**Vermont Agency of Transportation**

# Scoping Report for
# Pittsfield BHF 022-1(24) Bridge #126
# VT Route 100
# Over
# The West Branch of the Tweed River

**July, 2012**

## Contents



## Site Information

The existing conditions were gathered from a combination of a Site Photos, Inspection Reports, the Route Log and the existing Survey.

### Existing Conditions

| | |
|---|---|
| Functional Classification | Minor Arterial |
| Original Construction | 1932. Widened in 1970 with the addition of tee beams on both sides. |
| Bridge Roadway Width | 30.4 ft. |
| Approach Roadway Width | 37 ft. |
| Posted Speed | 35 mph at bridge, 50 mph typ. Vt. 100. |
| Horizontal Alignment | Bridge straight, 6-7 degree curves on approaches |
| Vertical Alignment | 1.75 % slope, south approach, flat north approach |
| Vertical Clearance Issues | See preliminary Hydraulics Report |
| Bridge Type | Two span concrete tee-beam bridge |
| Span Length | (2) 28 ft. spans, total length 56 ft. |
| Curb to Curb Width on Bridge | 30.4 ft. |
| Total Deck Width | 37.6 ft (includes 5 ft. sidewalk on east side of bridge). |
| Bridge Skew | 0° |
| Bridge Railing | Galv. steel W rail on Steel tube posts, angle on top serving as handrail. |
| Right-of-Way | It is believed that the existing wingwalls extend beyond the limits of the current ROW. |

### Inspection Report Information

| | |
|---|---|
| Bridge Deck Rating | 4 Poor |
| Superstructure Rating | 5 Fair |
| Substructure Rating | 5 Fair |
| Channel Rating | 5 Fair |

## Inspection Summary

"05/04/2009. Structure's in fair condition overall, however deck is in poor condition as soffit continues to deteriorate with areas of delaminations and longitudinal and transverse cracking and saturation.  T-beams are slowly breaking down with the most deterioration at T-beam #5 span 1. Substructure abutments and pier are deteriorating at a progressive slow rate.  Structure should be considered for full replacement in the near future.  – MJK"

05/23/11 Deck is in poor condition along center bay and potential for full depth failures possible. T-beams have areas of spalling with exposed rebar and in sp 2 t beam 4 the stirrups are rusted off.

There are additional comments that address the impacts from Tropical Storm Irene and associated repairs, but do not seem to indicate changes in the structural or functional status of the bridge.

## Hydraulics

Bridge 126 carries Vt. 100 over the West Branch of the Tweed River.  Vermont Agency of Transportation Hydraulic Standards (for Minor Arterials) require a bridge to be capable of passing a 50 year storm event with one foot of freeboard below the low chord of the superstructure.  There are additional standards for roadway overtopping, which are not applied to this project since it pertains mainly to the bridge.

The Preliminary Hydraulics Report indicates that the existing waterway opening is inadequate, as the 50 year flood event overtops the bridge and the 10 year event creates a submerged inlet condition.  The bridge would have to be raised approximately four feet to meet the hydraulic standard.  If the bridge substructure is replaced, the report recommends the consideration of a single 65 ft. span.

Hydraulics staff assumed a total deck plus superstructure depth of 36 inches, which may be a challenge for a 65 ft. span unless the typical bridge section is modified in some way such as leaving off the concrete overlay or pavement.  There are driveways or parking areas at three corners of the bridge, and a Town Highway on one corner.  Increasing the span and/or raising the bridge surface elevation would require the project to extend further in each direction on Vt. 100 to smoothly match existing roadway elevations, and would require work and Right of Way acquisition to blend into the other existing features.

## Utilities

The main path of overhead utilities is north/south along the east side of the bridge.  Overhead wires cross the roadway heading west perpendicular to the axis of the bridge just off the each end of the bridge.  There are no known buried utilities within the project site, although further investigation is needed off the northwest quadrant of the bridge for a possible culvert draining a roadside ditch, and a possible residential well off the southeast corner of the bridge.   It is recommended that the overhead utilities be relocated before construction begins, especially since the bridge will likely be widened, lengthened, and raised.

### High Crash Locations
The bridge site is not a high crash location.

## Resources

### Wetlands/Watercourses
No wetlands exist within the project area. The West Branch of the Tweed River is regulated by the US Army Corps of Engineers and the River Management Division of the Vermont Agency of Natural Resources.

### Habitat
The West Branch of the Tweed River would support a variety of fish and aquatic organisms. Disruption of the passage of fish and organisms is not anticipated. There is not a significant wildlife linkage area within this area of Vt. 100.

### Species / Habitats of Special Concern
No Rare, Threatened, or Endangered Species are mapped within the project area.

### Agricultural Soils / Floodplains
The land use in the immediate bridge area is residential, commercial, and roadway.
All soils within the project perimeter are mapped as statewide significant. The project is not expected to impact these soils since the bridge and the any temporary bridge will impact only previously disturbed soils. Temporarily disturbed areas will be restored.

### Archaeological Issues
There are no known archaeologically sensitive areas within the project limits.

### Historic Resources
The bridge is not considered to be historic itself, but it is within the Pittsfield Historic District. There are other historic properties nearby.

### Stormwater
At this time, there are no stormwater issues of note.

### Hazardous Waste Sites
At this time, there are no anticipated hazardous waste issues.

## Design Criteria

### Traffic

| TRAFFIC DATA | 2014 | 2034 | 2054 |
|---|---|---|---|
| **AADT** | 3300 | 3500 | ~ |
| **DHV** | 370 | 390 | ~ |
| **ADTT** | 360 | 550 | ~ |
| **%T** | 8.3 | 11.9 | ~ |
| **%D** | 57 | 57 | ~ |
| **FLEXIBLE ESALS:** | ~ | **2014~ 2034**<br>2,650,000 | **2014~ 2054**<br>5,954,000 |

Standards for this site according to the Vermont State Standards for the Design of Transportation Construction Reconstruction and Rehabilitation on Freeways, Roads, and Streets, Oct. 22, 1997

| | |
|---|---|
| Roadway Classification | Minor Arterial (Rural) |
| Design Speed | 35 mph |
| Maximum Banking | 6% (where side road intersects) |
| Lane and Shoulder Widths | 11/4 |
| Clear Zone Distance | 14’ fill / 12’ cut |
| Maximum Grade | 9% |
| K Values for Vertical Curves | 40 crest / 50 sag |
| Stopping Sight Distance | 225’-250’ |
| Vertical Clearance | NA |
| Bicycle/Pedestrian Criteria | minimum 3’ surfaced shoulder |
| Bridge Rail | TL-2 Required |

# Alternatives

## Existing Deficiencies

The deficiency status of the bridge is noted on the Inspection Summary report as Structurally Deficient. In addition, the waterway opening is hydraulically inadequate and the railing not in compliance with the current standard.

