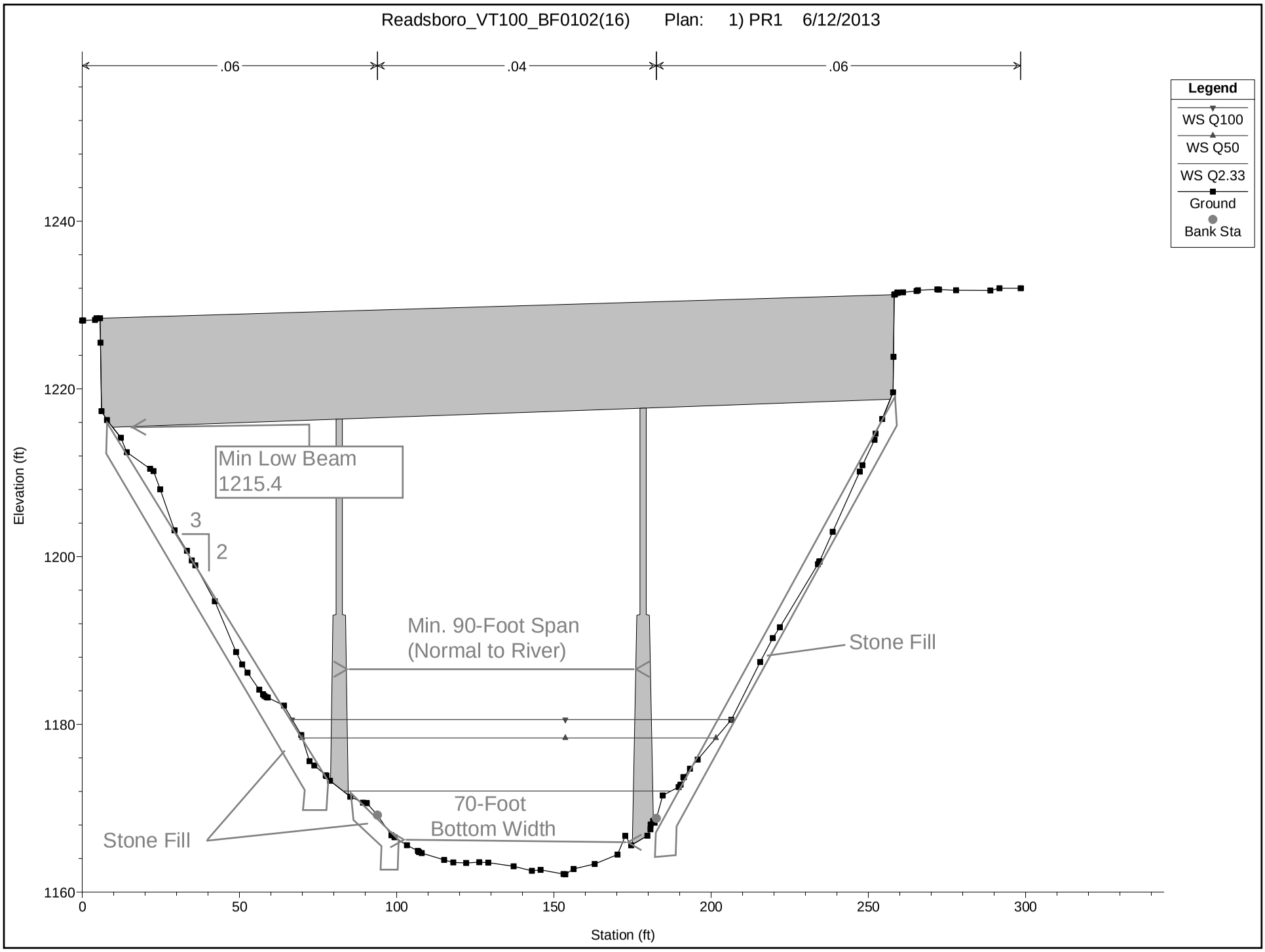
cc: Hydraulics Project File via NJW
Hydraulics Chrono File

Figure 1: 175-Foot Singe Span Normal to Road (130-feet Normal to River)



1 in Horiz. = 40 ft 1 in Vert. = 15 ft

Figure 2: 340-Foot Three Span normal to road (250-feet normal to Rr)iver



1 in Horiz. = 40 ft 1 in Vert. = 15 ft

AGENCY OF TRANSPORTATION **OFFICE MEMORANDUM**

To: Chris Williams, P.E., Structures Project Manager

From: Nicholas S. Meltzer, P.E., Geotechnical Engineer, via Christopher C. Benda P. E., Soils and Foundations Engineer

Date: July 24, 2013

Subject: Readsboro BF 0102(16) Preliminary Geotechnical Information

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 25 on Vermont 100 in Readsboro, which flows over the west branch of the Deerfield River. This review included, a site visit, our in-house bridge boring files, record plans, USDA Natural Resources Conservation soil survey records, surficial geology and bedrock maps of the State and the Agency of Natural Resources Well logs.

Previous Projects

Record plans were found for the project, which shows Abutment 1, Pier 1, and Pier 2 supported on spread footings. Pier 1 and 2 and both founded on bedrock, which is shown on the plans. Abutment 2 is supported on driven steel piles. No additional soil information was available. The Soils and Foundations Unit maintains a GIS based historical record of subsurface investigations, which contains electronic records for the majority of borings completed in the past 10 years. An exploration of this map revealed no borings in proximity to the project.

A nearby town bridge, located on Tunnel Street and approximately 750 feet as the crow flies from the subject bridge, is currently under construction. As part of a bridge replacement due to Tropical Storm Irene, borings were taken in 2011. One abutment consisted of glacial till to depths of 13 feet below the bottom of footing, underlain by bedrock, while the other abutment consisted of glacial till to depths of 100 feet.

Water Well Logs

The Agency of Natural Resources (ANR) documents and publishes all water wells that are drilled for residential or commercial purposes. Published online, the logs can be used to determine general characteristics of soil strata in the area. The soil description given on the logs is done in the field, by unknown personnel, and as such, should only be used as an approximation. No water well information was located near the project area.

USDA Soil Survey

The United States Department of Agriculture Natural Resources Conservation Service maintains a surficial geology map of the United States, which is available online.

According to the Web Soil Survey, the strata directly underlying the project site consists of a combination of sandy soils and rocky complexes. Colton gravelly loamy sand and Berkshire fine sandy loam compromise the course grained strata, while the Tunbridge-Berkshire complex and Tunbridge-Lyman complex make up the rocky strata.

A site visit was conducted to determine potential issues with boring operations, and to make any other pertinent observations about the project. Figure 1 was taken on July 17, 2013.

Figure 1. Looking North on VT-100

Overhead power is non-existent on the bridge, and will not interfere with boring operations. For borings completed on and through the bridge deck, the wide sidewalk allows for more width to locate the drilling rigs while maintaining one-way traffic.

Figure 2 shows visible bedrock upstream of the bridge; however it should be noted the bedrock elevation at this site is variable. Based on the existing plans, and nearby borings, although bedrock is visible up and downstream of the bridge, it could be vary significantly across the width of the bridge. Additionally, large boulders in the area can be misleading as to the presence of bedrock.

Figure 2. Bedrock visible upstream

Figure 3 shows the tall piers, steep banks, and presence of cobbles and boulders, all of which contribute to difficult boring operations. With the large size and scope of this project, an in-depth geotechnical investigation is necessary. Two borings should be completed at each abutment, and due to the irregularities in bedrock elevation, a minimum of two at each additional substructure unit. With bedrock visible in the river, the subsurface exploration could be done in phases to help gain more information for design decisions. A series of hand steel soundings could be conducted near existing piers as well, to help ascertain the bedrock profile.

Figure 3. Upstream side of the bridge, looking North on VT-100

Based on this information, possible foundation options for a bridge replacement include the following:

- Piers
  - Spread footings founded directly on bedrock
  - Spread footings supported on micropiles
  - Pier column supported on one drilled shaft
- Abutments
  - Pile caps on a single row of H-Piles
  - Reinforced concrete abutments on spread footings
  - Reinforced concrete abutments supported on driven piles

We recommend a minimum of two borings be taken at each abutment and a minimum of two at each additional substructure, in order to more fully assess the subsurface conditions at the site including, but not limited to, the soil properties, ground water conditions and depth to bedrock. If drilled shafts are contemplated, final borings should be aligned with the shaft location(s).

Based on existing plans, any pier substructure will be founded on bedrock, and the abutments will be either shallow foundations on soil, or deep foundations founded on bedrock. Recent Agency projects have shown advances in drilled shaft construction, and the ease of construction that can be obtained when one shaft is transitioned directly into a pier column.

When a preliminary alignment has been chosen, the Soils and Foundations Unit should be contacted to help determine a subsurface investigation that efficiently gathers the most information.

If you have any questions or would like to discuss this report, please contact us by phone at (802) 828-6910, or via email at chris.benda@state.vt.us.

cc: Project File/CCB
NSM

AGENCY OF TRANSPORTATION **OFFICE MEMORANDUM**

TO: James Brady, Environmental Specialist

FROM: John Lepore, Transportation Biologist

DATE: May 21, 2013

SUBJECT: Readsboro B_F 0102 (16)
VT 100, Bridge 25 over West Branch of Deerfield River
Natural Resource ID & Comments

The initial resource identification for this project was conducted on 20-MAY-2013 and based on that, which included a site visit, I have concluded that the only regulated natural resource in the immediate area of Bridge 25 is the West Branch of the Deerfield River itself. The existing structure is a long three-span bridge that spans a very steep sided (and deep) gorge.

Given the length of the structure and the height above the stream channel, it doesn't appear feasible to put in a temporary bridge in this location, but if one was needed, either side would be acceptable from an natural resources perspective, yet challenging from an engineering one. Phased construction is likely going to be needed in this location due to the long length of detours in the area.

If the project includes pier replacement, I recommend that the piers be placed outside of the limits of OHW, although the current pier doesn't seem to be problematic.

