Scoping Report for Warren BRF 013-4(32) Bridge #166 on VT Route 100 over the Mad River

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Site Information

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.

Existing Conditions

Roadway Classification	Rural Minor Arterial
Bridge Type	Single Span Rolled Beam, Concrete Deck with Pavement
Span Length	71’
Bridge Skew	45° with curtain walls

Design Parameters

Parameter	Existing Condition	Minimum Standard	Comment
Approach Lane and Shoulder Widths	11’/3’ (28’)	11’/4’ (30’)	Substandard
Bridge Lane and Shoulder Widths	11’/1’ (24’)	11’/4’ (30’)	Substandard
Clear Zone Distance	3’ behind guardrail	16’ fill / 10’ cut	
Banking		8% (max)	
Speed	50 mph (Posted)	50 mph(Design)	
Horizontal Alignment	Straight (3° curve on record plans)		
Vertical Grade	3% crest curve on record plans	5% (max)	
K Values for Vertical Curves		110 crest / 90 sag	
Vertical Clearance Issues	None noted	14’-3” (min)	
Horizontal Stopping Sight Distance	560’	425’	
Bicycle/Pedestrian Criteria		minimum 4’ paved shoulder[1]	Substandard
Bridge Railing	Concrete post with retrofit W-beam	TL-3	Substandard

[1] Includes additional 1’ for bridges.

Traffic

TRAFFIC DATA	2014	2034	2054
AADT	1100	1200	~
DHV	140	160	~
ADTT	65	110	~
%T	5.6	8.7	~
%D	55	55	~
FLEXIBLE ESALS:	~	**2014~ 2034** 378,000	**2014~ 2054** 873,000

Deficiencies

Structural Capacity of the Bridge Deck
Structural Stability of the Bridge Substructure
Substandard Bridge Rail
Travel Width on the Bridge

Inspection Report Information

Bridge Deck Rating	4 Poor
Superstructure Rating	6 Satisfactory
Substructure Rating	4 Poor
Channel Rating	6 Satisfactory

Inspection Summary

"06/09/2011 - Bridge deck is in poor condition with chronic maintenance requirements to address full depth holes. Bridge needs major reconstruction or full replacement. In the interim, the bridge rail needs repair to correct severe section loss along the posts and parapet. ~ MJ/DK"

Hydraulics

"This structure meets current hydraulic design standards and provides more than the required 1' of freeboard at the design storm. Contraction scour was calculated as less than 1' at all flows up to Q500."

Utilities

No overhead or underground utilities documented in the area.

Resources

Wetlands

"Potential wetlands exist in the northeastern quadrant of the project. Further review may be needed in this location if this area cannot be avoided."

Species / Habitats of Special Concern

"No [Rare, Threatened or Endangered] species are mapped within the project area. As this is a bridge project aquatic organism passage is not an issue. There are existing mapped deer yards on the eastern side of the roadway."

Agricultural Soils / Floodplains

"Adams Fine Sandy Loam soils are located in the southeastern quadrant and are statewide significant soils. No other prime or statewide soils are within the project area."

Archaeological Issues

"A field visit conducted on 6/15/2011 was adequate to identify potential resources within the project area. Background research shows that there were no historic mills or structures within the project area. A prehistoric archaeological site is unlikely given the environmental and topographical features of the area. There are no concerns for archaeology."

Historic Resources

"There are no above-ground historic properties in the project area and Section 4(f) is N/A."

6f Properties

None present.

Natural Resource Identification

"As this project is located within the US National Forest tree clearing should be limited."

Stormwater

No issues noted.

Alternatives

Maintenance of Traffic Options

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 the duration 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. We will be considering the closure option on most projects as we develop this approach to construction and/or rehabilitating bridge projects. 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:

1. **One-way control without traffic signals**

   This is not valid in this location. The 560' of stopping sight distance is not adequate on the south end of structure for a stop condition at the end of the bridge. The stopping sight distance required is calculated by adding a decision sight distance of 10 seconds, or 730', to the emergency stopping sight distance of 425' and getting 1155', which is larger than the currently existing sight distance.

2. **One-way control with traffic signals**

   Bridge < 100', DHV < 830, ADT < 6500. This is an acceptable option. This option could be used with phased construction or a one-way temporary bridge.

3. **Phased Construction**

   Phased construction is the maintenance of one lane of two-way traffic on the existing bridge while building one lane of the proposed structure. The cons of phased construction are the increased cost and complexity, decreased safety and the greater potential for decreased serviceability of the proposed structure. However, the option is usually considered when the pros include reduced impacts to resources and decreased costs and development time by not requiring the purchase of additional ROW. Phased construction is not possible in this location without widening the proposed bridge beyond that required by standards, shifting the centerline of the proposed structure relative to the existing centerline, or utilizing a temporary structure during construction. Widening the proposed bridge and shifting the proposed centerline would either have greater impacts on the river channel and other resources, extend outside of the Right of Way (ROW) or include costly retaining structures to avoid those scenarios. Since these options would remove the pros of phased construction, only utilizing a one-lane temporary bridge within the existing ROW will be considered with phased construction.

4. **One and two lane two-way temporary bridges**

   This is a possibility on the downstream side of the bridge. Since the Mad River runs adjacent to the roadway on the southwestern side of the bridge there is no room to place a temporary bridge on the upstream side of the bridge. An off alignment temporary bridge should be considered only as a last option at this site because of the sensitive lands and mature trees adjacent to the project.

5. **Off-project detour**

   Any detour utilizing only state routes would have an end to end distance in excess of 60 miles. This option would not usually be considered with these numbers but will be because of the concerns with placing a temporary bridge at this site. There are local roads which bypass this bridge. Based on the "Gravel Road Capacity Analysis"[2], the section of gravel road that bypasses this project site could handle between 600 and 800 vehicles per day on a permanent basis. It is

[2] Developed by the Livingston County Department of Planning in Michigan. http://www.co.livingston.mi.us/planning/PDFs/1%20Gravel%20Road%20Capacity%20Analysis.pdf

conceivable that a higher number could be supported for a short duration. In either scenario, this bypass route would likely see increased traffic if VT 100 were closed during construction.