## Accelerated Bridge Construction

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 a portion of the construction period, where appropriate, 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 of new and/or rehabilitated bridges. The use of precast elements in new bridges may also expedite construction schedules. This can apply to decks, superstructures, and substructures. Measures will be in effect to ensure that there is no compromise of safety to workers or the traveling public, and no compromise to project quality. The alternatives considered for Pittsfield BHF 022-1(24) are:

1. Do Nothing
2. Rehabilitation
3. Replace Superstructure, Deck, and Rails Only
4. Replace Entire Bridge.

# Traffic Control Options

Several traffic control options were considered. All of these options will cause some form of disruption to travel during the work period.

- Close Bridge using off-site detour.

  Closing the bridge to traffic during construction is a cost saving option and one that allows the use of rapid bridge construction techniques and allows the contractor to work unimpeded by traffic in the work zone. Any time a bridge is closed in this manner, the goal is to expedite the work and reopen the bridge as soon as possible. Vt. 100 is a Minor Arterial with an AADT of 3300. The official detour route (in either direction) would follow Route 100 north to the intersection with Vt. 107 in the Town of Stockbridge, then west on Vt. 107 to Vt. 12 in Bethel, south on Vt. 12 to the intersection with US 4 in Woodstock, west on US 4 back to Vt. 100 in the Town of Killington (see map in appendix). The total round trip end-to-end would be 57 miles. The length of travel <u>added</u> to a trip between Vt. 107 and

US 4 via Vt. 12 is 36 miles. The most likely local bypass would be short, approximately 3 miles, all on Class 3 gravel surface roads, using Upper Michigan Road (TH-1), Crossover Road (TH-17), and Lower Michigan Road (TH-6). Despite not being an official detour and prohibited to trucks, these Class 3 Roads would see increased traffic. For any option including closing the bridge consideration should be given to providing some means for pedestrians and cyclists to cross the river. The biggest disadvantage to this method of traffic control is the user cost and inconvenience for the duration of the closure. Discussion should be had with the Town to ascertain that fire protection can be provided for the area of town south of the bridge. A possible mutual aid scenario for Pittsfield could have the Town of Killington providing this protection.

- On-Site Detour via Temporary Bridge.

  Utilizing a temporary bridge allows the closure of the bridge and minimal impact on the travelling public. For the current ADT of 3300 and a DHV of 370, the Structures Process Manual indicates that a one lane temporary bridge with traffic signals is appropriate, however a two lane temporary bridge is recommended since there are driveways, parking lots, and a Town road very close to the project. Concerns with a one lane bridge include traffic queuing into intersections and driveway areas. It is believed that the sight distance is adequate in both directions. Placing the temporary bridge on the east side of Vt. 100 is recommended. Accommodation for pedestrians and bicyclists on the temporary bridge should be considered. Disadvantages include increased cost for the bridge and temporary Right of Way.

- Phased construction was considered for this project. The advantages of phased construction include the avoidance of sending travelers on a long detour and saving the cost of a temporary bridge and Right of Way. Disadvantages include a longer construction phase (increased cost) due to being able to only work on one half of the project at a time, longer period of disruption to travel, and increased danger to workers and travelers due to close proximity. If a cast-in-place concrete overlay is used, a compromise in the quality of the overlay may result.

## Discussion

1. Do Nothing

   The Do Nothing Alternative is the cheapest short term option. Disadvantages include the continued and perhaps accelerated deterioration of the steel reinforcing, concrete superstructure, and substructure. Potential hidden flaws would not be addressed and maintenance costs would increase over time. The deck, superstructure, and substructure ratings are 4, 5, and 5 respectively in the latest inspection report, and the deficiency status is listed as SD, structurally deficient. The inspection report notes that full depth holes could develop in the deck, which is in poor condition in the center bay (original construction).

The bridge site is not a high crash location. The bridge does not meet hydraulic standards. During Tropical Storm Irene, flow overtopped the bridge, destroying the pavement, constricting flow, and destroying nearby homes. Given the preliminary hydraulics report, the Inspector's ratings and comments, the age of the structure, and the apparent deterioration of all substructure and superstructure components, the Do Nothing alternative seems inappropriate and is not recommended.

2. Rehabilitation

This alternative is economical in the short term, and is the least disruptive and quickest action alternative. The intent in this alternative would be to address the worst of the apparent deficiencies by removing the pavement, cutting out and repairing deterioration and holes in the deck from above and below, and repairing or patching cracks and holes in the tee-beams. A critical element of these repairs would be thorough removal of corrosion from exposed steel reinforcing and removal of deteriorated concrete so that good bonding to new repair materials is achieved. Repairs would be made to cracks and deterioration in the abutments and wingwalls that are visible without excavation. There is some deterioration of the curbs and fascia areas of the deck on the west side that needs to be addressed. The existing bridge rail would be replaced. Minor additions to the rock protection for the abutments and footings could be included. New paving would be placed. For traffic control, phased work would be done, so that alternating traffic is maintained on one lane of the bridge for each phase, with only minor delays. The geometry of the bridge would not be changed. No ROW changes would be anticipated. Some service life would be added for a relatively low cost and minor disruption of traffic flow, but this project would be back, probably within fifteen years. This alternative would offer no improvement to the existing hydraulic conditions.

3. Replacement of Superstructure Only

Replacement of the superstructure only was considered. This would resolve the ongoing deterioration of the deck and tee-beam superstructure while using some remaining service life of the substructure. The final grade of the bridge and nearby roadway could be raised slightly with this alternative. If this alternative were implemented, a precast superstructure and deck with a concrete overlay would be proposed, with a new NETC rail. Repairs would be made to cracks and deterioration in the abutments and wingwalls that are visible without excavation. Minor additions to the rock protection for the abutments and footings could be included.

After consideration and review of the known existing conditions, it was decided that this alternative would not be further developed. The rationale for this is as follows:

1. The original components of the bridge (center portion) are 80 years old.
2. The substructure rating is 5 (fair), indicating some remaining life, but aging.
3. Vertical and horizontal cracks are visible in many pictures in abutments, the center pier, and the wingwalls. There is deterioration of concrete surfaces on several of the wingwalls. The bridge is listed on the latest inspection report as “Scour Critical”.
4. If a new superstructure was placed on the existing substructure, we would likely be faced in the near future with either scrapping or shoring the fairly new superstructure while the substructure is replaced. The construction method could affect the way traffic was controlled during this work. Trying to save a superstructure in future work would present challenges, since the length would be fixed and driving piles difficult.