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: 5/30/2013

Subject: Readsboro BF 0102(16) – Archaeological Resource ID

James,

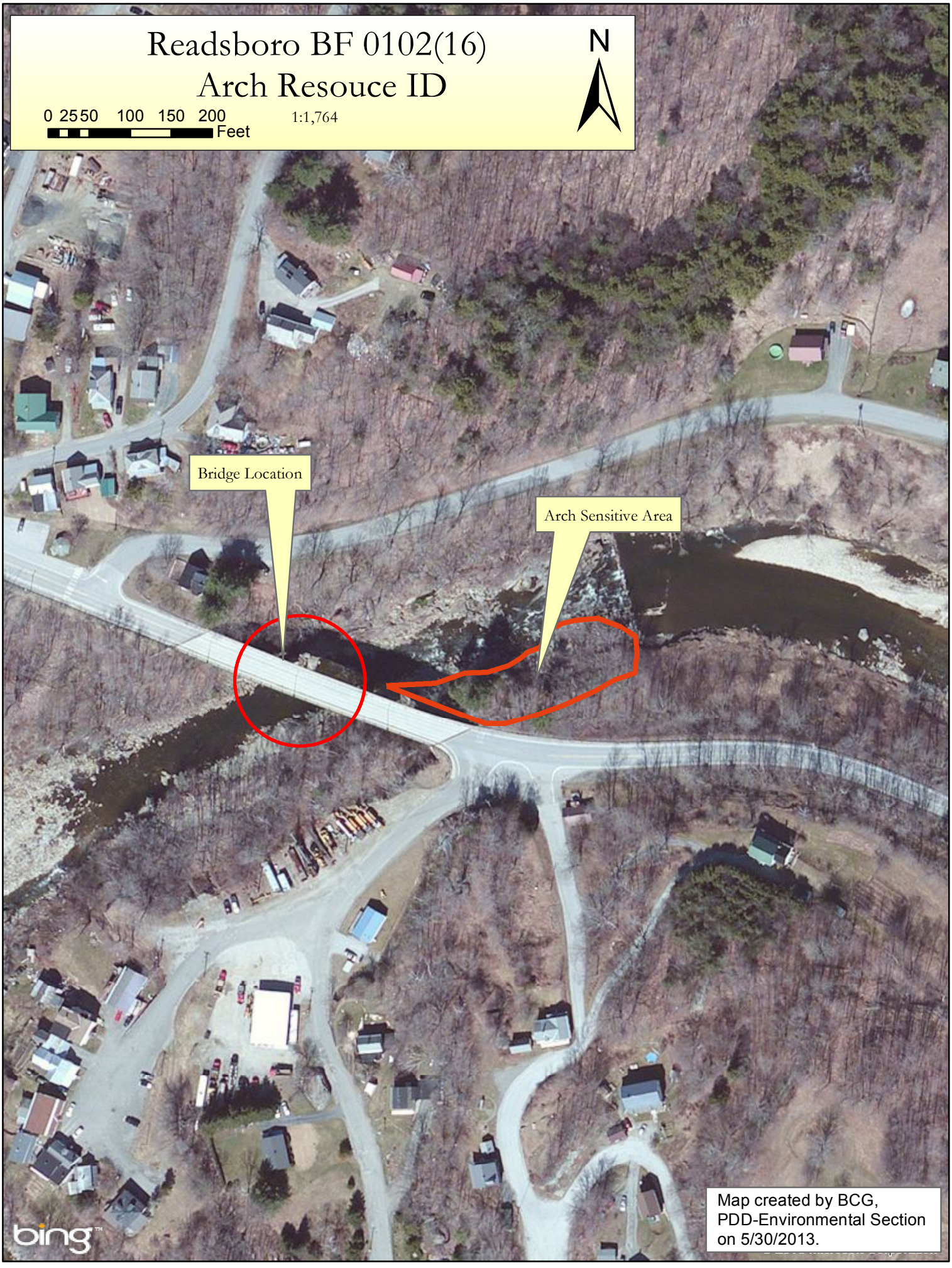
A field visit to Readsboro Bridge 25 on VT100 over the West Branch of the Deerfield River was adequate to identify potential archaeological resources in the project area. Through historical background research and field verification, I've been able to identify a series of mill foundation remains in the SE quadrant of the project area. The granite foundation, sluice way, and wooden crib dam are visible on site and should be avoided during construction. I've mapped the resources into the archaeology geodatabase for inclusion in the project DGN file.

Sincerely,

Brennan

Brennan Gauthier
VTrans Archaeologist
Vermont Agency of Transportation
Program Development Division
Environmental Section
1 National Life Drive
Montpelier, VT 05633
tel. 802-828-3965
fax. 802-828-2334
Brennan.Gauthier@state.vt.us

VTrans Working to Get You There
Vermont Agency of Transportation


Readsboro BF 0102(16)
Arch Resouce ID
0 25 50 100 150 200
Feet
1:1,764
N
Bridge Location
Arch Sensitive Area
bing
Map created by BCG,
PDD-Environmental Section
on 5/30/2013.

Brady, James

From: O'Shea, Kaitlin
Sent: Tuesday, May 14, 2013 8:58 PM
To: Brady, James
Cc: Newman, Scott; Williams, Chris
Subject: Readsboro BF 0102(16) Historic Resource ID

Hi James,

The historic resource ID is complete for Readsboro BF 0102(16). Bridge 25 is a historic bridge, significant for its 1954 metal tube railing. It also serves as a gateway to a historic village, with an abutting historic property at the NE corner of the bridge. These properties also qualify as Section 4(f) resources.

This project has been mapped in Arcmap and bookmarked under the project name.

Let me know if you have any questions.

Thanks,
Kaitlin

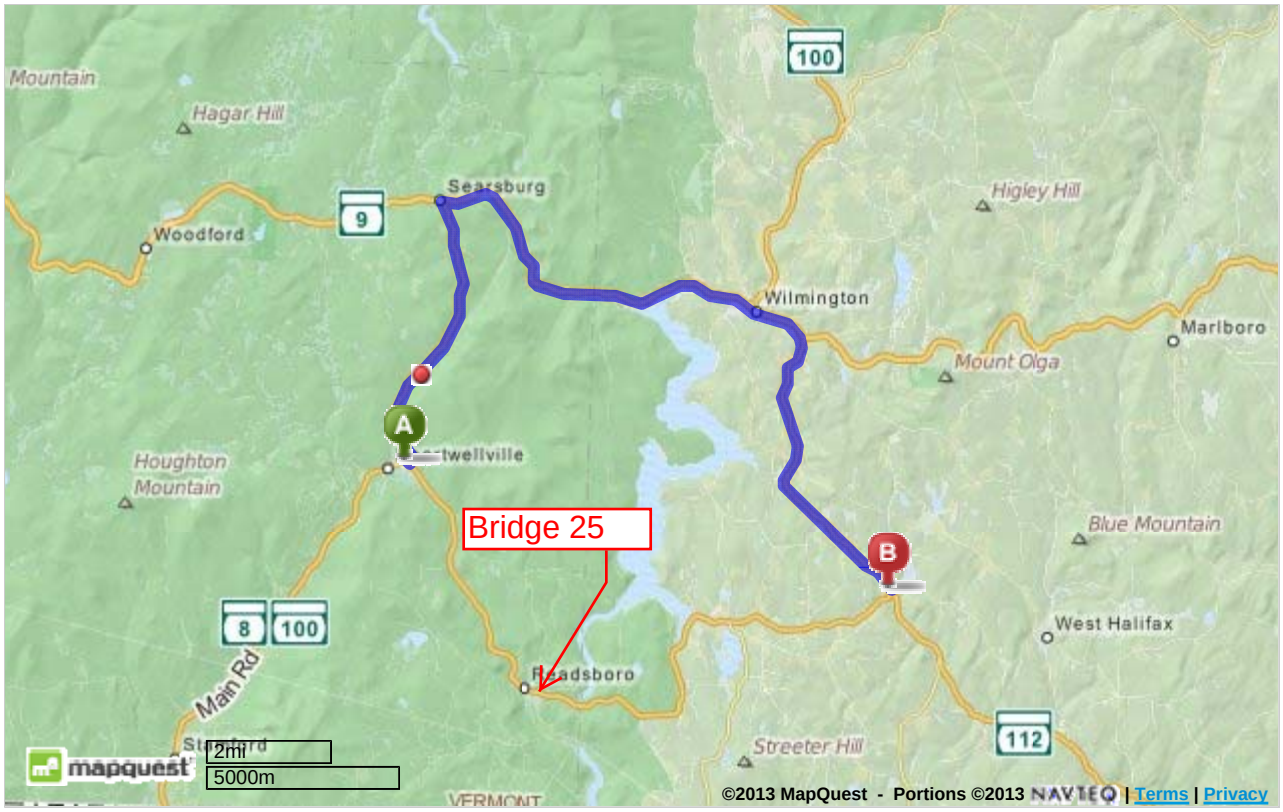
Kaitlin O'Shea
Historic Preservation Specialist
Program Development - Environmental Section Vermont Agency of Transportation

One National Life Drive
Montpelier VT 05633

office: 802-828-3962
fax: 802-828-2334

Kaitlin.O'Shea@state.vt.us

Total Travel Estimate: **18.62 miles - about 27 minutes**



Detour Route: From Readsboro west on VT 100, north on VT 8, east on VT 9 to Wilmington, south and west on VT 100 through Jacksonville and Whitingham to Readsboro.

A-B on through route:	13.5 miles
A-B on detour route:	18.6 miles
Added miles:	5.1 miles
End to End distance:	32.2 miles

Community Considerations

1. Are there any scheduled public events in the community that will generate increased traffic (e.g. vehicular, bicycles and/or pedestrians), 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.

   Independence Day and Memorial Day parade and celebrations occur annually – Contact Readsboro Selectboard.

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

   In between holiday weekends

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

   Fire Department - 102 School Street
   Police - State Police – Shaftsbury, Vt

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

   Readsboro Central School (Elementary School) – 301 Phelps Lane

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

   Yes, Twin Valley MOVER

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

   Yes, this is the main entrance to the Town; it will impact Schools, Fire, Inn's and all businesses.

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?

   No

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

   Yes, Depot Road and Railroad Ally.

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

   Yes, the water department, it will shut down the public water supply to the town.

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.

    Deerfield Valley News (Weekly publication), Town website.

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

    Planning Commission, Home Town Redevelopment.

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? **N/A**
2. Are there any concerns with the width of the existing bridge? **No**
3. What is the current level of bicycle and pedestrian use on the bridge? **Daily light traffic**
4. If a sidewalk or wide shoulder is present on the existing bridge, should the new structure have one? **Yes**
5. Is there a need for a sidewalk or widened shoulder if one does not currently exist? Please explain. **N/A**
6. Does the bridge provide an important link in the town or statewide bicycle or pedestrian network such that bicycle and pedestrian traffic should be accommodated during construction?

   Yes, Children use to go to school.

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

   We would like to keep the Veterans Signage

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

   No

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

   No

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

    No

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

    No

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

- **The Town would like to review guardrail styles available to them.**
- **Remove trees around abutments.**
- **Use methods to minimize exposure and transfer of Japanese knotweed.**
- **Keep streetlights and use over size conduit for feed-lines. The Town would like to review light fixture styles available to them.**
- **Keep the sidewalk.**
- **Add brackets to the guardrail such that the Town may install planters.**
- **Any metal free concrete may be trucked to the Towns gravel pit.**
- **The Town request salvage rights to the present guardrails that were installed by the Town (located at the approaches of each end).**

Land Use & Public Transit Considerations – to be filled out by the municipality or RPC.