Discussion

1. Do Nothing

This option is not being considered. There is no plan to close VT 100 in this location and VT 100 cannot safely convey the travelling public in this location without doing anything.

2. Repair/Rehabilitation

No repair options are being considered. The deck and substructure would require so much patching that it would be more desirable to replace them. The beams could be saved, but there is no good reason to save 70 year old beams sandwiched between a new deck and substructure.

3. Complete Replacement

This is the only option being considered. The existing horizontal and vertical alignments meet current standards; therefore, no off-alignment options will be considered because of the additional expense and impacts associated with realigning a roadway. The various considerations under this option include: the bridge width and length, skew, superstructure type and substructure type.

a. Bridge Width

The current rail to rail width is substandard by 6' on the bridge. Since a new 75+ year bridge is being proposed in this location, the bridge geometry should meet the minimum standards. Meeting the minimum roadway width through the length of the project can be achieved by increased embankment widths and the use of retaining structures where it is more cost-effective than obtaining additional ROW or encroaching in the river (see plan sheets).

b. Bridge Length and Skew

The existing bridge is 71' long and skewed 45° to accommodate the stream crossing. This skew was introduced around 1938, when the stream channel was realigned with the construction of the then new bridge. This configuration is deemed hydraulically adequate and there is no indication that we would want to decrease this distance. Thus, this length and skew should be the baseline for consideration.

However, the preferred substructure type is an integral abutment. Integral abutments do not accommodate skews over 20° well. By increasing the design span to 85', the skew can be reduced to 20°; and by increasing the span to 100', the skew can be eliminated while maintaining the hydraulic clearance and providing a simple square superstructure and integral abutment substructure.

The Strategic Highway Research Program 2 (SHRP2) design tables provide length cutoffs of 40, 70, 100 and 130 feet. Thus, the same typical section would be used for any option

between 71’ and 100’. While the skewed structure would have increased cost and complexity associated with a similar square structure of that length, the savings in material costs between and 85’ and 100’ superstructure will outweigh those disadvantages. The increase in substructure costs for the skewed 85’ bridge option is minimal for this site. Therefore, the bridge option considered will be the 85’ long with a 20° skew bridge.

c. Superstructure Type

The possible 85’ span length bridge types are steel and composite concrete deck and prestressed decked tees. Both of these prefabricated items are listed in the SHRP2 examples, but based on past projects in Vermont, the comfort level is higher and thus the costs should be lower for the steel and composite concrete deck bridge type. The lifting weights associated with 85’ long concrete structures would also be significant.

d. Substructure Type

The existing structure appears to be a skeletal abutment founded approximately 20’ below finished grade. While there are large boulders and visible ledge in the location of the project, the record plans provide a boring log showing layers of sand and gravel and fine sand for approximately 70’ below finished grade. This should be conducive for an integral abutment at this location. Any rapid construction alternative should have sufficient subsurface information to verify the in-situ conditions.

Costs

As mentioned previously, the Do Nothing and the Repair/Rehabilitation options are not being considered.

	Road Closed	One-lane Temporary Bridge On Alignment	One-lane Temporary Bridge Off Alignment	Two-lane Temporary Bridge Off Alignment
Bridge Cost	$700,000	$736,000	$700,000	$700,000
Removal of Structure	$40,000	$42,000	$40,000	$40,000
Channel Work	$20,000	$20,000	$20,000	$20,000
Roadway	$300,000	$300,000	$300,000	$300,000
Erosion Control	$20,000	$30,000	$45,000	$60,000
Temporary Bridge	$0	$80,000	$150,000	$250,000
Construction Costs	$1,080,000	$1,208,000	$1,255,000	$1,370,000
Construction Duration	3 months	18 months	18 months	18 months
Preliminary Engineering	$216,000	$242,000	$251,000	$274,000
Right of Way	$0	$0	$88,000	$96,000
Construction Engineering	$216,000	$302,000	$377,000	$411,000
Engineering Costs	$432,000	$544,000	$716,000	$781,000
Project Development Duration	1 year	1 year	3 years	3 years
Total Costs	$1,512,000	$1,752,000	$1,971,000	$2,151,000
Premium		15.9%	30.4%	42.3%

Conclusion

Remaining Considerations

The drawbacks of utilizing off-alignment temporary bridges at this location include the following. There is a 30 to 40 percent cost premium for these options. The impacts to sensitive lands would be increased. Going through the ROW and permitting process necessary to construct off-alignment temporary bridges in this location could add years to the project delivery process. Because of the critical status of the bridge, prolonging the project delivery process may necessitate an emergency closure or emergency repairs. In addition, there is no structural or safety benefit as opposed to closing the road. Thus, the off-alignment temporary bridges will not be considered further.

The remaining options to consider are closing the road for one to two weeks to perform a complete bridge replacement or paying a 16% premium to maintain traffic on the existing road. Phased construction with an adjacent temporary bridge is something that contractors attempt to avoid, because it can create a less working condition; necessitate complex earth retention systems for construction; and will increase the project duration since every task has to be performed at least twice and a temporary bridge needs to be installed. Since the duration of construction is increased, the time that the travelling public is exposed to modified and varying traffic patterns is increased. In addition to creating less safe working conditions, this longer exposure to varying phased construction decreases the safety of the travelling public. While it may seem contraindicative based on past practice, it is believed that the shorter duration, longer detour scenario provides more benefit for the cost than the longer duration, existing alignment scenario.

Proposal

Ergo, the recommendation is to go with the least expensive, safest and smallest impact alternative, which is closing the road in order to construct a new structure at this location. The contracting should include a two week closure period with incentives for opening the road within a week and disincentives for longer duration closures. In order to accomplish work within the roadway, such as guardrail, paving and driving piles, a lane rental agreement[3] should be included in the contract as well.

[3] Assigning costs to the amount of time that a Contractor is closing a lane of traffic to work on the project.