4. Full Bridge Replacement

Full bridge replacement includes the entire removal and replacement of the existing superstructure, substructure, and approaches. New bridge characteristics would include:

- ❖ Single span structure without a pier in the river.
- ❖ Maintain current centerline alignment.
- ❖ New bridge shoulder and lane widths to be 4-11-11-4.
- ❖ Depth of the new bridge superstructure should be as shallow as possible to minimize the hydraulic constriction.
- ❖ TL-2 crash-tested design bridge rail.
- ❖ Integral abutment substructure with precast abutments/pile caps, precast concrete superstructure, new approach slabs, a waterproof membrane, and pavement are proposed. Since depth of superstructure section influences hydraulic capacity, consideration may be given to omitting the membrane and pavement.
- ❖ Minor improvements to the river channel at the bridge and at the former pier location to improve flow characteristics and reduce turbulence and scour potential.

The preliminary hydraulics report recommends the removal of the existing center pier, an increase in span to 65 ft., and raising the deck elevation. Raising the grades on the bridge is not recommended due to the magnitude of rise required to meet the hydraulic standard. The additional work required would include filling the roadway on each end of the bridge, and blending this new construction back into existing features such as driveways, parking lots, and Lower Michigan Road (TH-6), and blending the raised roadway back into existing grades. Additional cost associated with Right of Way acquisition would also be incurred.

The rail-to-rail width of the new bridge is recommended to be 30 ft. The logic for determination of the width is as follows:

- Currently the bridge width is 4-11-11-4 with a 5 ft. sidewalk on the east side of the bridge. There is no sidewalk beyond the bridge on either end.

- The current standard for bridge lane and shoulder widths at this location is 4-11-11-4, which is expected to be adequate at this site for shared use by pedestrians and bicycles.
- The roadway and bridge are cleared by plow trucks in winter, but since there is no need for a concerted effort to maintain sidewalks in adjacent areas, the sidewalk on the bridge might be overlooked. It is proposed that a sidewalk not be included on the new bridge, since it is more likely that plow trucks will clear the lane and shoulder. The Town is expected to provide input regarding bicycle and pedestrian use in the area, shoulder widths, and future sidewalk plans, ie Complete Streets criteria.

Alternatives 4a, 4b, and 4c, cover the full replacement of the bridge and various methods of traffic control. They are defined as follows:

4a. Full bridge replacement with integral abutment, precast bridge using off-site detour.

4b. Full bridge replacement with integral abutment, precast bridge using on-site detour – phased construction.

4c. Full bridge replacement with integral abutment, precast bridge using on site detour – temporary bridge.

These alternatives all cost more than the deck and superstructure replacement or repair options, but eliminate all structural deficiencies in the bridge and rail, improve the hydraulic conditions, and provide a full service life of 80+ years.

## Costs

Note that these cost projections are for comparison purposes only.

| Pittsfield BHF 022-1(24) | | Alternative 2<br>Rehabilitation | Alternative 4a<br>Replace Bridge Off-site Detour | Alternative 4b<br>Replace Bridge Phased Construction | Alternative 4c<br>Replace Bridge Temporary Bridge |
|---|---|---|---|---|---|
| COST | Roadway & Mobilization | $85,000 | $491,400 | $574,700 | $491,400 |
| | Superstructure | $67,500 | $292,400 | $292,400 | $292,400 |
| | Substructure | $21,100 | $213,600 | $251,300 | $213,600 |
| | Temporary Bridge | $0 | $0 | $0 | $150,000 |
| | Construction Costs | $173,600 | $997,400 | $1,118,400 | $1,147,400 |
| | Construction Duration | 2 months | 3 months, with 1 month closure | 1 year, with 3 month closure | 1.5 years, with minimal closure |
| | | | | | |
| | Preliminary Engineering | $29,500 | $229,400 | $257,200 | $263,900 |
| | Right of Way | $0 | $40,000 | $40,000 | $150,000 |
| | Construction Engineering | $31,200 | $239,400 | $268,400 | $275,300 |
| | Contingencies | $17,000 | $50,000 | $56,000 | $60,000 |
| | Project Development Duration | | 3 year | 3 year | 4 year |
| | | | | | |
| | Total Costs | $251,300 | $1,556,200 | $1,848,500 | $1,896,600 |
| | Premium | | | 18.8% | 21.9% |
| | Design Life | 15 years | 80 years | 80 years | 80 years |
| | | | | | |
| | Typical Section - Roadway (feet) | 30.4' | 30' | 30' | 30' |
| ENGINEERING | Typical Section - Bridge (feet) | 4-11-11-4 | 4-11-11-4 | 4-11-11-4 | 4-11-11-4 |
| | Traffic Safety | No Change | No Change | No Change | No Change |
| | Alignment Change | No | No | No | No |
| | Bicycle Access | No Change | No Change | No Change | No Change |
| | Hydraulic Opening | No Change | Improved | Improved | Improved |
| | Pedestrian Access | No Change | Reduced | Reduced | Reduced |
| | Utility | No change | Aerial Relocated | Aerial Relocated | Aerial Relocated |
| | ROW Acquisition | No | Yes | Yes | Yes |
| | Road Closure | No | Yes | No | No |

A 15 year life is assumed for Alternative 2, Rehabilitation. The other alternatives, 4a, 4b, and 4c, all involve full replacement of all bridge elements, and are assumed to have a life expectancy of 80 years. Ignoring inflation and maintenance costs, the annual capital cost of Alternative 2 is approximately $16,750 per year. Any of the other alternatives, for full replacement, are roughly equivalent to each other cost-wise, and would have an approximate annual cost of $23,700 per year, depending on the particular alternative selected.

## Conclusion

Given the relative costs, benefits, and implications for construction methods, **Alternative 4c, full bridge replacement, with on-site detour via a temporary bridge,** is recommended for this site. This alternative was chosen because it resolves many issues. It provides the opportunity for some improvement to the hydraulics of the site, provides an improved condition for maintenance of the pedestrian space in winter, and eliminates known and potential unknown structural flaws, restoring a full service life. It is likely that additional Right of Way will be required for any of the full replacement alternatives, which has a significant time impact on the project development phase for the project. Because the annual costs between the full replacements alternatives are so close, a temporary bridge is recommended to minimize the disruption and inconvenience of an off-site detour.

A new precast superstructure and integral abutment substructure are proposed. To improve hydraulic conditions, increasing the span to 65 ft. , elimination of the center pier, and minor channel improvements are recommended. A construction schedule of 24/7 is not recommended since there are homes adjacent to the bridge site.