1. Does your municipal land use plan reference the bridge in question? If so please provide a copy of the applicable section or sections of the plan. **The Town Plan (2010) references the priorities to the town transportation system including: preserving and maintaining the existing road infrastructure, safety improvements and enhancements, and capacity enhancements. It also references the speed limit of 40mph of this bridge, needs to be reduced.**

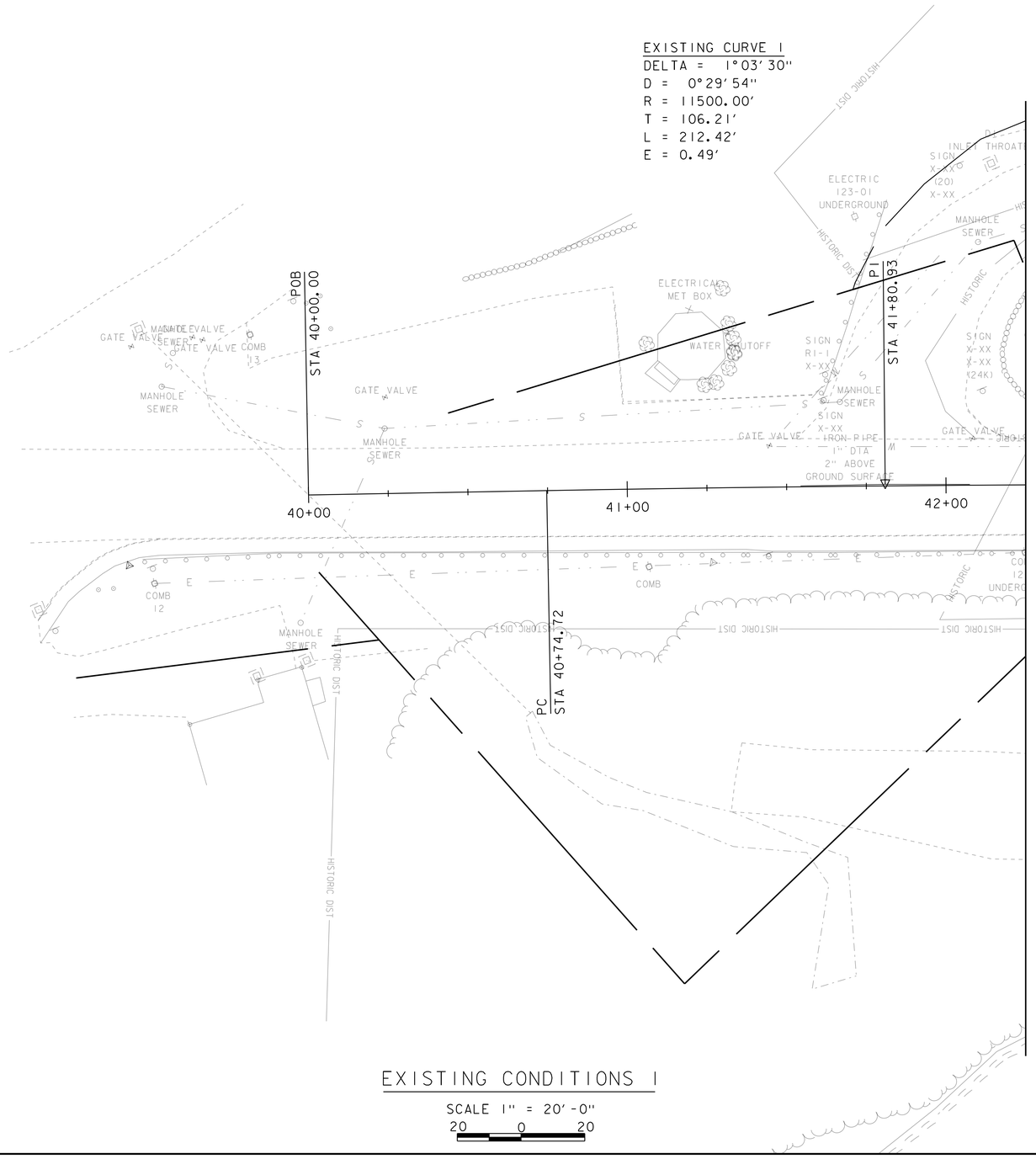
2. Please provide a copy of your existing and future land use map, if applicable.
   - Existing Land Use - **file:///U:/GIS/Maps/Towns/Readsboro/2010%20Town%20Plan%20Maps/Existing%20Land%20Use%20color.pdf**
   - **Future Land Use – file:///U:/GIS/Maps/Towns/Readsboro/2010%20Town%20Plan%20Maps/Future%20land%20use%20color.pdf**
3. Are there any existing, pending or planned development proposal that would impact future transportation patterns near the bridge? If so please explain. **It's my understanding there are none at this time.**

4. Is there any planned expansion of public transit service in the project area? If not known please contact your Regional Public Transit Provider. **No expanded transit is being proposed at this time.**

N

VT STATE PLANE GRID

EXISTING CURVE 1
DELTA = 1°03'30"
D = 0°29'54"
R = 11500.00'
T = 106.21'
L = 212.42'
E = 0.49'



EXISTING CONDITIONS 1

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

PROJECT NAME:	READSBORO
PROJECT NUMBER:	BF 0102(16)
FILE NAME: 13c068/sl3c068borderexisting.dgn	PLOT DATE: 25-SEP-2013
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: O.M.DARISSE
DESIGNED BY: ------	CHECKED BY: ------
EXISTING CONDITIONS 1	SHEET 1 OF 39

N

VT STATE PLANE GRID

MATCH LINE STA 42+25.00

MATCH LINE STA 47+50.00

PHELPS LANE
TH 22

COMAI, RUDOLF R.
& MADELINE

TRANS-CANADA HYDRO NORTHEAST INC.
joined by
VERMONT LAND TRUST

TRANS-CANADA HYDRO N
joined by
VERMONT LAND

VT 100
TO STAMFORD

PC
STA 45+72.56

PT
STA 42+87.14

TRANS-CANADA HYDRO NORTHEAST INC.
joined by
VERMONT LAND TRUST

VTHD SURVEY DISK G33
RESET 1965
ELEV. = 1232.83

TRANS-CANADA HYDRO NORTHEAST INC.
joined by
VERMONT LAND TRUST

READSBORO,
TOWN OF

SMITH, RONDA J. &
EILERS, RAYMOND J

MARONI, THOMAS J.
KAREN C.

IRON PIPE
1" DIA
5" ABOVE GROUND SURFACE

DEERFIELD RIVER
FLOW

DEPOT STREET
TH 4

WOODS
DRIVE

GRAVEL
DRIVE

EXISTING CURVE 2
DELTA = 23° 18' 08"
D = 8° 00' 48"
R = 715.00'
T = 147.43'
L = 290.79'
E = 15.04'

PI
STA 47+19.99

EXISTING CONDITIONS 2

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

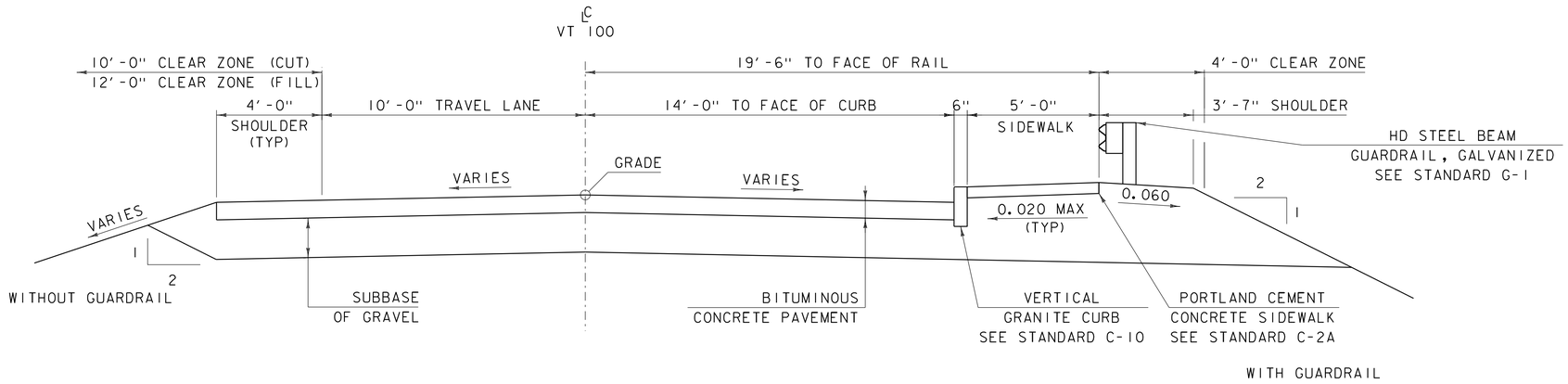
PROJECT NAME:	READSBORO
PROJECT NUMBER:	BF 0102(16)
FILE NAME:	I3c068/sI3c068borderexisting.dgn
PLOT DATE:	25-SEP-2013
PROJECT LEADER:	C.P.WILLIAMS
DRAWN BY:	
DESIGNED BY:	------
CHECKED BY:	------
EXISTING CONDITIONS 2	
SHEET	2 OF 39

EXISTING CONDITIONS 3

SCALE 1" = 20'-0"

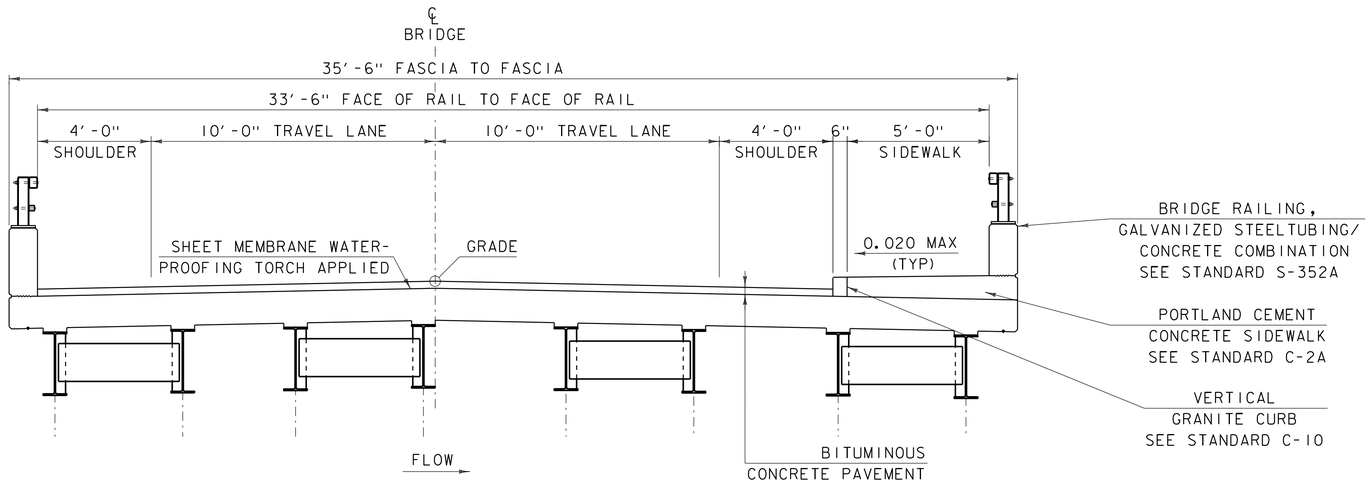
20 0 20

PROJECT NAME:	READSBORO
PROJECT NUMBER:	BF 0102(16)
FILE NAME: l3c068/sl3c068borderexisting.dgn	PLOT DATE: 25-SEP-2013
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: O.M.DARISSE
DESIGNED BY: ------	CHECKED BY: ------
EXISTING CONDITIONS 3	SHEET 3 OF 39



PROPOSED VT 100 TYPICAL SECTION

SCALE 3/8" = 1'-0"



PROPOSED BRIDGE TYPICAL SECTION

SCALE 3/8" = 1'-0"

NOTE: PBU'S SHOWN FOR EXAMPLE,
SUPERSTRUCTURE NOT YET DESIGNED

MATERIAL TOLERANCES

(IF USED ON PROJECT)

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

PROJECT NAME: READSBORO
PROJECT NUMBER: BF 0102(16)