Appendices

- Pictures
- Plans
    - Proposal
        - Typical Sections
        - Layout
        - Profile
    - Phased Construction without Temporary Bridge
    - One-lane Temporary Bridge On Alignment
    - One and Two Lane Temporary Bridge Off Alignment
- Bridge Inspection Report
- Hydraulics Memo
- Natural Resources Memo
- Archeology Memo
- Historic Memo

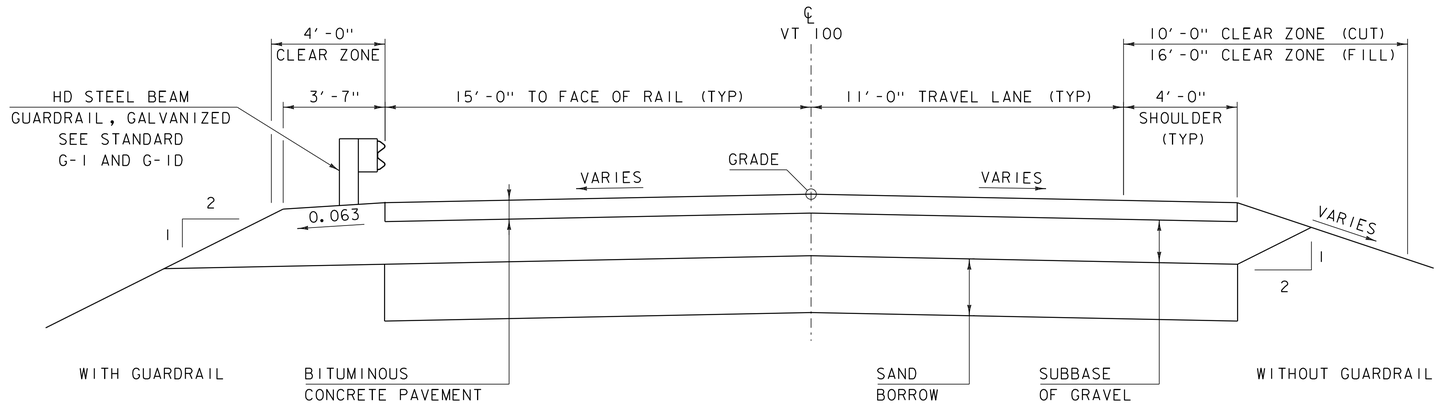
Pictures

Picture 1: Deck, curb and railing issues as seen from the top

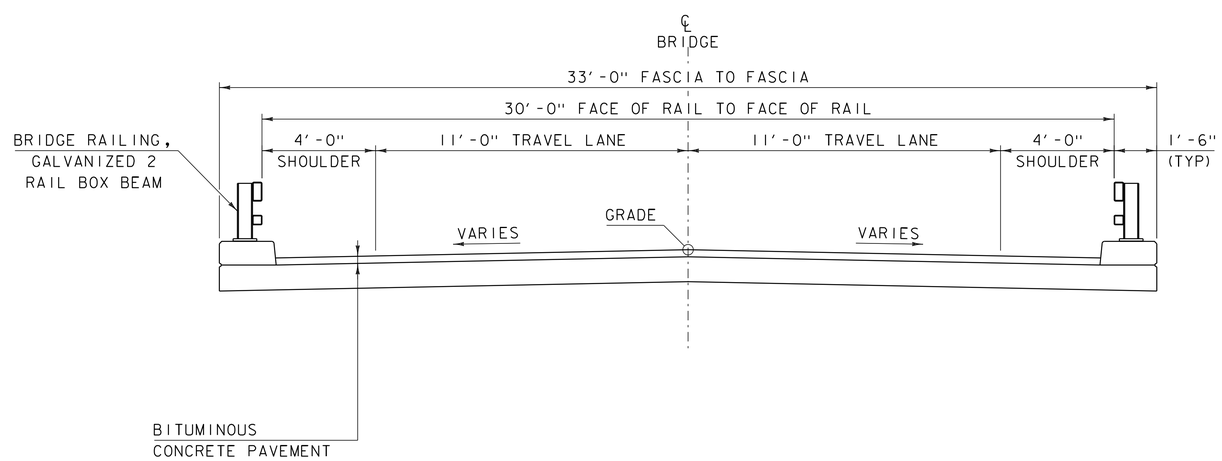
Picture 2: Deck and beam issues as seen from the bottom