## Appendices

Photos of Existing Conditions
Proposed Detour Route
Bridge Inspection Report
Geotechnical Report
Resources Memo
Archaeological Memo
Historic Sketch
Existing Layout Plan
Existing Profile
Proposed New Bridge Section
Temporary Bridge Options

East (downstream) side of bridge, looking south

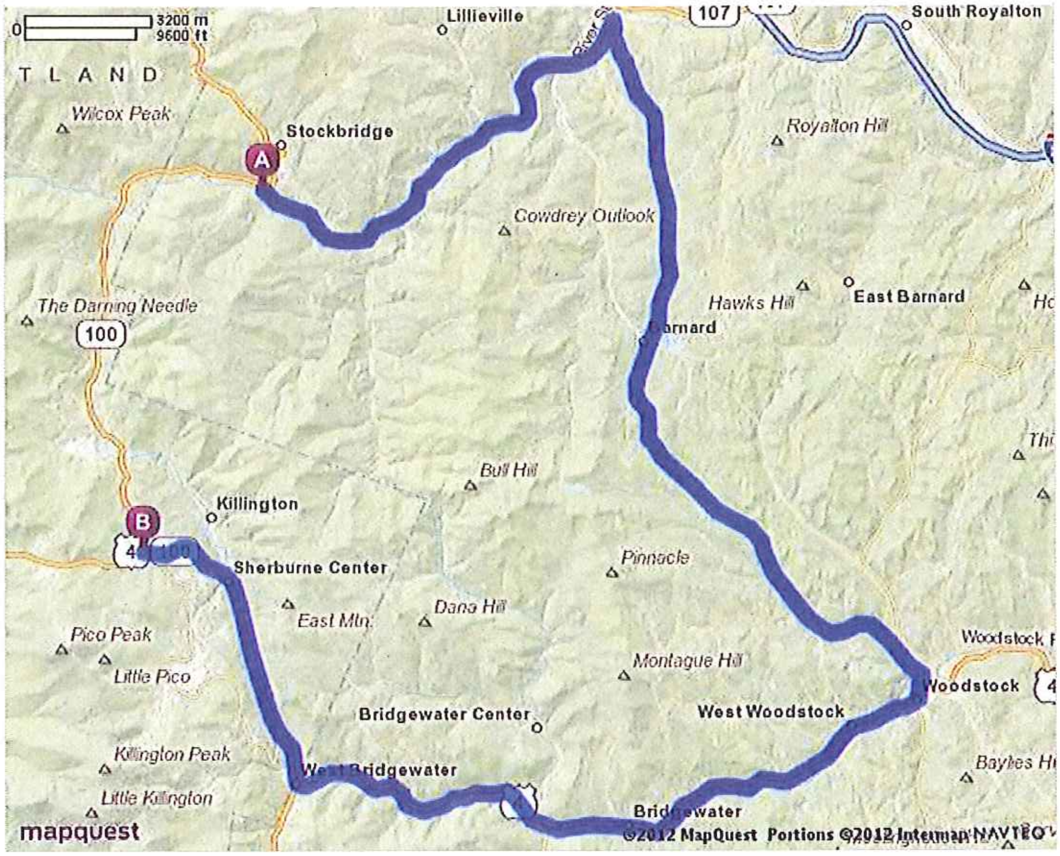
West (upstream) side of bridge looking south


West (upstream)side of bridge looking north

Looking east (downstream)


Abutment and tee-beam deterioration

Deck deterioration






Regional Detour:
Through Distance: 10.6 miles
Detour Distance: 46.8 miles
Additional Distance: 36.2 miles
End to End Distance: 57.4 miles

# STRUCTURE INSPECTION, INVENTORY and APPRAISAL SHEET

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

*Inspection Report for* PITTSFIELD — *bridge no.:* 00126 — *District:* 3

*Located on:* VT 00100 ML *over* W. BR. TWEED RIVER *approximately* 2.3 MI S JCT. VT.107 — *Owner:* 01 STATE-OWNED

## CONDITION

*Deck Rating:* 4 POOR
*Superstructure Rating:* 5 FAIR
*Substructure Rating:* 5 FAIR
*Channel Rating:* 5 FAIR
*Culvert Rating:* N NOT APPLICABLE
*Federal Str. Number:* 200022012611152
*Federal Sufficiency Rating:* 52.9
*Deficiency Status of Structure:* SD

## AGE and SERVICE

*Year Built:* 1932 *Year Reconstructed:* 1970
*Service On:* 5 HIGHWAY-PEDESTRIAN
*Service Under:* 5 WATERWAY
*Lanes On the Structure:* 02
*Lanes Under the Structure:* 00
*Bypass, Detour Length (miles):* 33
*ADT:* 003300 *% Truck ADT:* 10
*Year of ADT:* 1998

## GEOMETRIC DATA

*Length of Maximum Span (ft):* 0025
*Structure Length (ft):* 000056
*Lt Curb/Sidewalk Width (ft):* 0
*Rt Curb/Sidewalk Width (ft):* 5
*Bridge Rdwy Width Curb-to-Curb (ft):* 30.4
*Deck Width Out-to-Out (ft):* 37.6
*Appr. Roadway Width (ft):* 037
*Skew:* 00
*Bridge Median:* 0 NO MEDIAN
*Min Vertical Clr Over (ft):* 99 FT 99 IN
*Feature Under:* FEATURE NOT A HIGHWAY OR RAILROAD
*Min Vertical Underclr (ft):* 00 FT 00 IN

## STRUCTURE TYPE and MATERIALS

*Bridge Type:* 2 SP CONCRETE T-BEAM
*Number of Approach Spans:* 0000 *Number of Main Spans:* 002
*Kind of Material and/or Design:* 1 CONCRETE
*Deck Structure Type:* 1 CONCRETE CIP
*Type of Wearing Surface:* 6 BITUMINOUS
*Type of Membrane:* 2 PREFORMED FABRIC
*Deck Protection:* 0 NONE

## APPRAISAL *AS COMPARED TO FEDERAL STANDARDS

*Bridge Railings:* 1 MEETS CURRENT STANDARD
*Transitions:* 0 DOES NOT MEET CURRENT STANDARD
*Approach Guardrail:* 1 MEETS CURRENT STANDARD
*Approach Guardrail Ends:* 1 MEETS CURRENT STANDARD
*Structural Evaluation:* 5 BETTER THAN MINIMUM TOLERABLE CRITERIA
*Deck Geometry:* 4 MEETS MINIMUM TOLERABLE CRITERIA
*Underclearances Vertical and Horizontal:* N NOT APPLICABLE
*Waterway Adequacy:* 5 OCCASIONAL OVERTOPPING OF BRIDGE & ROADWAY WITH SIGNIFICANT TRAFFIC DELAYS
*Approach Roadway Alignment:* 8 EQUAL TO DESIRABLE CRITERIA
*Scour Critical Bridges:* 3 SCOUR CRITICAL