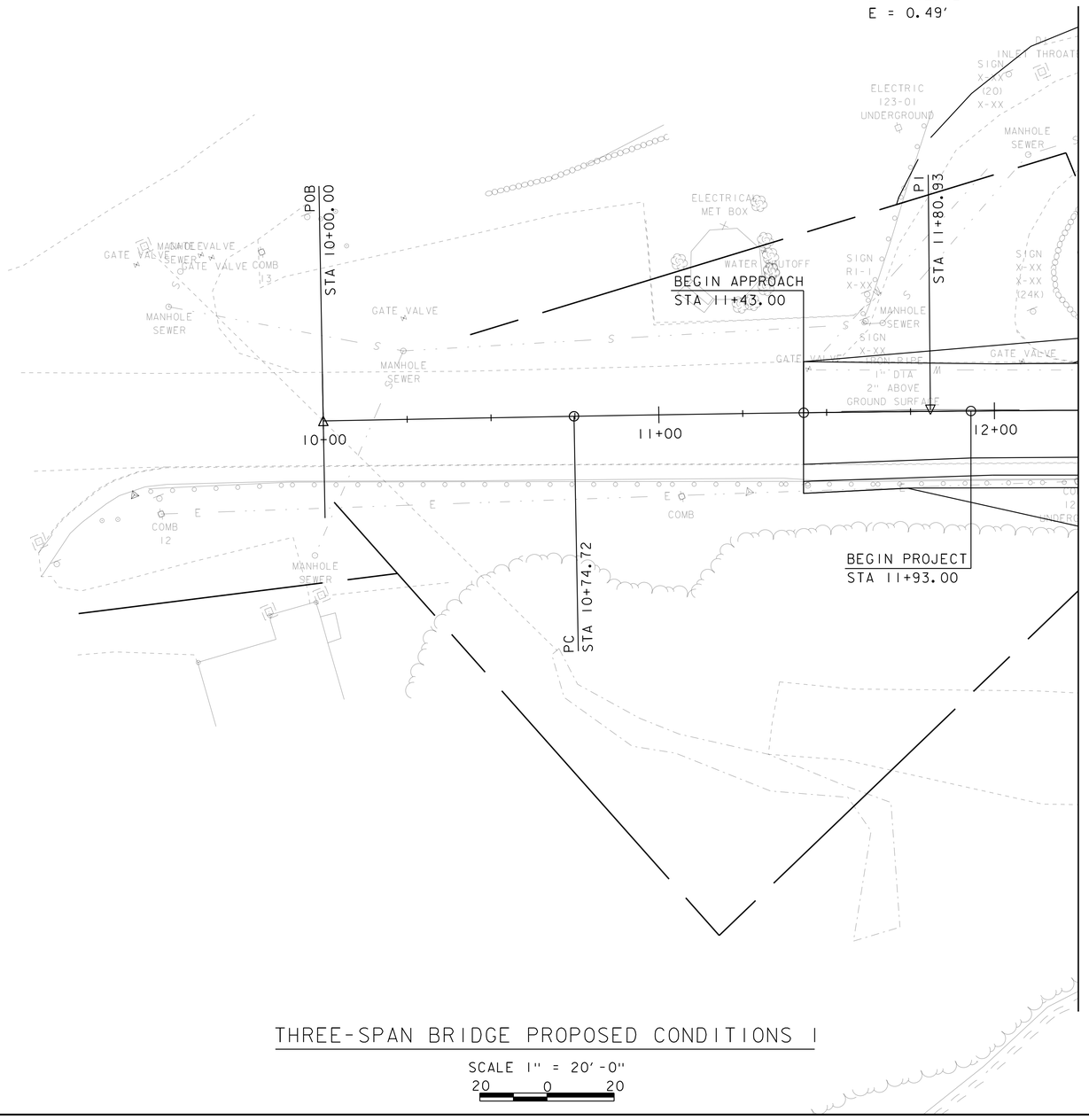
FILE NAME: 13j068\sl3j068typical.dgn
PROJECT LEADER: C.P.WILLIAMS
DESIGNED BY: ----------
TYPICAL SECTIONS

PLOT DATE: 09-OCT-2013
DRAWN BY: O.M.DARISSE
CHECKED BY: ------

N

VT STATE PLANE GRID

PROPOSED CURVE 1
DELTA = 1°03'30"
D = 0°29'54"
R = 11500.00'
T = 106.21'
L = 212.42'
E = 0.49'



THREE-SPAN BRIDGE PROPOSED CONDITIONS 1

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

PROJECT NAME:	READSBORO
PROJECT NUMBER:	BF 0102(16)
FILE NAME: 13c068/sl3c068border.dgn	PLOT DATE: 09-OCT-2013
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: O.M.DARISSE
DESIGNED BY: O.M.DARISSE	CHECKED BY: ------
THREE-SPAN BRIDGE PROPOSED CONDITIONS 1	SHEET 5 OF 41

N

VT STATE PLANE GRID

MATCH LINE STA 12+25.00

MATCH LINE STA 17+50.00

PHELPS LANE
TH 22

MANHOLE
SEWER

PAVED
DRIVE

STONE FILL

18" CGMP
FLOW

SIGN
X-XX

RAIL
FENCE

BEGIN BRIDGE
STA 13+10.00

12" CGMP
FLOW

ELECTRIC PANEL
W/ METER

HYDRANT

VT 100
TO STAMFORD

42°

SIDEWALK

GUY

ROUND

SIGN
X-XX
(40)
X-XX

LIMITS OF
POTENTIAL IMPACTS

PT
STA 12+87.14

CENTERLINE OF PIER
STA 14+17.00

CENTERLINE OF PIER
STA 15+47.00

PC
STA 15+72.56

END BRIDGE
STA 16+67.00

ELECTRICAL
MH BOX

GATE VALVE

SIGN
X-XX
X-XX

SIGN
X-XX
(24K)

DEPOT STREET
TH 4

PI
STA 17+16.96

IRON PIPE
1" DIA
5" ABOVE GROUND SURFACE

BENCH MARK
VTHD SURVEY DISK G33
RESET 1965
ELEV. = 1232.83

WOODS
DRIVE

GRAVEL
DRIVE

COMB
B4
2
50T
160
530
UNDERGROUND

DEERFIELD RIVER
FLOW

13+00 14+00 15+00 16+00 17+00

50+00 51+00 52+00 53+00 54+00

PROPOSED CURVE 2
DELTA = 23° 18' 08"
D = 8° 00' 48"
R = 715.00'
T = 147.43'
L = 290.79'
E = 15.04'

THREE-SPAN BRIDGE PROPOSED CONDITIONS 2

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

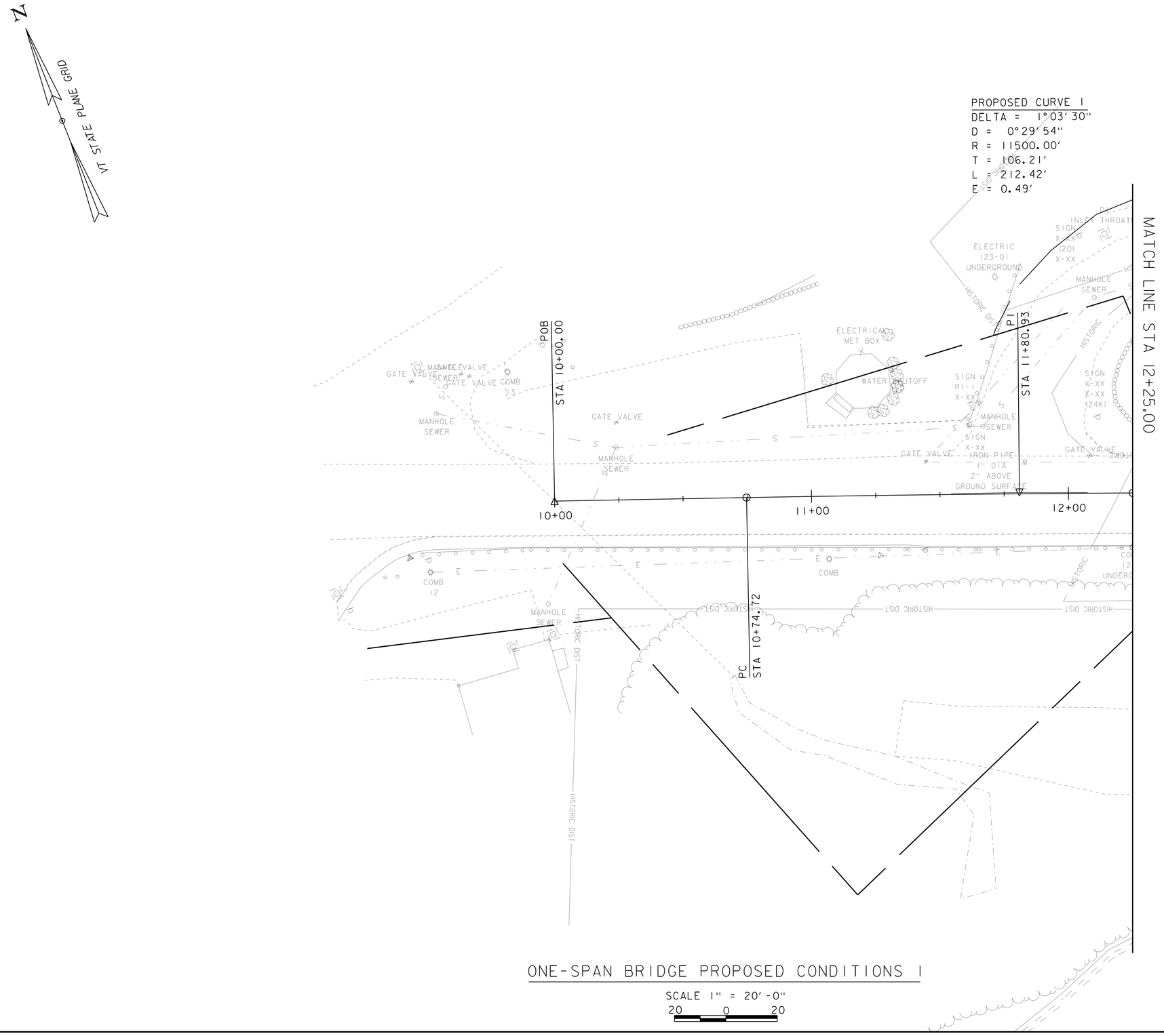
PROJECT NAME:	READSBORO
PROJECT NUMBER:	BF 0102(16)
FILE NAME:	13c068/sl3c068border.dgn
PROJECT LEADER:	C.P.WILLIAMS
DESIGNED BY:	O.M.DARISSE
THREE-SPAN BRIDGE PROPOSED CONDITIONS 2	
PLOT DATE:	09-OCT-2013
DRAWN BY:	O.M.DARISSE
CHECKED BY:	------
SHEET	6 OF 41

THREE-SPAN BRIDGE PROPOSED CONDITIONS 3

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME:	READSBORO
PROJECT NUMBER:	BF 0102(16)
FILE NAME: l3c068/sl3c068border.dgn	PLOT DATE: 09-OCT-2013
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: O.M.DARISSE
DESIGNED BY: O.M.DARISSE	CHECKED BY: ------
THREE-SPAN BRIDGE PROPOSED CONDITIONS 3	SHEET 7 OF 41