Picture 3: Beam and Abutment issues

Picture 4: Natural resources (trees) adjacent to the bridge



PROPOSED VT 100 TYPICAL SECTION



PROPOSED BRIDGE TYPICAL SECTION

MATERIAL TOLERANCES

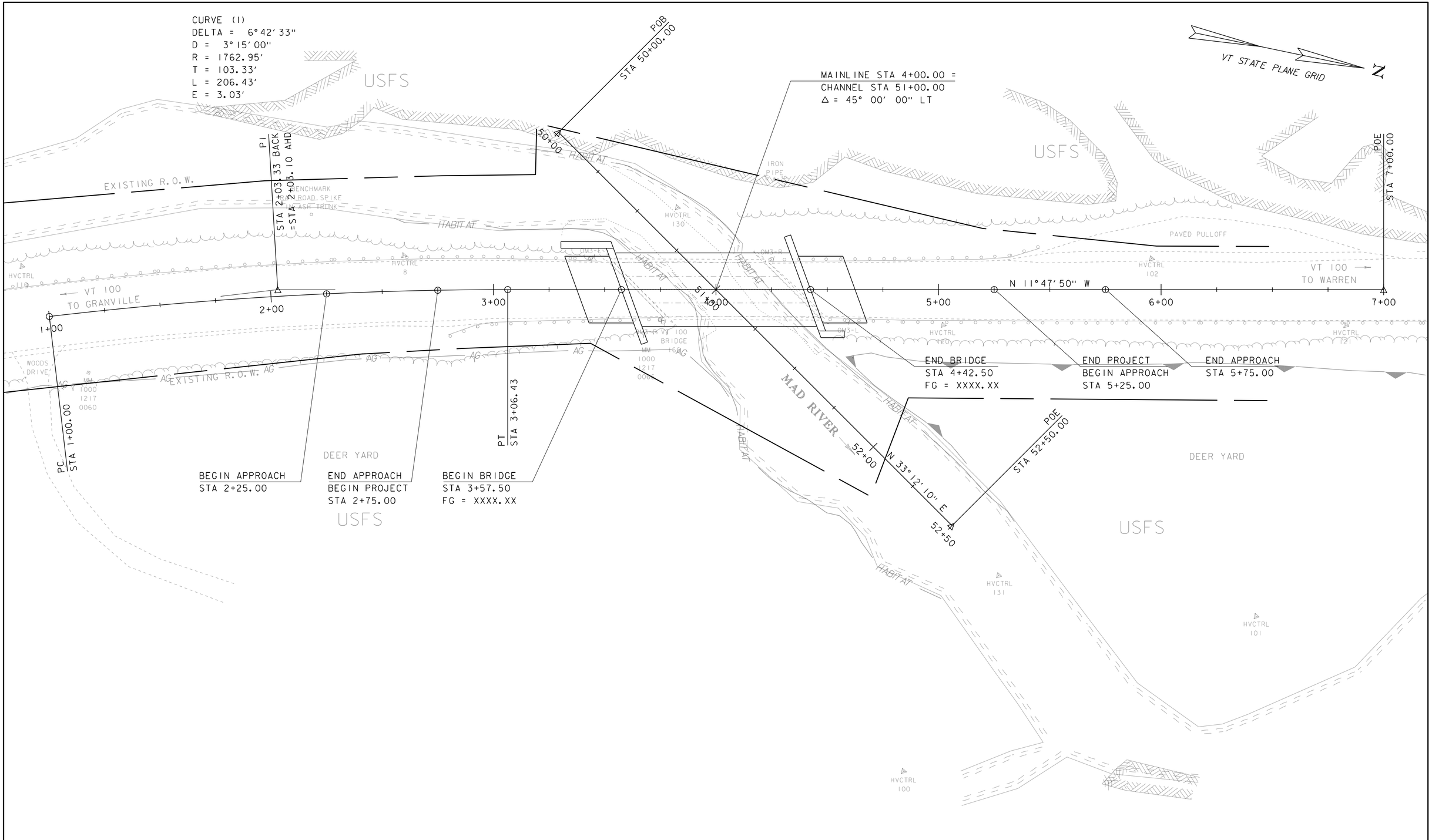
(IF USED ON PROJECT)

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

PROJECT NAME: WARREN
PROJECT NUMBER: BRF 013-4(32)

FILE NAME: s10b424typ.dgn
PROJECT LEADER: C.P.WILLIAMS
DESIGNED BY: T.FILLBACH
TYPICAL SECTIONS

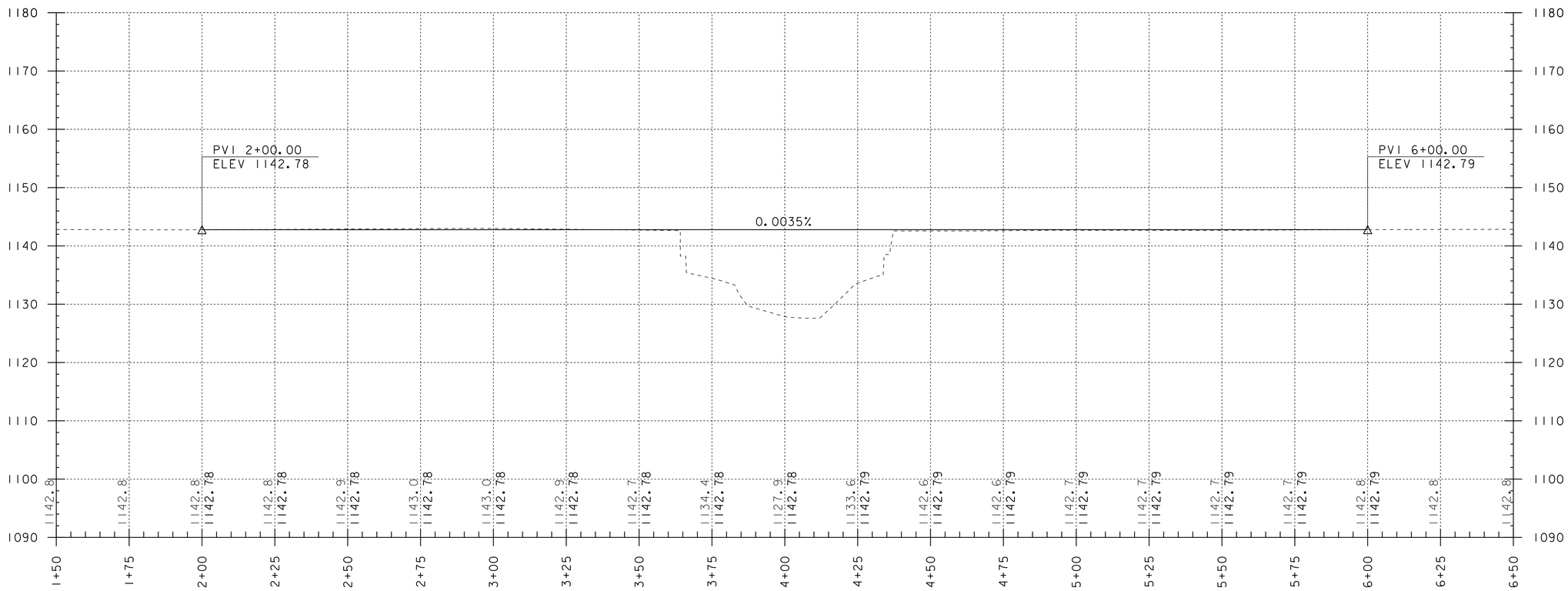
PLOT DATE: 14-MAY-2012
DRAWN BY: D.D.BEARD
CHECKED BY: ------
SHEET 1 OF 7



EXISTING BRIDGE DATA

YEAR BUILT 1939
SINGLE SPAN ROLLED BEAM
OVERALL LENGTH = 74 FT
CLEAR SPAN = 71 FT
DECK WIDTH = 27 FT

PROJECT NAME: WARREN	
PROJECT NUMBER: BRF 013-4(32)	
FILE NAME: s10b424brd.dgn	PLOT DATE: 14-MAY-2012
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: T.FILLBACH	CHECKED BY: ------
LAYOUT SHEET	SHEET 2 OF 7