## 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:* 01 NO LOAD POSTING SIGNS EXIST NEAR BRIDGE
*Posted Vehicle:* POSTING NOT REQUIRED
*Posted Weight (tons):*
*Design Load:* 2 H 15

## INSPECTION and CROSS REFERENCE

*X-Ref. Route:*
*Insp. Date:* 052011 *Insp. Freq. (months)* 24 *X-Ref. BrNum:*

## INSPECTION SUMMARY and NEEDS

*9/2011 since May inspection structure was impacted by Irene and pavement along deck was ripped up and heavy erosion occurred along embankments. Deck was repaved in 10/2011 and large rip rap was put in place along embankments*
*8/31/11 The bridge is ok but there is lots of debris caught on the upstream nose of the pier from hurricane Irene flooding which needs to be removed. The bank erosin in the channel banks needs to be repaired. DCP & FRE*

*5/23/11 Deck is in poor condition along center bay and potential for full depth failures possible. T - beams have areas of spalling with exposed rebar and in sp 2 t beam 4 the stirrups are rusted off.*

**AGENCY OF TRANSPORTATION** **OFFICE MEMORANDUM**

**To:** Chris Williams, Project Manager, Structures

CAA CCB

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

**Date:** February 22, 2012

**Subject:** Pittsfield BRF 022-1(24) – VT 100, Bridge 126 Geotechnical Scoping Report

## 1.0 Introduction

In an effort to assist the Structures Section with their bridge type study, the Soils and Foundations Unit within the Materials and Research Section has completed a review of available geological data for Bridge 126 on VT 100. Bridge 126, see Figure 1, is a two span structure that crosses over the Second Branch of the Tweed River in Pittsfield, Vermont. This scoping report included a review of VTrans record plans and bridge boring files, VTrans Route Survey, USDA Natural Resources Conservation soil survey records, surficial geology and bedrock maps of the State and water well logs on record with the Agency of Natural Resources.

Figure 1: VT 100, Bridge 126 over the Second Branch of the Tweed River

## 2.0 Surficial and Bedrock Geology

Subsurface information reported in well driller reports on file at ANR indicates that the surficial geology appears to be gravels and sands mixed with cobbles and boulders. A visual inspection of the stream bottom corroborates this information. Well locations are shown in Figure 2 and a summary of the overburden information is provided in Table 1.

| Well Number | Overburden Description | Overburden Thickness (ft) |
|---|---|---|
| 42 | Gravel, sand, boulders | 10 |
| 53 | Gravel, sand, boulders | 28 |
| 144 | Gravel, sand | 44 |
| 217 | 0 to 20’ gravel/sand 20 to 99’ clay | 99 |
| 216 | 0 to 20’ gravel, 20’ to 95’ clay | 97 |
| 220 | Gravel, sand, boulders | 95 |
| 20085 | Gravels, sands, silts (clay noted from 35 to 39’) | 20 |

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

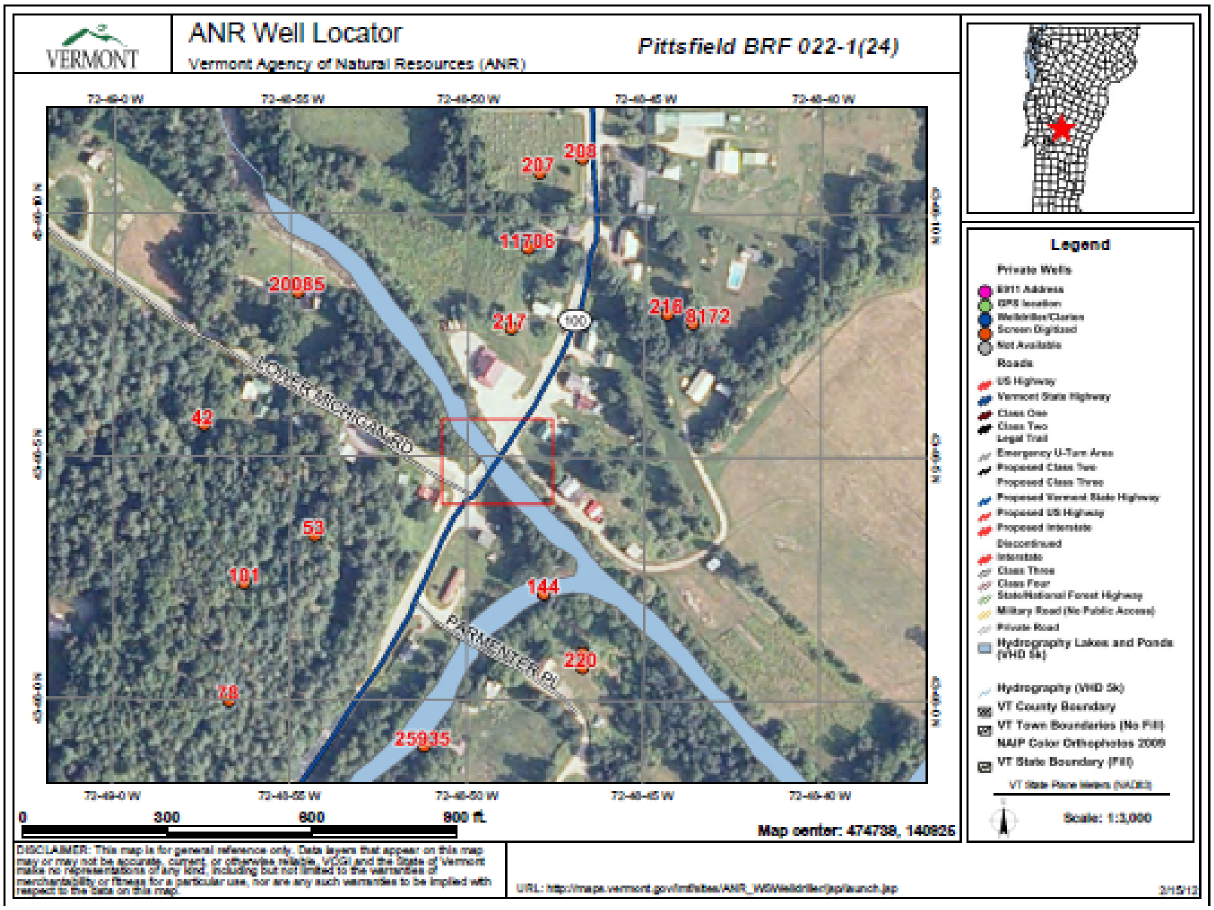



Figure 2: ANR Well Log Locations near Bridge 126, VT 100 in Pittsfield, VT

Attached are two borings for Bridge 127 drilled for the Pittsfield STP 022-1(22)S project; borings penetrated 52 ft without encountering bedrock. Bridge 127 is located on the Stockbridge-Pittsfield town line approximately 1.26 miles north of Bridge 126. During the drilling for this project VTrans’ drillers encountered gravels, sands and boulders in the first 20 ft ( 0 to 20 ft) followed by silt (20 to 38 ft) and underlain by a sandy-gravel material (38 to 52 ft). The “grey clay” layers noted in the well drillers’ logs for wells 217, 216 and 20085 may actually consist of a gray silt, or hardpan, material that possesses some plasticity.