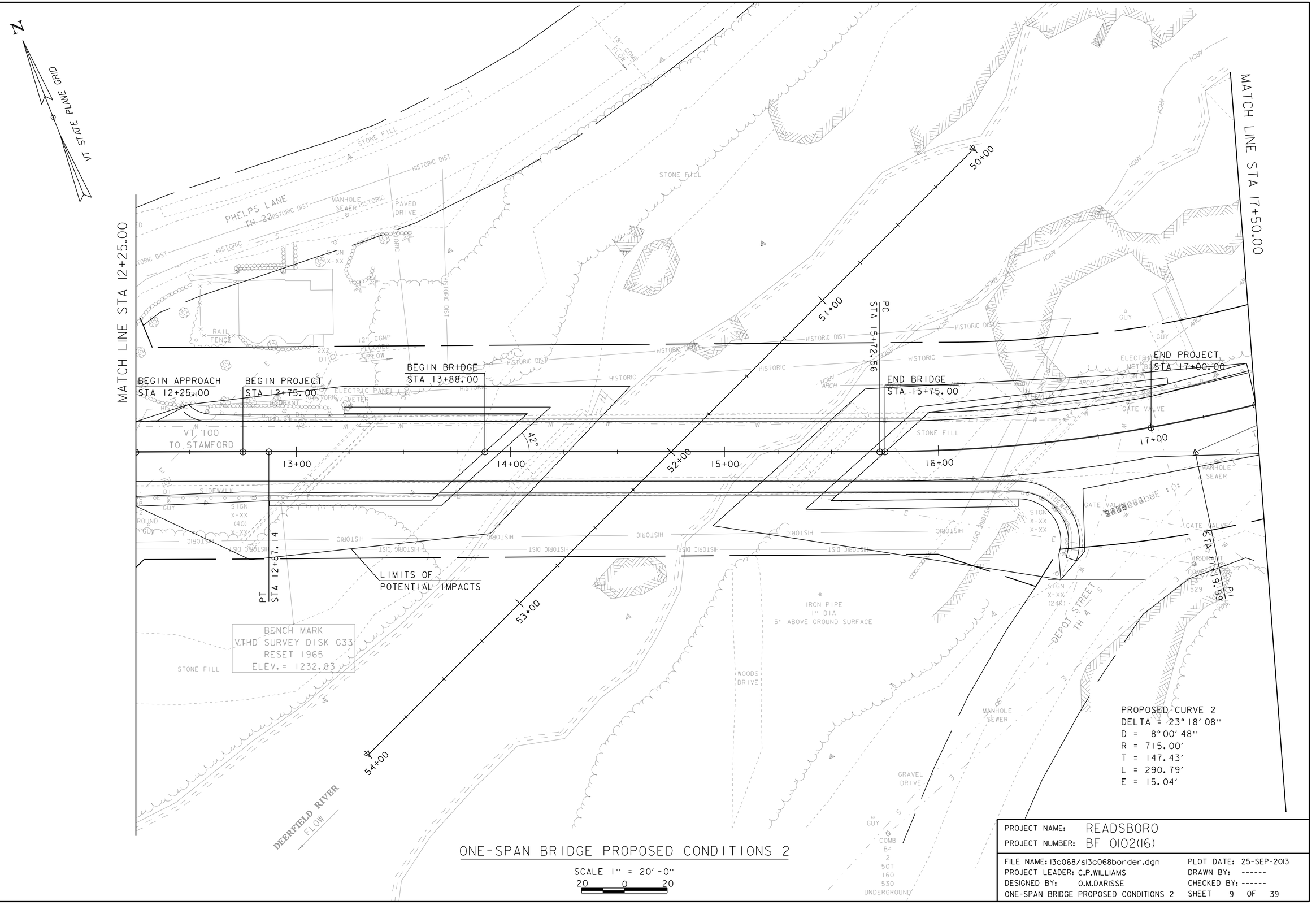
ONE-SPAN BRIDGE PROPOSED CONDITIONS 1

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME:	READSBORO
PROJECT NUMBER:	BF 0102(16)

FILE NAME: 13c068/sl3c068border.dgn	PLOT DATE: 25-SEP-2013
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: O.M.DARISSE
DESIGNED BY: O.M.DARISSE	CHECKED BY: ------
ONE-SPAN BRIDGE PROPOSED CONDITIONS 1	SHEET 8 OF 39

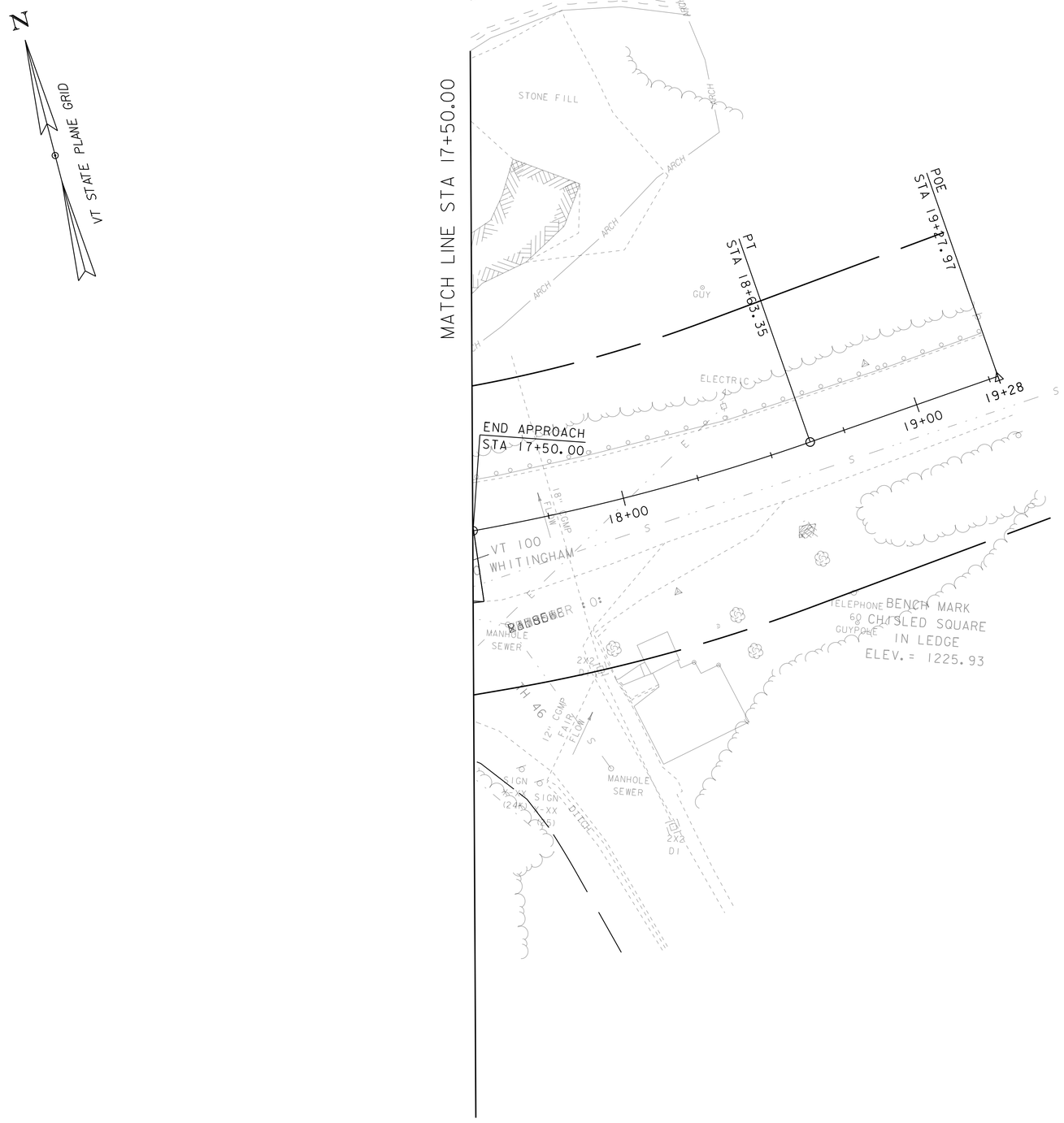


ONE-SPAN BRIDGE PROPOSED CONDITIONS 2

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME:	READSBORO
PROJECT NUMBER:	BF 0102(16)
FILE NAME: l3c068/sl3c068border.dgn	PLOT DATE: 25-SEP-2013
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: ------
DESIGNED BY: O.M.DARISSE	CHECKED BY: ------
ONE-SPAN BRIDGE PROPOSED CONDITIONS 2	SHEET 9 OF 39



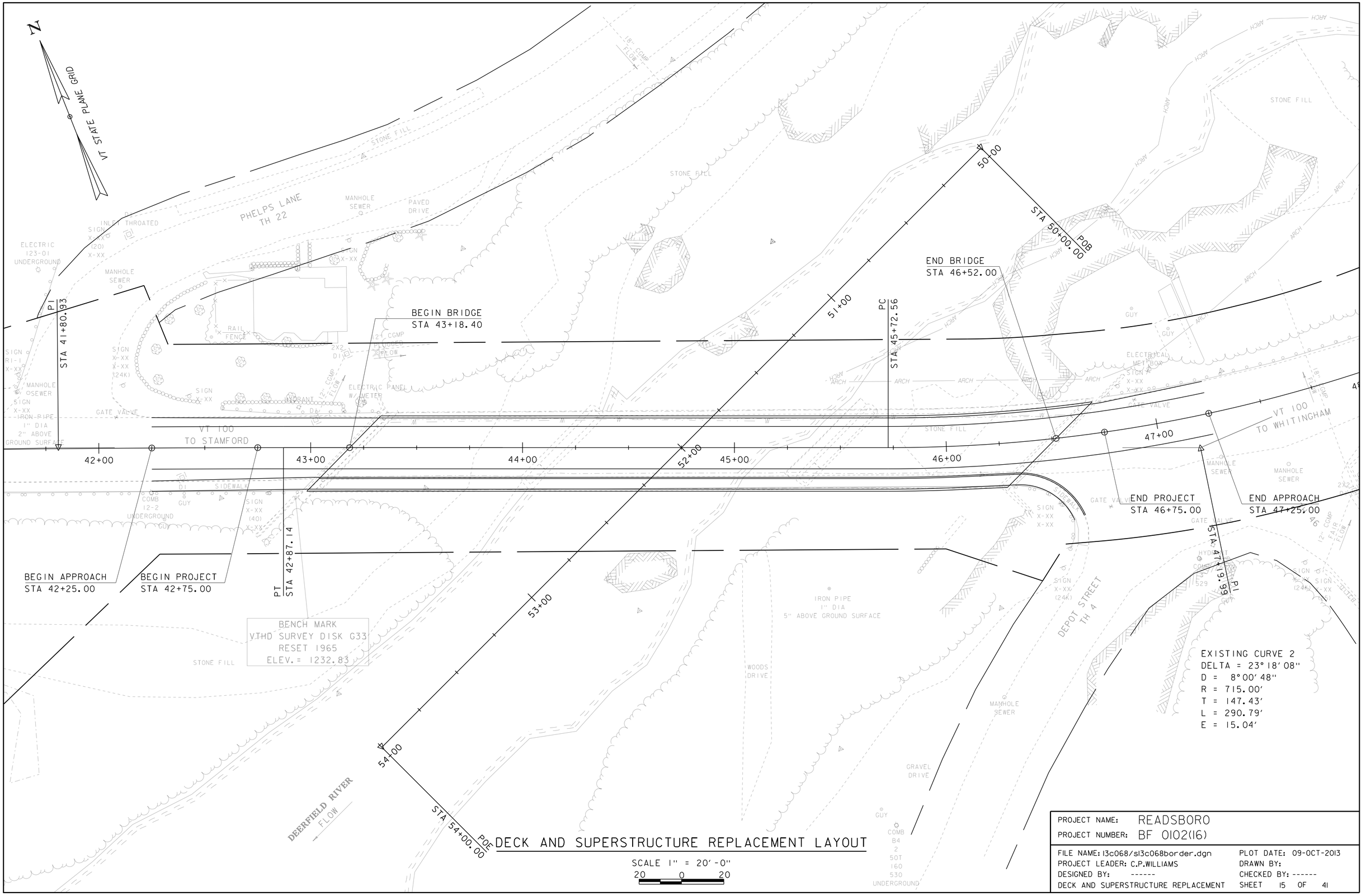
ONE-SPAN BRIDGE PROPOSED CONDITIONS 3

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME:	READSBORO
PROJECT NUMBER:	BF 0102(16)