NOTE:

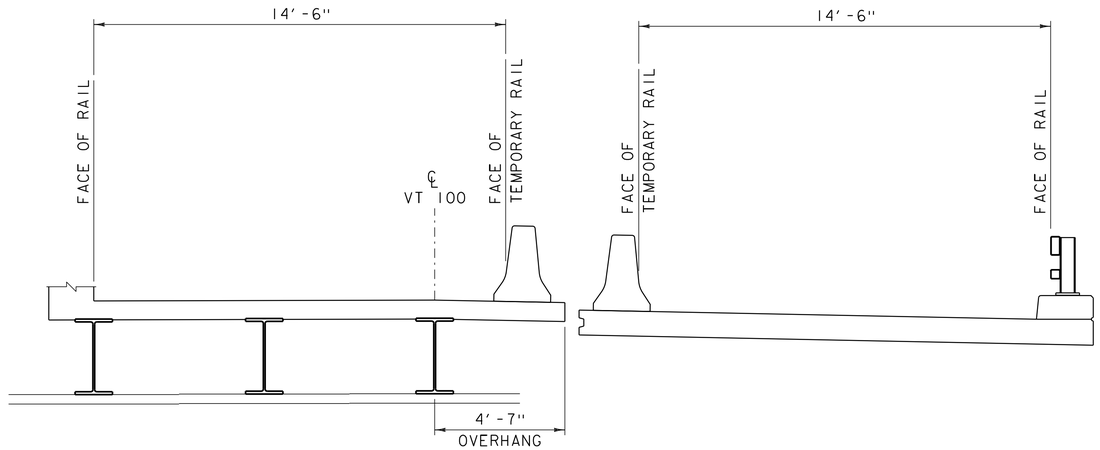
ELEVATIONS SHOWN TO THE NEAREST TENTHS ARE EXISTING GROUND ALONG PROPOSED CENTERLINE.

ELEVATIONS SHOWN TO THE NEAREST HUNDREDTHS ARE FINISH GRADES ALONG PROPOSED CENTERLINE.

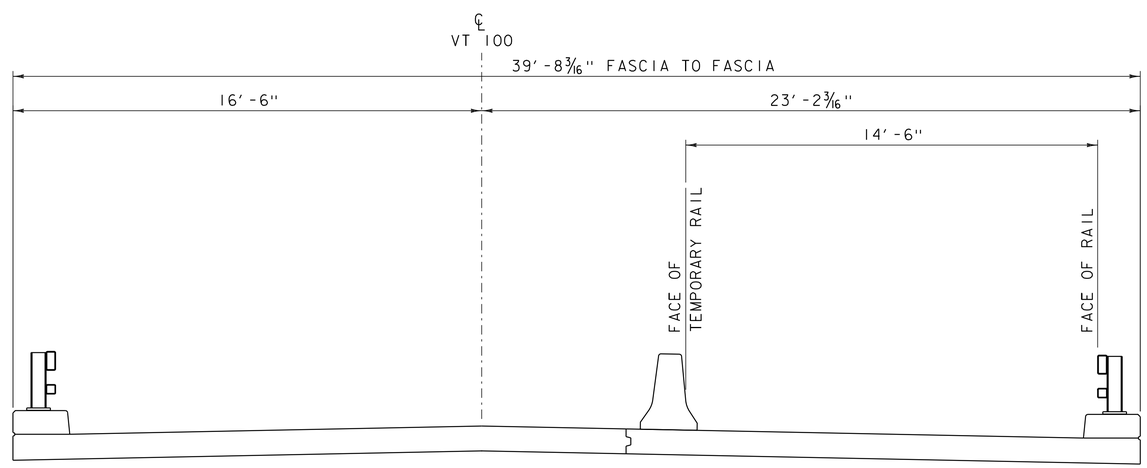
PROFILE ALONG VT 100

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

PROJECT NAME: WARREN	
PROJECT NUMBER: BRF 013-4(32)	
FILE NAME: s10b424pro.dgn	PLOT DATE: 14-MAY-2012
PROJECT LEADER: C. P. WILLIAMS	DRAWN BY: G. ROY
DESIGNED BY: G. ROY	CHECKED BY: ------
VT 100 PROFILE	SHEET 3 OF 7