Surficial mapping conducted for the 1970 Surficial Geologic Map of Vermont indicates that the subject area is underlain by recent alluvium and granular glacial deposits (kame terrace).
Although there was no exposed bedrock evident in the area, based on a review of the ANR well logs the bedrock seems to be dipping from the west to the east and from the west to the south. The top of bedrock varies significantly over a relatively short distance (500 ft) as can be seen between wells 144 and 20085. Well 144 may provide the best representation of the depth to bedrock (44 ft) that may be encountered by drilling personnel (although a depth to bedrock of 95 feet would not necessarily be a surprise).

Surficial bedrock maps of the area indicate the bedrock is of the Pinney Hollow formation and likely consists of a green quartz-sericite chlorite phyllite and schist. Figure 3 depicts the cobbles and boulders which can be seen along the river channel.

Figure 3: Second Branch of Tweed River - Downstream of Bridge 126

**3.0 The Irene Effect**

Tropical Storm Irene had a severe impact on this watershed. Adjacent to Bridge 126, a large home and mobile home were displaced from their foundations while boulders and debris were moved downstream clogging waterways. At bridge 126 the remnants of a boulder debris field can be seen in Figure 4; the boulders have been placed on either side of the waterway thereby reducing the pre-flood channel volume. In addition, emergency repairs necessitated the placement of large diameter rip-rap material behind the upstream retaining walls to fill in scour holes; however, the large rip-rap is reducing the effective waterway opening, see Figure 5.

Figure 4: Possible Waterway Restriction due to Boulder Debris (Upstream)

Figure 5: Possible Waterway Restriction due to Large Rip-Rap

**4.0 Utility Considerations**

Power lines exist on both sides of VT 100 and cross the stream along the southern edge of Bridge 126. There is a medium size (24" +/-) corrugated metal pipe serving as an outlet for the surface drainage along the northern side of VT 100. There is a drainage inlet just east of the "Yoga Pilates Adventure" sign.


Figure 5: Roadway Profile / Overhead Utility Locations at BR 126

Figure 6: CMP Outlet at Northeast Wingwall

**5.0 Construction Considerations**

There appears to be a sidewalk on the East bound travel lane. In addition there are local businesses on both sides of the structure; pedestrian traffic accommodations should be considered for any temporary structure. Based on this site inspection a temporary bridge could be placed on either side of the existing structure, however, placement of a temporary structure downstream of the existing bridge appears to be generally more feasible.

**6.0 Design / Foundation Options**

Due to the variable depth to bedrock shown in the well logs, two borings are recommended to be drilled in order to fully assess the subsurface conditions at the site including, but not limited to, the soil properties, ground water conditions and depth of bedrock. The borings should be located at opposite corners of the proposed bridge. Final recommendations for borings can be provided once an alignment and preliminary structure type have been selected. There does not appear to be any drilling equipment access limitations, except for the overhead wires, at this site.

Although the required superstructure depth may be controlled by hydraulic limitations, consideration should be given to replacing the current two span structure with a single span.

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

- Reinforced concrete abutments on spread footings
- Pile caps on a single row of H-Piles (integral abutment or pinned superstructure)

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

cc: WEA/Read File

CCB/Project File

STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH SECTION
SUBSURFACE INFORMATION

BORING NUMBER: B-101
SHEET 1 of 1
DATE STARTED: 6/21/07
DATE COMPLETED: 6/26/07

PROJECT NAME: PITTSFIELD - STOCKBRIDGE
SITE NAME: VT-100
STATION: 260+09.50
OFFSET: 17.90
VTSPG: N 466205.94 ft E 1561637.80 ft

PROJECT NUMBER: STP 022-1(22)S
SITE NUMBER: BR-127
GROUND ELEVATION: 841.8 ft
GROUNDWATER DEPTH: 25.0 ft 6/26/07
PROJECT PIN NUMBER: 00B122