FILE NAME: l3c068/sl3c068border.dgn	PLOT DATE: 25-SEP-2013
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: O.M.DARISSE
DESIGNED BY: O.M.DARISSE	CHECKED BY: ------
ONE-SPAN BRIDGE PROPOSED CONDITIONS 3	SHEET 10 OF 39

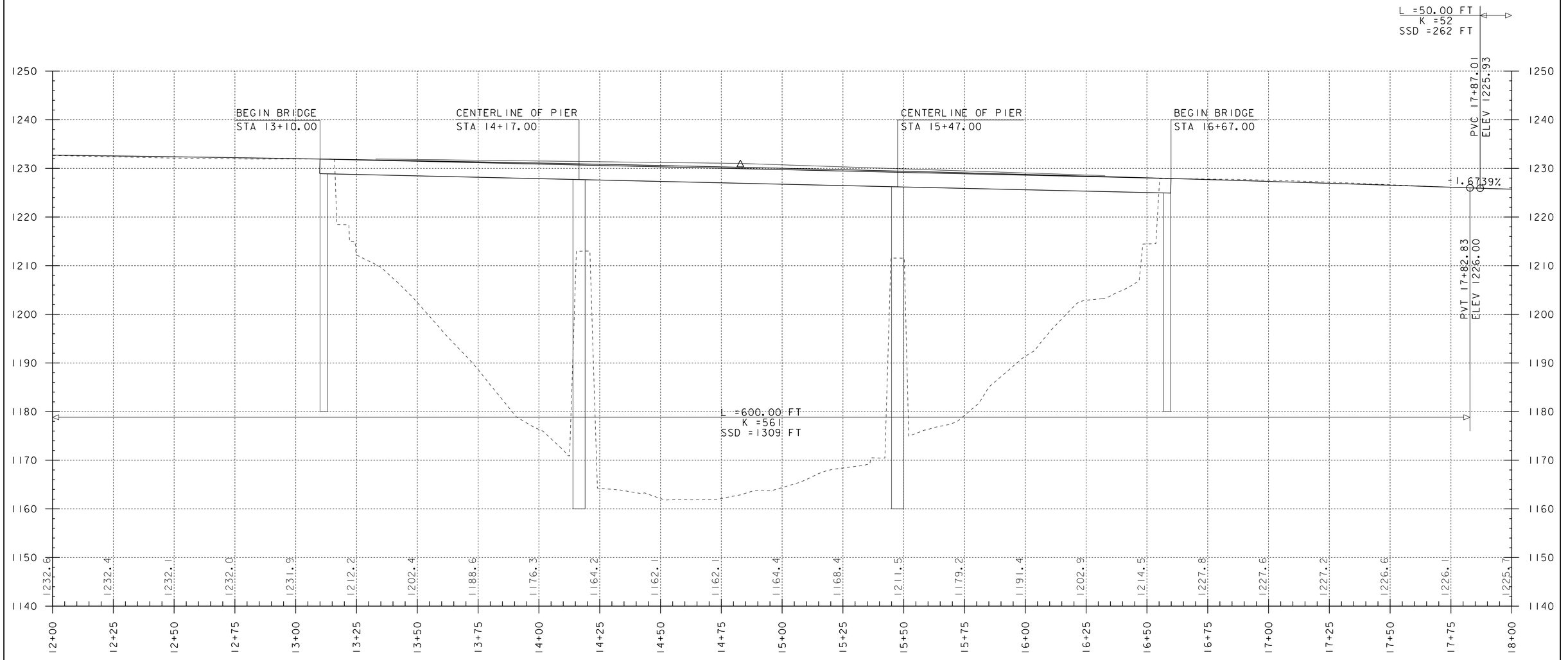


DECK AND SUPERSTRUCTURE REPLACEMENT LAYOUT

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME:	READSBORO
PROJECT NUMBER:	BF 0102(16)
FILE NAME: 13c068/sl3c068border.dgn	PLOT DATE: 09-OCT-2013
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY:
DESIGNED BY: ------	CHECKED BY: ------
DECK AND SUPERSTRUCTURE REPLACEMENT	SHEET 15 OF 41



THREE SPAN BRIDGE VT 100 PROFILE 1

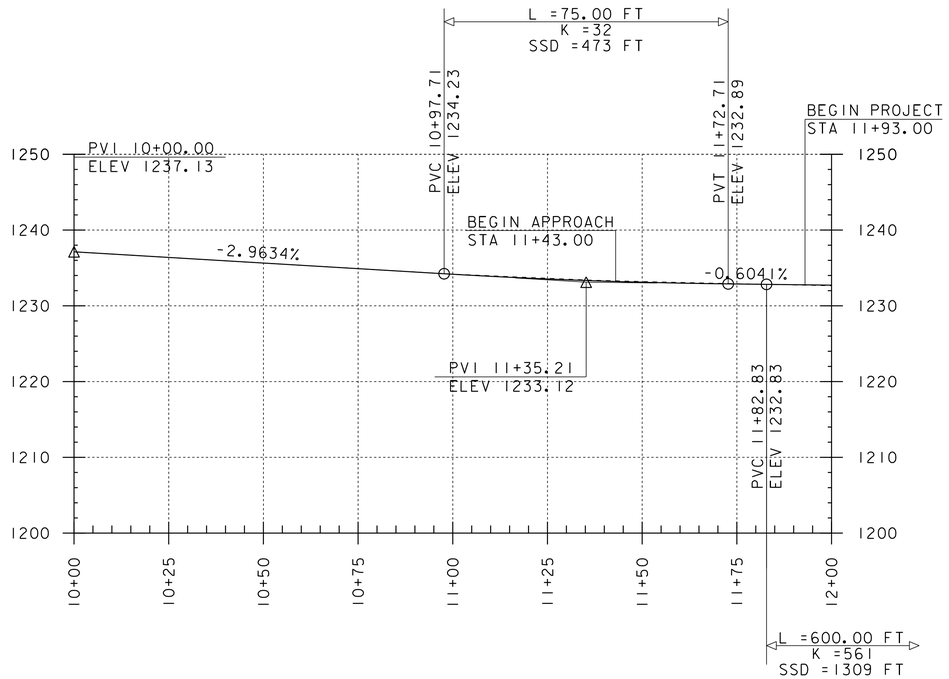
SCALE: HORIZONTAL 1"=20'-0"
VERTICAL 1"=10'-0"

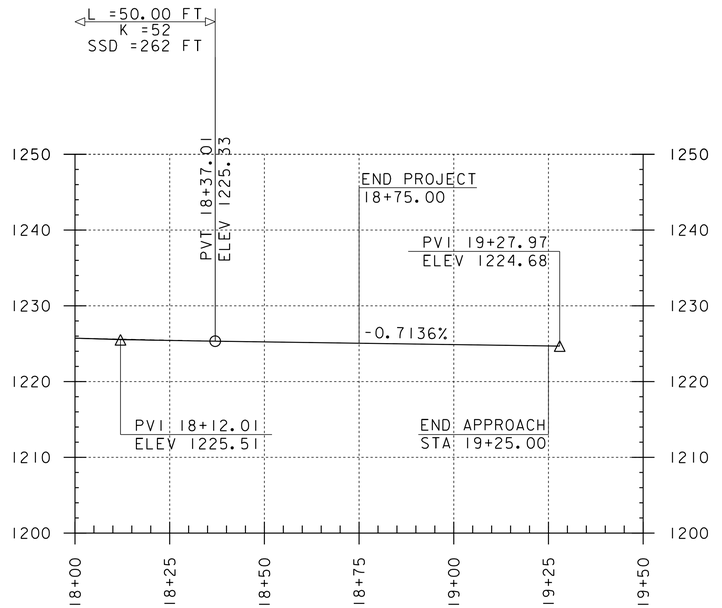
NOTE:

GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: READSBORO	
PROJECT NUMBER: BO 0102(16)	
FILE NAME: l3c068/sl3c068profile.dgn	**PLOT DATE:** 10-OCT-2013
PROJECT LEADER: C.P.WILLIAMS	**DRAWN BY:** O.M.DARISSE
DESIGNED BY: ------	**CHECKED BY:** ------
THREE-SPAN BRIDGE PROFILE 1	**SHEET** 1 **OF** 1





THREE SPAN BRIDGE VT 100 PROFILE 2

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

NOTE:

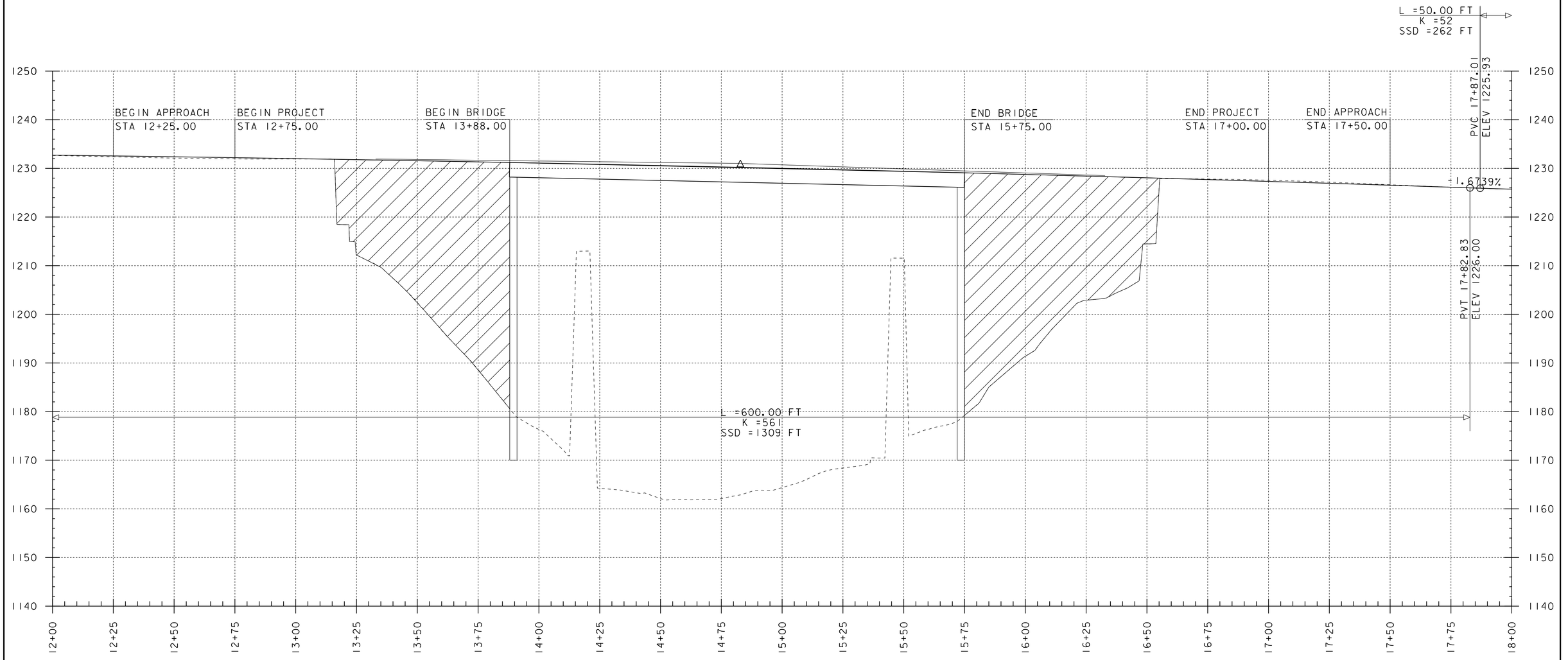
GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: READSBORO
PROJECT NUMBER: BO 0102(16)