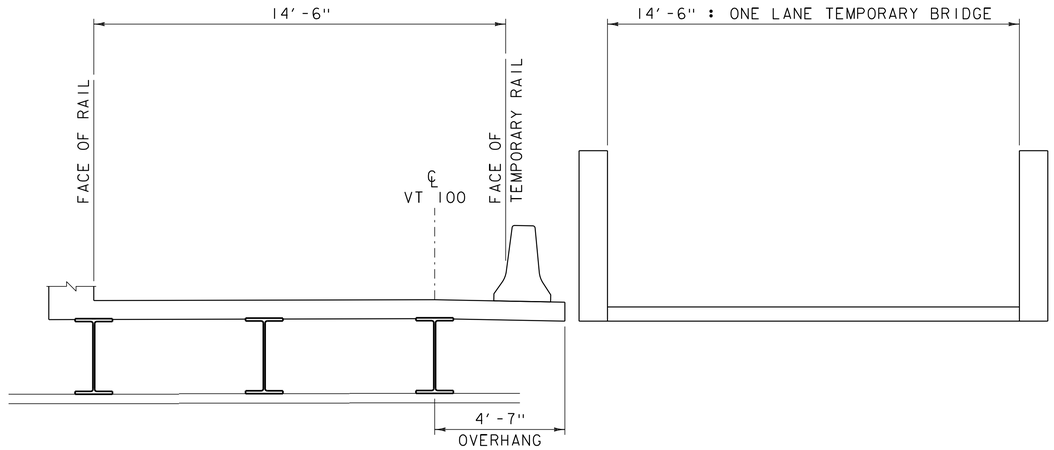


PHASE #1 TYPICAL SECTION

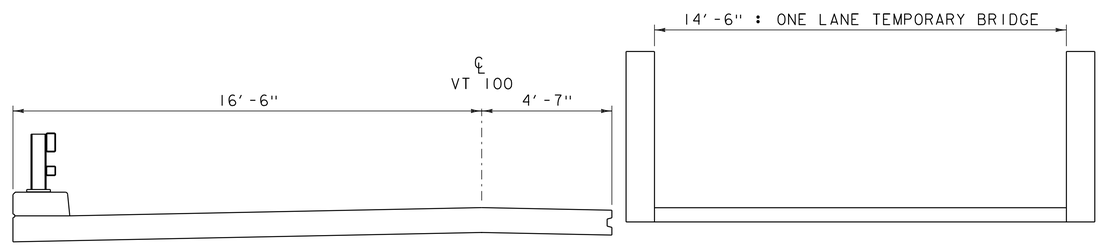


PHASE #2 TYPICAL SECTION

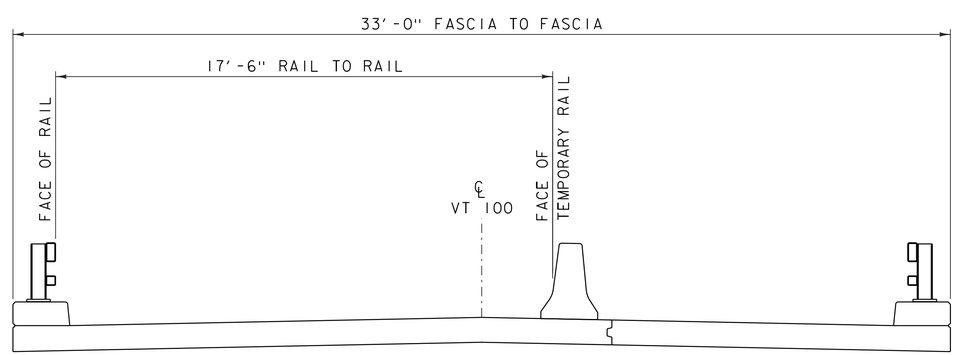
PROJECT NAME: WARREN	
PROJECT NUMBER: BRF 013-4(32)	
FILE NAME: s10b424typ.dgn	PLOT DATE: 14-MAY-2012
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: T.FILLBACH	CHECKED BY: ------
TYPICAL SECTIONS - PHASED WITHOUT TEMP	SHEET 4 OF 7



PHASE #1 TYPICAL SECTION

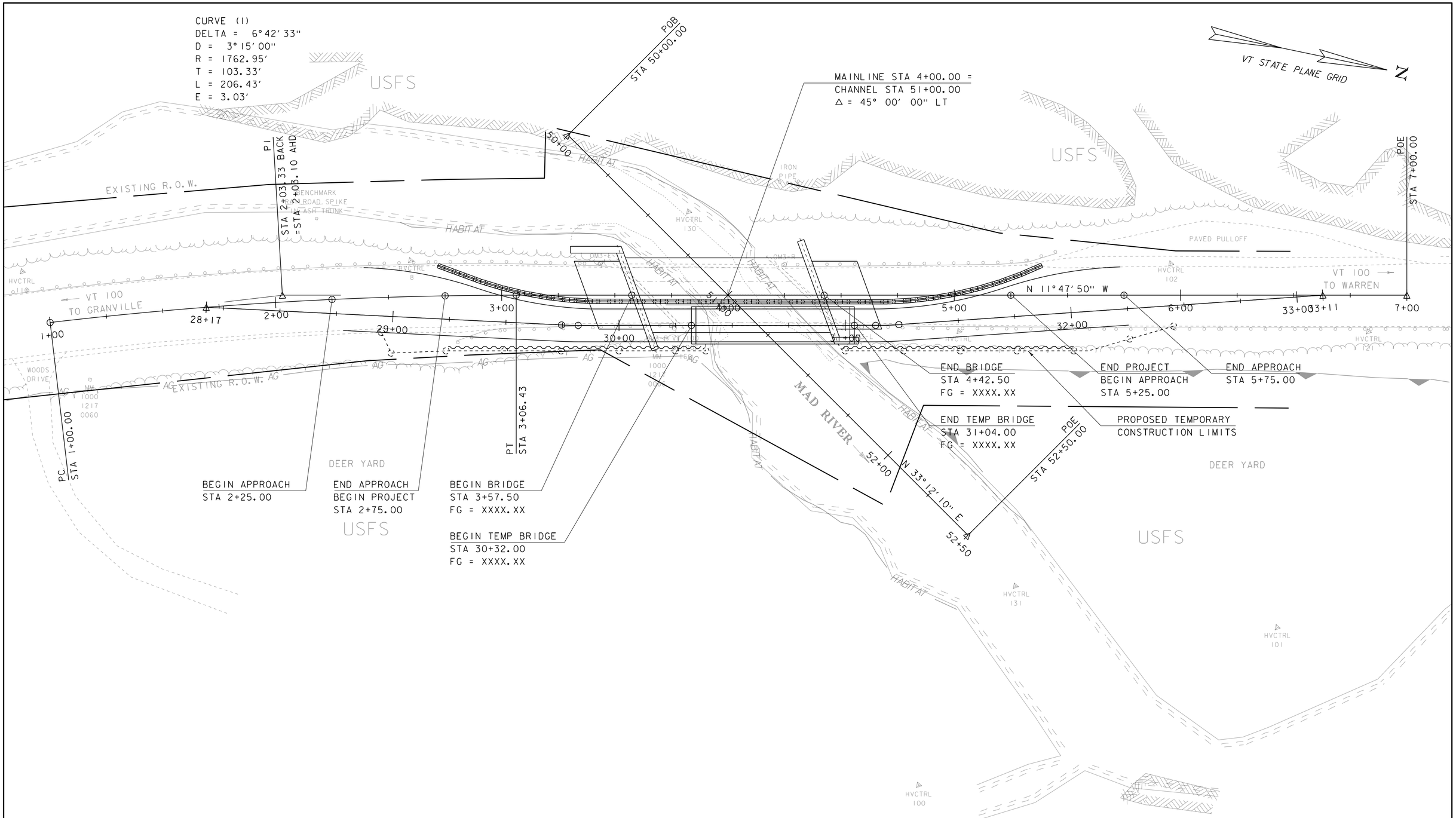


PHASE #2 TYPICAL SECTION



PHASE #3 TYPICAL SECTION

PROJECT NAME: WARREN	
PROJECT NUMBER: BRF 013-4(32)	
FILE NAME: s10b424typ.dgn	PLOT DATE: 14-MAY-2012
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: T.FILLBACH	CHECKED BY: ------
TYPICAL SECTIONS - PHASED WITH TEMP	SHEET 5 OF 7