BORING CREW
CREW CHIEF: GARROW
DRILLER: GARROW
LOGGER: SINGLETON

BORING RIG: SMALL SKID RIG
BORING TYPE: WASH BORE
SAMPLE TYPE: SPLIT BARREL
CHECKED BY: DLG

| DEPTH (ft) | SYMBOL | CLASSIFICATION OF MATERIALS (Description) | BLOWS PER FOOT | M.C. (%) | GRAVEL (%) | SAND (%) | FINES (%) |
|---|---|---|---|---|---|---|---|
| | | A-2-4, SiSa, brn, Moist, Rec. = 0.7 ft | 2 | 13.3 | 19.5 | 50.4 | 30.1 |
| | | BXDC, Boulder, Cleaned out casing, 4.1 ft - 5.0 ft | | | | | |
| | | Visual Classification, Fill Material: Silty sand with asphalt pavement, brn-blk, Moist, Rec. = 0.5 ft | 8 | 14.5 | | | |
| 10 | | A-4, Si, Lt/brn, Moist, Rec. = 0.8 ft | 5 | 29.1 | 7.7 | 17.0 | 75.3 |
| | | BXDC, Cobbles, Cleaned out casing, 13.5 ft - 15.0 ft | | | | | |
| | | A-1-a, SaGr, brn, Wet, Rec. = 0.5 ft | 15 | 10.0 | 71.2 | 20.6 | 8.2 |
| 20 | | No recovery. Sitly material on sampler., 20.0 ft - 22.0 ft | 8 | | | | |
| | | A-4, Si, brn, Wet, Rec. = 0.7 ft | 12 | 32.0 | 17.3 | 9.6 | 73.1 |
| | | A-4, Si, brn, Wet, Rec. = 0.8 ft | 5 | 39.9 | 0.1 | 6.7 | 93.2 |
| | | No recovery, Rock in end of sampler, 26.0 ft - 28.0 ft | 8 | | | | |
| | | A-4, SaSi, brn, Wet, Rec. = 1.3 ft | 5 | 31.2 | 0.7 | 26.6 | 72.7 |
| 30 | | A-4, SaSi, brn, Wet, Rec. = 1.0 ft | 7 | 30.8 | 6.3 | 36.8 | 56.9 |
| | | A-4, SaSi, brn, Wet, Rec. = 1.3 ft | 6 | 27.7 | 3.0 | 27.2 | 69.8 |
| | | A-4, Si, brn, Wet, Rec. = 0.8 ft | 5 | 36.0 | 0.0 | 4.9 | 95.1 |
| | | A-4, Si, brn, Wet, Rec. = 1.3 ft | 5 | 38.4 | 2.3 | 2.9 | 94.8 |
| | | A-4, Si, brn, Wet, Rec. = 2.0 ft | 7 | 36.3 | 4.9 | 1.5 | 93.6 |
| 40 | | A-4, SaSi, brn, Wet, Rec. = 1.4 ft | 4 | 32.1 | 0.0 | 44.5 | 55.5 |
| | | A-2-4, SiSa, brn, Wet, Rec. = 1.0 ft | 13 | 25.4 | 3.9 | 74.2 | 21.9 |
| | | A-2-4, Sa, brn, Wet, Rec. = 1.1 ft | 13 | 20.4 | 11.7 | 72.2 | 16.1 |
| | | A-2-4, SiSa, brn, Wet, Rec. = 1.3 ft | 7 | 26.4 | 3.5 | 67.0 | 29.5 |
| | | A-2-4, SaSiGr, brn, Wet, Rec. = 1.3 ft | 36 | 15.8 | 50.3 | 22.3 | 27.4 |
| 50 | | A-1-a, SaGr, brn, Wet, Rec. = 0.8 ft | 32 | 10.9 | 64.2 | 25.9 | 9.9 |

Hole stopped @ 52.0 ft

DRILLER'S NOTES:
1. Hole offset was moved 1.0 ft.

STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH SECTION
SUBSURFACE INFORMATION

BORING NUMBER: B-102
SHEET 1 of 1
DATE STARTED: 6/11/07
DATE COMPLETED: 6/19/07

PROJECT NAME: PITTSFIELD - STOCKBRIDGE
SITE NAME: VT-100
STATION: 260+34.20
OFFSET: -15.35
VTSPG: N 466233.27 ft E 1561668.72 ft

PROJECT NUMBER: STP 022-1(22)S
SITE NUMBER: BR-127
GROUND ELEVATION: 842.52 ft
GROUNDWATER DEPTH: 20.0 ft 6/19/07
PROJECT PIN NUMBER: 00B122

BORING CREW
CREW CHIEF: GARROW
DRILLER: GARROW
LOGGER: CARRIERE

BORING RIG: LARGE SKID RIG w/AUTO HAMMER
BORING TYPE: WASH BORE
SAMPLE TYPE: SPLIT BARREL
CHECKED BY: DLG

| DEPTH (ft) | SYMBOL | CLASSIFICATION OF MATERIALS (Description) | BLOWS PER FOOT | M.C. (%) | GRAVEL (%) | SAND (%) | FINES (%) |
|---|---|---|---|---|---|---|---|
| | | A-1-b, SiGrSa, brn, Moist, Rec. = 1.1 ft | 7 | 7.5 | 39.6 | 39.7 | 20.7 |
| | | NXDC, Cobbles, Cleaned out casing, 4.6 ft - 5.0 ft | | | | | |
| | | A-4, GrSi, brn, MTW, Rec. = 0.9 ft | 21 | 18.8 | 40.4 | 17.6 | 42.0 |
| 10 | | NXDC, Cleaned out casing, 9.9 ft - 10.0 ft | 6 | | | | |
| | | No recovery, 10.0 ft - 12.0 ft | | | | | |
| | | NXDC, Cobbles, Cored ahead & cleaned out casing, 12.7 ft - 15.0 ft | | | | | |
| | | A-1-a, Gr, brn-gry, Moist, Rec. = 0.9 ft, Broken Rock was within sample | 23 | 10.3 | 68.5 | 19.9 | 11.6 |
| | | NXDC, Cobbles, Cored ahead & cleaned out casing, 17.0 ft - 20.0 ft | | | | | |
| 20 | | A-1-a, SaGr, gry, Moist, Rec. = 0.6 ft, Broken Rock was within sample | 41 | 10.8 | 65.0 | 29.1 | 5.9 |
| | | NXDC, Cleaned out casing, 21.5 ft - 22.0 ft | | | | | |
| | | A-4, SaSi, brn, MTW, Rec. = 0.2 ft | 6 | 34.3 | 2.6 | 20.1 | 77.3 |
| | | A-4, Si, brn, MTW, Rec. = 1.4 ft | 5 | 38.8 | 0.0 | 3.6 | 96.4 |
| | | A-4, Si, brn, MTW, Rec. = 1.9 ft | 5 | 37.4 | 0.0 | 3.9 | 96.1 |
| | | A-4, Si, brn, MTW, Rec. = 1.7 ft | 3 | 38.7 | 0.0 | 19.8 | 80.2 |
| 30 | | A-4, Si, brn, Wet, Rec. = 0.4 ft | 4 | 42.6 | 2.5 | 4.9 | 92.6 |
| | | A-4, Si, brn, Wet, Rec. = 2.0 ft | 4 | 33.9 | 0.0 | 4.1 | 95.9 |
| | | A-4, Si, brn, Wet, Rec. = 1.9 ft | 2 | 41.9 | 1.6 | 2.3 | 96.1 |
| | | A-4, Si, brn, Wet, Rec. = 2.0 ft | 1 | 39.3 | 6.1 | 2.0 | 91.9 |
| | | A-1-a, SaGr, brn, Wet, Rec. = 1.1 ft, NXDC, Cleaned out casing 39.6'-40.0' | 23 | 11.9 | 49.7 | 37.1 | 13.2 |
| 40 | | No recovery, 40.0 ft - 42.0 ft | 33 | | | | |
| | | A-1-b, SaGr, brn, Moist, Rec. = 1.0 ft | 21 | 12.5 | 46.4 | 36.6 | 17.0 |
| | | A-1-a, SaGr, brn, Moist, Rec. = 0.8 ft | 17 | 10.8 | 62.6 | 26.2 | 11.2 |
| | | A-1-a, SaGr, brn, Moist, Rec. = 0.8 ft | 19 | 11.0 | 58.9 | 26.8 | 14.3 |
| | | A-1-b, SaGr, brn-gry, Moist, Rec. = 1.7 ft | 32 | 10.4 | 55.9 | 28.5 | 15.6 |
| 50 | | A-1-a, SaGr, brn, Moist, Rec. = 1.2 ft | 59 | 10.8 | 65.0 | 24.9 | 10.1 |

Hole stopped @ 52.0 ft

DRILLER'S NOTES:
1. Hole offset was moved 3.0 ft.