FILE NAME: 13c068/sl3c068profile.dgn
PROJECT LEADER: C.P.WILLIAMS
DESIGNED BY: ------
THREE-SPAN BRIDGE PROFILE 2

PLOT DATE: 25-SEP-2013
DRAWN BY: O.M.DARISSE
CHECKED BY: ------
SHEET 12 **OF** 39



ONE-SPAN BRIDGE VT 100 PROFILE 1

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

NOTE:

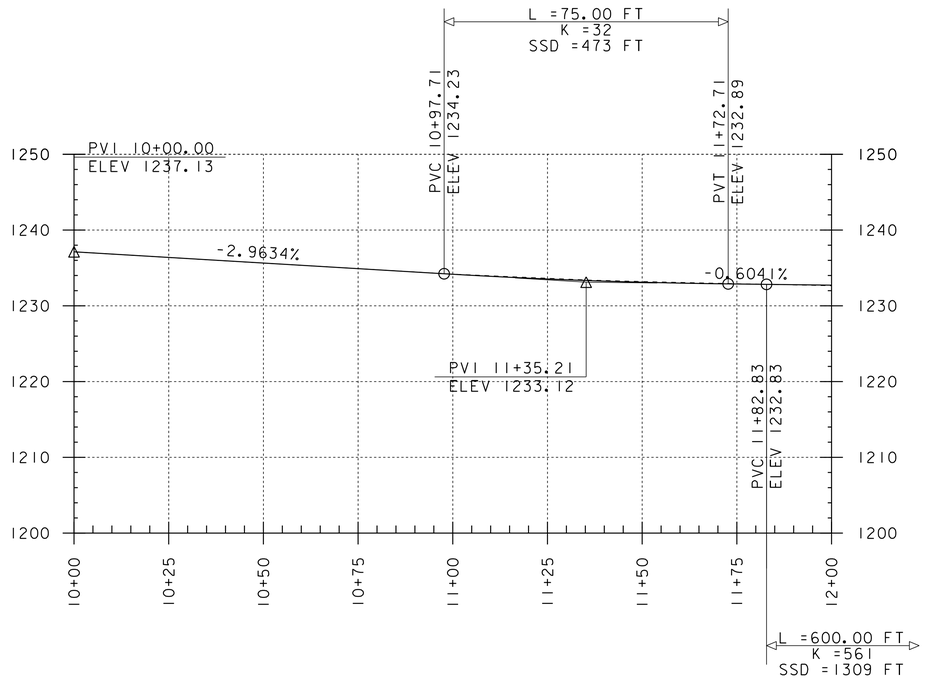
GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

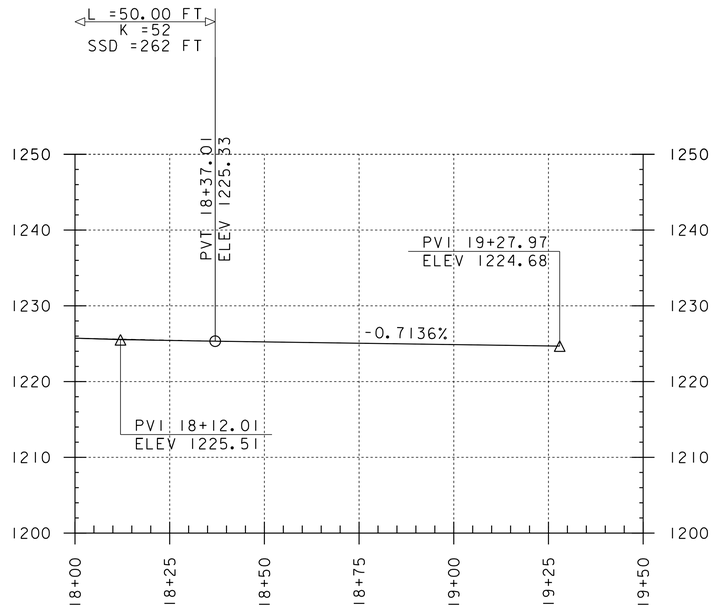
GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: READSBORO
PROJECT NUMBER: BF 0102(16)

FILE NAME: 13c068/sl3c068profile.dgn
PROJECT LEADER: C.P.WILLIAMS
DESIGNED BY: ------
ONE-SPAN BRIDGE PROFILE 1

PLOT DATE: 25-SEP-2013
DRAWN BY: D.D.BEARD
CHECKED BY: ------
SHEET 13 OF 39





ONE-SPAN BRIDGE VT 100 PROFILE 2

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

NOTE:

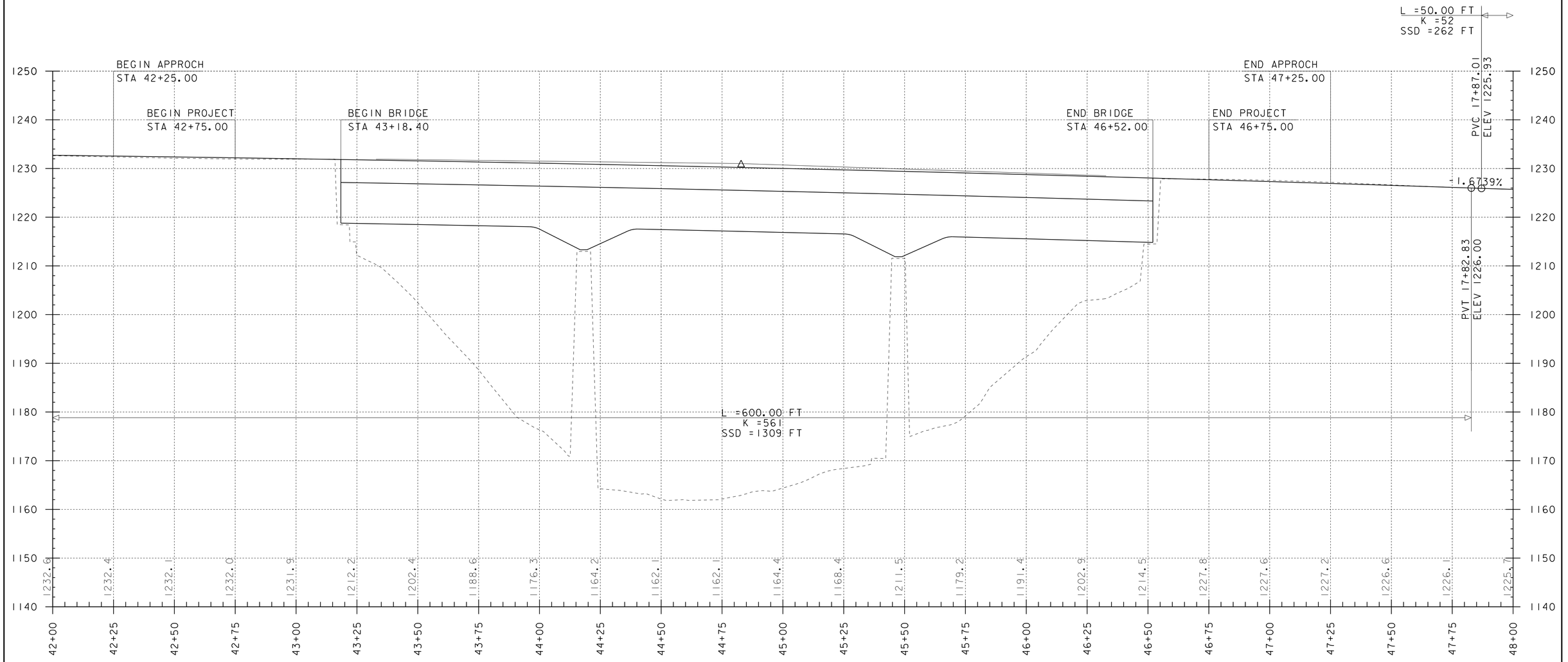
GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: READSBORO
PROJECT NUMBER: BF 0102(16)