EXISTING BRIDGE DATA

YEAR BUILT 1939
SINGLE SPAN ROLLED BEAM
OVERALL LENGTH = 74 FT
CLEAR SPAN = 71 FT
DECK WIDTH = 27 FT

PROJECT NAME: WARREN	
PROJECT NUMBER: BRF 013-4(32)	
FILE NAME: s10b424brd.dgn	PLOT DATE: 14-MAY-2012
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: T.FILLBACH	CHECKED BY: ------
LAYOUT - SINGLE PHASE WITH TEMP	SHEET 6 OF 7

CURVE (1)
DELTA = 6°42′33″
D = 3°15′00″
R = 1762.95′
T = 103.33′
L = 206.43′
E = 3.03′

VT STATE PLANE GRID
N

MAINLINE STA 4+00.00 =
CHANNEL STA 51+00.00
Δ = 45° 00′ 00″ LT

POB
STA 50+00.00

PI
STA 2+03.33 BACK
=STA 2+03.10 AHD

POE
STA 7+00.00

PC
STA 1+00.00

PT
STA 3+06.43

POE
STA 52+50.00

N 11°47′50″ W

N 33°12′10″ E

EXISTING R.O.W.

VT 100
TO GRANVILLE

VT 100
TO WARREN

MAD RIVER

USFS

DEER YARD

PAVED PULLOFF

WOODS DRIVE

HABITAT

BEGIN APPROACH
STA 2+25.00

END APPROACH
BEGIN PROJECT
STA 2+75.00

BEGIN BRIDGE
STA 3+57.50
FG = XXXX.XX

BEGIN TEMP BRIDGE
STA 43+92.00
FG = XXXX.XX

END TEMP BRIDGE
STA 44+80.00
FG = XXXX.XX

END BRIDGE
STA 4+42.50
FG = XXXX.XX

END PROJECT
BEGIN APPROACH
STA 5+25.00

END APPROACH
STA 5+75.00

EXISTING BRIDGE DATA

YEAR BUILT 1939
SINGLE SPAN ROLLED BEAM
OVERALL LENGTH = 74 FT
CLEAR SPAN = 71 FT
DECK WIDTH = 27 FT

PROJECT NAME: WARREN	
PROJECT NUMBER: BRF 013-4(32)	
FILE NAME: s10b424brd.dgn	PLOT DATE: 14-MAY-2012
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: T.FILLBACH	CHECKED BY: ------
LAYOUT - TWO LANE TEMPORARY BRIDGE	SHEET 7 OF 7

STRUCTURE INSPECTION, INVENTORY and APPRAISAL SHEET

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

Inspection Report for WARREN **bridge no.:** 00166 **District:** 6

Located on: VT 00100 ML **over** MAD RIVER **approximately** 8.3 MI S JCT. VT.17 **Owner:** 01 STATE-OWNED

CONDITION

Deck Rating: 4 POOR

Superstructure Rating: 6 SATISFACTORY

Substructure Rating: 4 POOR

Channel Rating: 6 SATISFACTORY

Culvert Rating: N NOT APPLICABLE

Federal Str. Number: 200013016612172

Federal Sufficiency Rating: 33

Deficiency Status of Structure: SD

AGE and SERVICE

Year Built: 1939 **Year Reconstructed:** 0000

Service On: 1 HIGHWAY

Service Under: 5 WATERWAY

Lanes On the Structure: 02

Lanes Under the Structure: 00

Bypass, Detour Length (miles): 28

ADT: 000970 **% Truck ADT:** 09

Year of ADT: 1998

GEOMETRIC DATA

Length of Maximum Span (ft): 0071

Structure Length (ft): 000074

Lt Curb/Sidewalk Width (ft): 0.4

Rt Curb/Sidewalk Width (ft): 0.4

Bridge Rdwy Width Curb-to-Curb (ft): 24.5

Deck Width Out-to-Out (ft): 27

Appr. Roadway Width (ft): 028

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: ROLLED BEAM

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

Kind of Material and/or Design: 3 STEEL

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: 0 DOES NOT MEET CURRENT STANDARD

Transitions: 1 MEETS CURRENT STANDARD

Approach Guardrail: 1 MEETS CURRENT STANDARD

Approach Guardrail Ends: 1 MEETS CURRENT STANDARD

Structural Evaluation: 4 MEETS 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: 062011 **Insp. Freq. (months)** 24 **X-Ref. BrNum:**

INSPECTION SUMMARY and NEEDS

06/09/2011 - ** Bridge deck is in poor condition with chronic maintenance requirements to address full depth holes. Bridge needs major reconstruction or full replacement. In the interim, the bridge rail needs repair to correct severe section loss along the posts and parapet. ~ MJ/DK

05/04/2010 12 month interim inspection: This structure needs a project to replace the bridge. DCP & JWW

VT AGENCY OF TRANSPORTATION **PROGRAM DEVELOPMENT DIVISION**

HYDRAULICS UNIT

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

FROM: Nick Wark, P.E., Hydraulics Engineer

DATE: August 24, 2011

SUBJECT: Warren BRF 013-4(32)
VT100 Br166 over Mad River

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

The existing single span rolled beam bridge has a span of 72', with a clear span measured perpendicular to the channel of 50'. The calculated water surface elevation at Q50 is approximately 1136.6'. This structure meets current hydraulic design standards and provides more than the required 1' of freeboard at the design storm.

Contraction scour was calculated as less than 1' at all flows up to Q500. There is some stone fill in front of the abutments, but it has either slid down the slope or was never placed all the way to the abutments. Due to the alignment of the structure it is vulnerable to abutment scour. During construction we would recommend maintenance to this stone fill. Material will need to be removed prior to the placement of any additional stone fill so the bridge cross section area is not reduced.

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

NJW

cc: Hydraulics Project File
Hydraulics Chrono File

VERMONT

State of Vermont
Program Development Division
One National Life Drive
Montpelier, VT 05633-5001
www.aot.state.vt.us

Agency of Transportation

[phone] 802-828-3979
[fax] 802-828-2334
[ttd] 800-253-0191

Memorandum

To: James Brady, VTrans Environmental Specialist

From: Glenn Gingras, VTrans Environmental Biologist

Date: 6/29/11

Subject: **Warren BRF 013-4(32)**
Natural Resource Identification

I have identified resources for the above mentioned project. I have reviewed existing mapped environmental mapping and I performed a field visit.

The above referenced project is located on VT 100, Bridge #166 over the Mad River in the town of Warren.

Wetlands/Watercourses:
Potential wetlands exist in the North Eastern quadrant of the project. Further review may be needed in this location if this area cannot be avoided. The Mad River flows north east through the project area. The Mad River is regulated by the US COE and the River Management Division of ANR.

Rare, Threatened and Endangered (R/T/E) Species:
No R/T/E species are mapped within the project area.

Agricultural Soils:
Adams Fine Sandy Loam soils are located in the south eastern quadrant and are statewide significant soils. No other prime or statewide soils are within the project area.

Fish and Wildlife Habitat:
The Mad River would support a variety of aquatic organisms. As this is a bridge project aquatic organism passage is not an issue. The project area is located within the US National Forest which supports a variety of large and small mammals. There are existing mapped deer yards on the eastern side of the roadway.

Most wildlife could use the Mad River riparian corridor as a travel corridor. Currently a small shelf exists on each side of the river bank to support potential corridor movement. Both sides of the road have large tracts of conserved undeveloped lands which improves habitat connectivity in this area. Considerations to wildlife movement should be made in the design to maintain this connectivity.

Temporary Bridge Options:
As this project is located within the US National Forest tree clearing should be limited. There are large mature trees providing shading for the Mad River immediately adjacent to the roadway toes of slopes. This may be a good project to conduct phased construction as the upstream side is limited due to the alignment of the river and

the downstream side of the bridge has large mature trees providing shading and a potential wetland. If a temporary bridge is required the river alignment may dictate placement of the temporary bridge on the downstream side of the existing bridge. Further review will be required if a temporary bridge is required.

If you have any questions, please feel free to contact me.

Cc

Chris Williams, VTrans Project Manager
Natural Resource Environmental File

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AGENCY OF TRANSPORTATION **OFFICE MEMORANDUM**

FROM: Jeannine Russell, VTrans Archaeology Officer
DATE: 6/20/2011

SUBJECT: ARCHAEOLOGICAL ISSUES ONLY **Field Visit: YES** ☒ **NO** ☐

Project Name: Warren Bridge 166
Project Number: BRF 013-4(32)

On 6/20/2011, the VTrans Archaeology Officer reviewed the above project with the Transportation Archaeologist(s) and agreed to the following:

**********Archaeological Resource Assessment**********

☒ That the Archaeological Resource Assessment of the Area of Potential Effect (APE) conducted by **VTrans** ☒, **Consultant** ☐ _____, or **Sub-consultant** ☐ _____and dated 6/20/2011 is adequate to identify archaeological resources, and **Does Not** have a CADD map with the archaeological resources on it.
Date ARA was approved 6/20/2011.

☒ **Plans dated** 6/17/2011 reviewed by **VTrans** ☒, **Consultant** ☐_____or **Sub-consultant** ☐_____.
Recommendations:
☐ Project **CLEARED** as **EXEMPT** (based on the PA 12/28/00).
☒ Project **CLEARED** with avoidance to all archaeologically sensitive areas.
☐ Project **CLEARED** with the following Conditions(See Conditions below)
☐ Recommend more archaeological study - **Phase I**

**********PHASE 1 & Beyond**********

☐ **ARA Proposal received** _____ and **approved** _____.

☐ **The above project is being reviewed at which level: ARA.**
Authorization Date: _____ Consultant Firm _____.
End of field letter/report Date _____.
Determination of Effect: **NO EFFECT**(NE) ☐
CONDITIONAL NO ADVERSE EFFECT ☐ (See conditions below)
NO ADVERSE EFFECT(NAE) ☐ **ADVERSE EFFECT**(AE) ☐
Consultant Recommends:_____
Draft Report Received:_____
Comments to Consultant:_____
Final Report Received:_____
Clearance of **Phase I** Date:_____
Phase I Costs: $_____
Number of sites found:_____
Number of National Register(NR) sites:_____
Number of NR sites Mitigated:_____

☒ **Additional comments or conditions that apply to this project.(see page 2 for additional conditions)**

J Russell
_____ 6-22-11
(***Signature of VTrans Archaeology Officer***) (***Date***)

Prepared by Brennan Gauthier, VTrans Assistant Archaeologist

Project: Warren BRF 013-4(32)

Additional Comments from Page 1:

A field visit conducted on 6/15/2011 was adequate to identify potential resources within the project area. Background research shows that there were no historic mills or structures within the project area. A prehistoric archaeological site is unlikely given the environmental and topographical features of the area. There are no concerns for archaeology.

From: Newman, Scott
Sent: Wednesday, July 13, 2011 2:23 PM
To: Brady, James
Subject: Warren BRF 013-4(14)

James –

There are no above-ground historic properties in the project area and Section 4(f) is N/A.

It is worth noting that the project is located within the GMNF and the PM should determine whether there are any related guardrail constraints.

Thanks.