FILE NAME: 13c068/sl3c068profile.dgn
PROJECT LEADER: C.P.WILLIAMS
DESIGNED BY: ------
ONE-SPAN BRIDGE PROFILE 2

PLOT DATE: 25-SEP-2013
DRAWN BY: D.D.BEARD
CHECKED BY: ------
SHEET 14 OF 39



DECK AND SUPERSTRUCTURE REPLACEMENT PROFILE

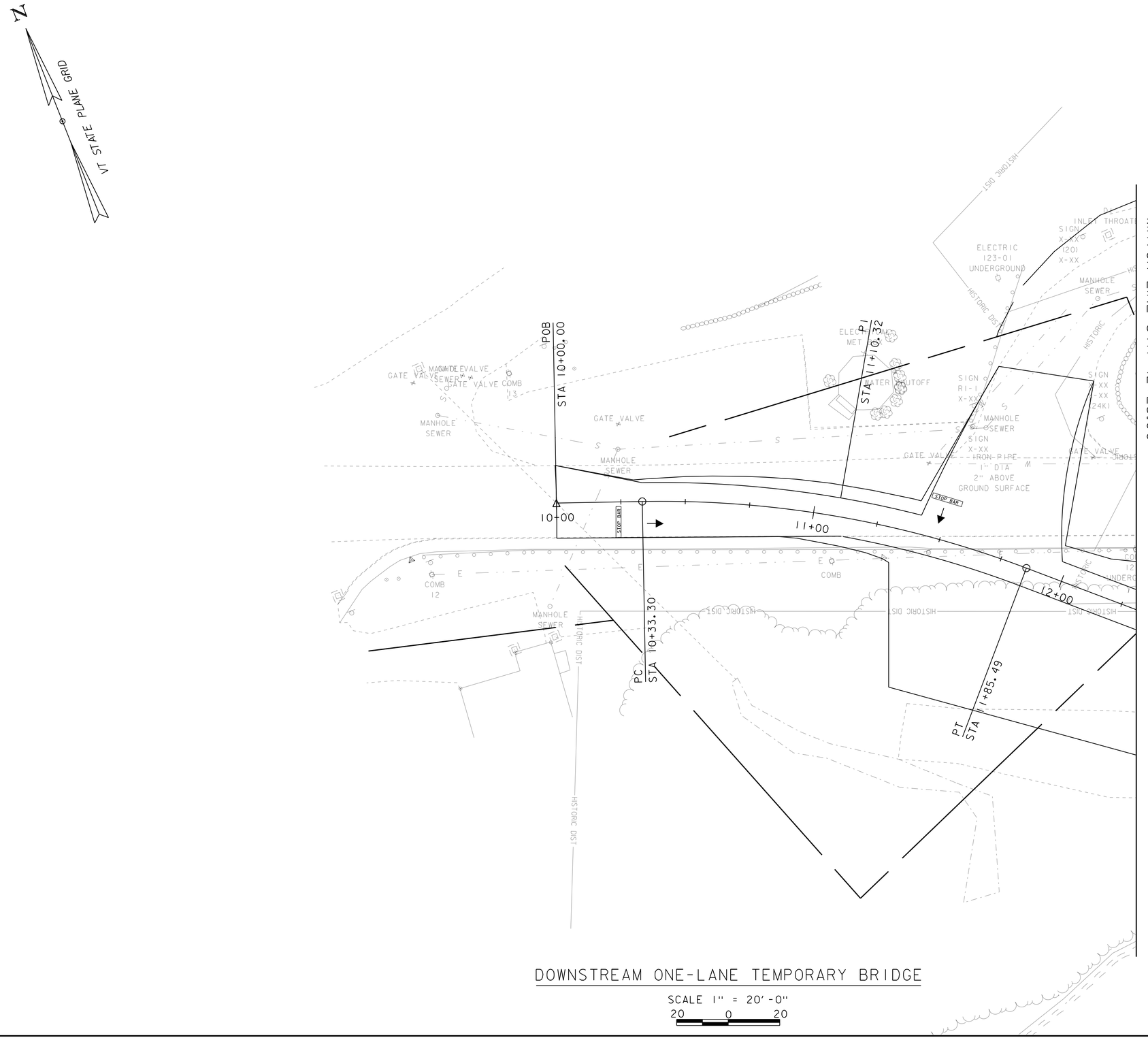
SCALE: HORIZONTAL 1"=20'-0"
VERTICAL 1"=10'-0"

NOTE:

GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: READSBORO	
PROJECT NUMBER: BF 0102(16)	
FILE NAME: 13c068/sl3c068profile.dgn	PLOT DATE: 09-OCT-2013
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
DECK REPLACEMENT PROFILE	SHEET 16 OF 41

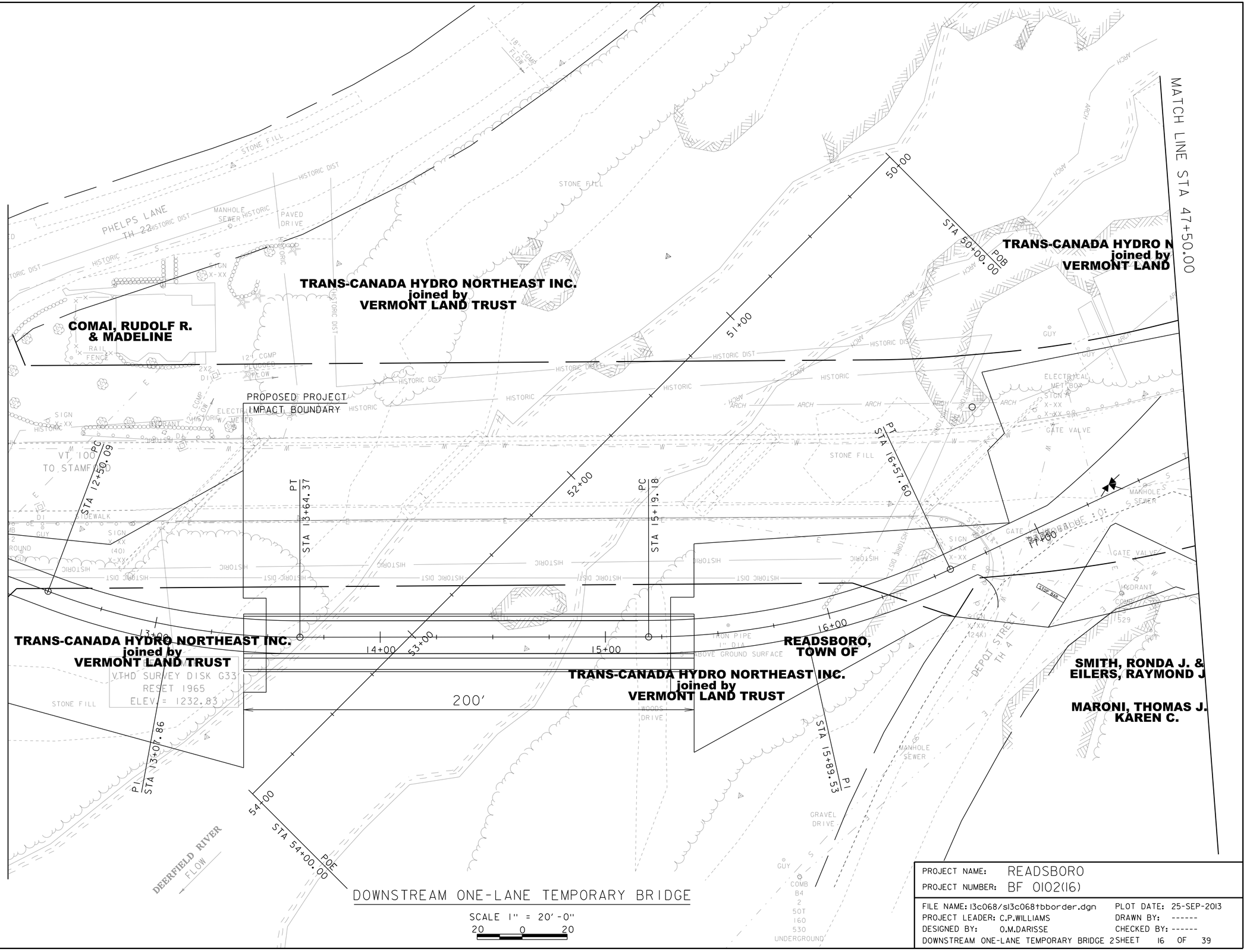


DOWNSTREAM ONE-LANE TEMPORARY BRIDGE

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME:	READSBORO
PROJECT NUMBER:	BF 0102(16)
FILE NAME: l3c068/sl3c068tbborder.dgn	PLOT DATE: 25-SEP-2013
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: O.M.DARISSE
DESIGNED BY: O.M.DARISSE	CHECKED BY: ------
DOWNSTREAM ONE-LANE TEMPORARY BRIDGE I	SHEET 15 OF 39

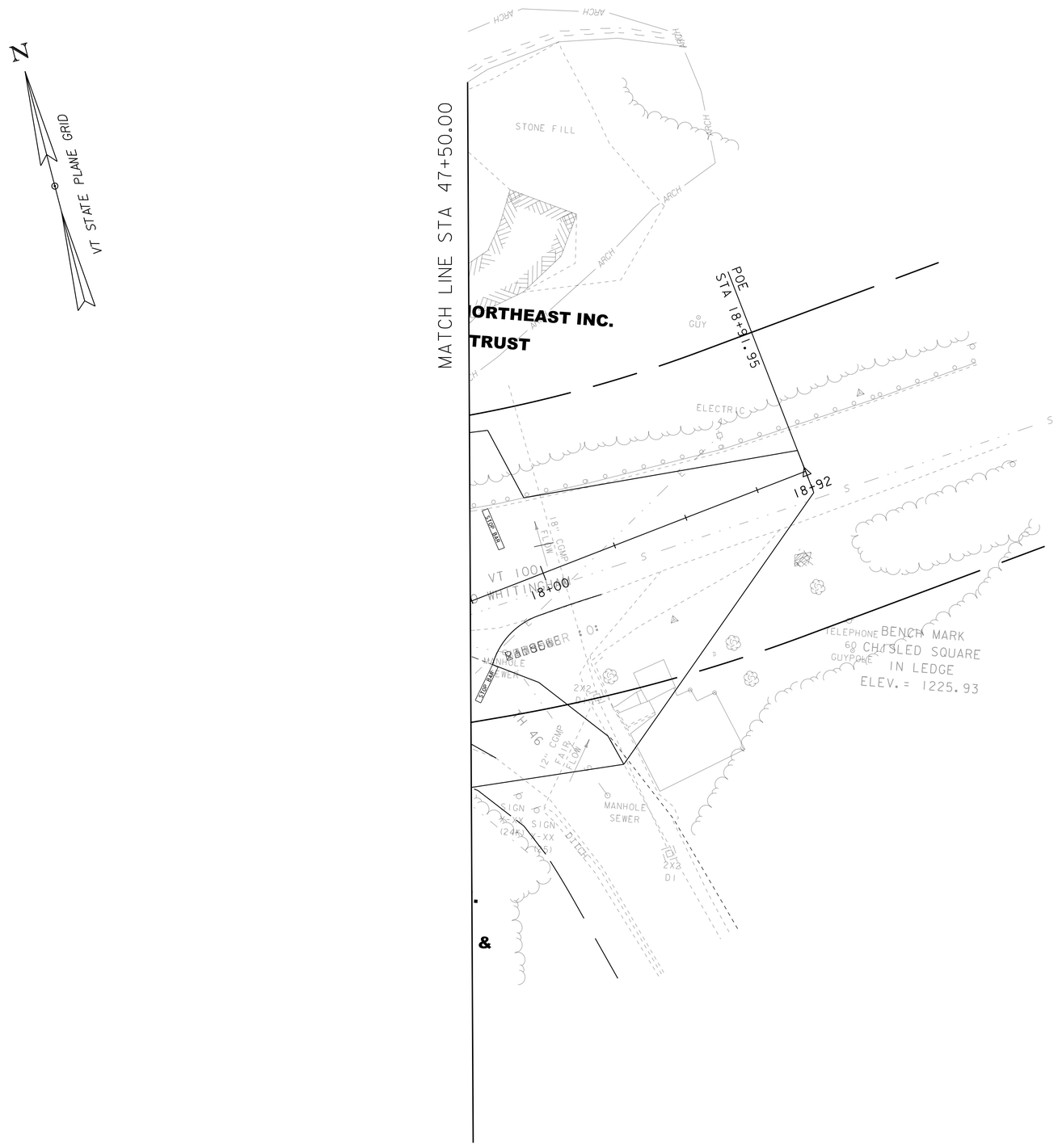


DOWNSTREAM ONE-LANE TEMPORARY BRIDGE

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME:	READSBORO
PROJECT NUMBER:	BF 0102(16)
FILE NAME:	I3c068/sI3c068tbborder.dgn
PROJECT LEADER:	C.P.WILLIAMS
DESIGNED BY:	O.M.DARISSE
DOWNSTREAM ONE-LANE TEMPORARY BRIDGE 2	
PLOT DATE:	25-SEP-2013
DRAWN BY:	------
CHECKED BY:	------
SHEET	16 OF 39



DOWNSTREAM ONE-LANE TEMPORARY BRIDGE

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME:	READSBORO
PROJECT NUMBER:	BF 0102(16)

FILE NAME: l3c068/sl3c068tbborder.dgn	PLOT DATE: 25-SEP-2013
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: O.M.DARISSE
DESIGNED BY: O.M.DARISSE	CHECKED BY: ------
DOWNSTREAM ONE-LANE TEMPORARY BRIDGE 3	SHEET 17 OF 39