**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: 8/25/11

Subject: Pittsfield BHF 022-1(24)
**Natural Resource Identification**

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

The above referenced project is located on VT 100, Bridge #126 over the West Branch of the Tweed River in the town of Pittsfield.

**Wetlands/Watercourses**:
No wetlands exist within the project area. The West Branch of the Tweed River is regulated by the US COE and the River Management Division of ANR. This brook flows southeasterly through the project area.

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

**Agricultural Soils**:
All the soils within the project area are considered statewide significant.

**Fish and Wildlife Habitat**:
The West Branch of the Tweed River would support a variety of aquatic organisms. As this is a bridge project aquatic organism passage is not an issue. There is not a significant wildlife linkage area within this area of VT 100 (Regional linkage score of 4).

**Temporary Bridge Options:**
A temporary bridge on either side of the existing structure would be ok for natural resources.

**Potential Impacts**:
Eliminating the center pier and spanning the river should be evaluated during the design process of this project. This would be a minimization effort to potential impacts on the West Branch of the Tweed River. Minimal impacts to natural resources are anticipated from this project.

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

Cc

Chris Williams, VTrans Project Manager
Natural Resource Environmental File

Z:\PDD\EnvironmentalHydraulics\GlennGingras\Windsor County\Pittsfield BHF 022_1(24)\nrid_pittsfieldBHF022_24_82511.docx

**AGENCY OF TRANSPORTATION** **OFFICE MEMORANDUM**

**FROM:** Jeannine Russell, VTrans Archaeology Officer
**DATE:** 10/17/2011
**SUBJECT:** **ARCHAEOLOGICAL RESOURCE ASSESSMENT ONLY. NOT A CLEARANCE.**
**Field Visit: YES** ☒ **NO** ☐

**Project Name:** Pittsfield Bridge 126
**Project Number:** BHF 022-1(24)

On 10/17/2011, 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 10/17/2011 is adequate to identify archaeological resources, and **Does Not** have a CADD map with the archaeological resources on it.
**Date ARA was approved** 10/17/2011.

☐ **Plans dated** ______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
_________________________________________ 10-17-11
(***Signature of VTrans Archaeology Officer***) (***Date***)

**Prepared by Brennan Gauthier, VTrans Assistant Archaeologist**

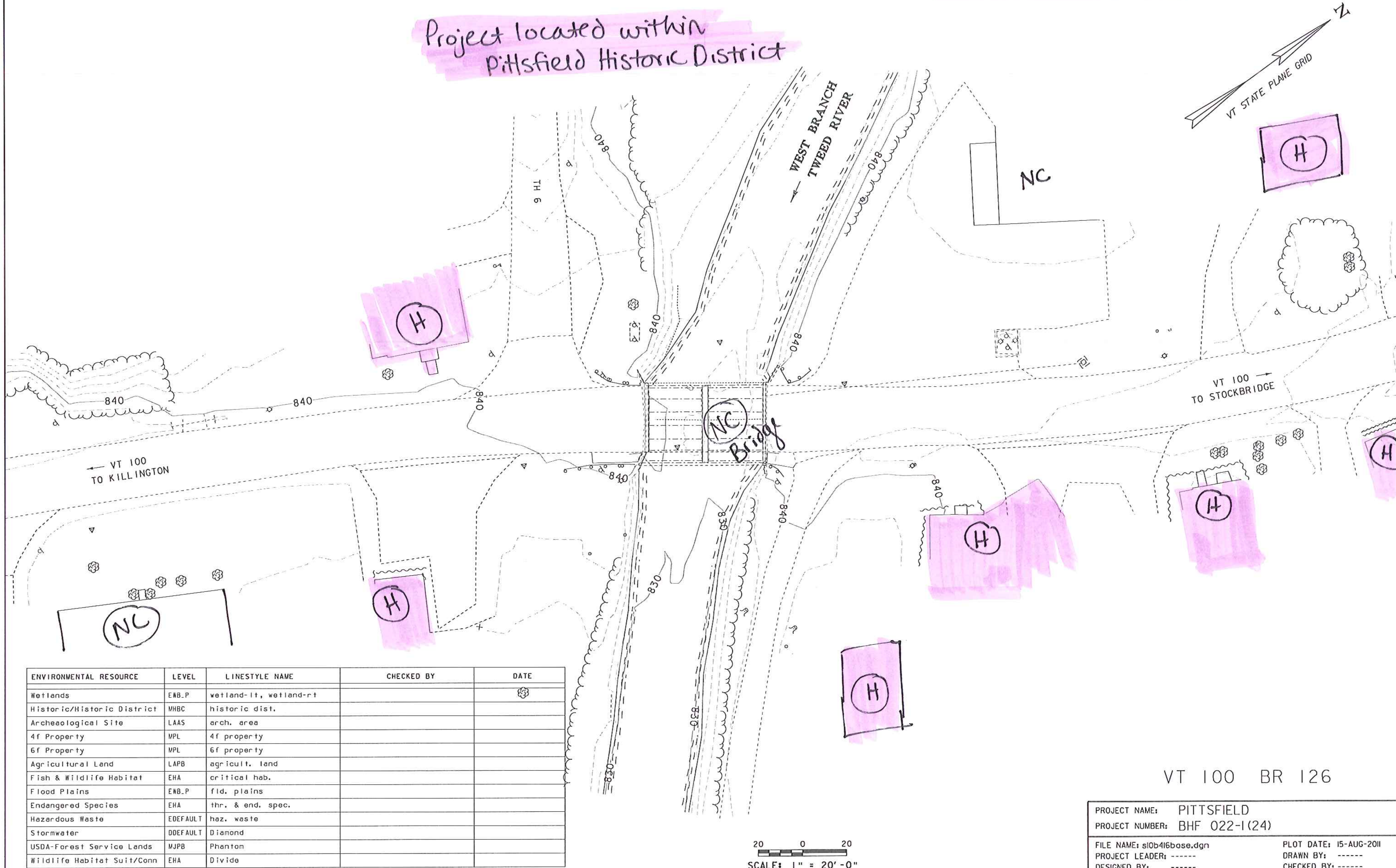
**Project:** Pittsfield BHF 022-1(24)

Additional Comments from Page 1:

There are no archaeologically sensitive areas within the project limits.

Historic Resource ID 9/15/2011 K.O'Shea

Project located within Pittsfield Historic District



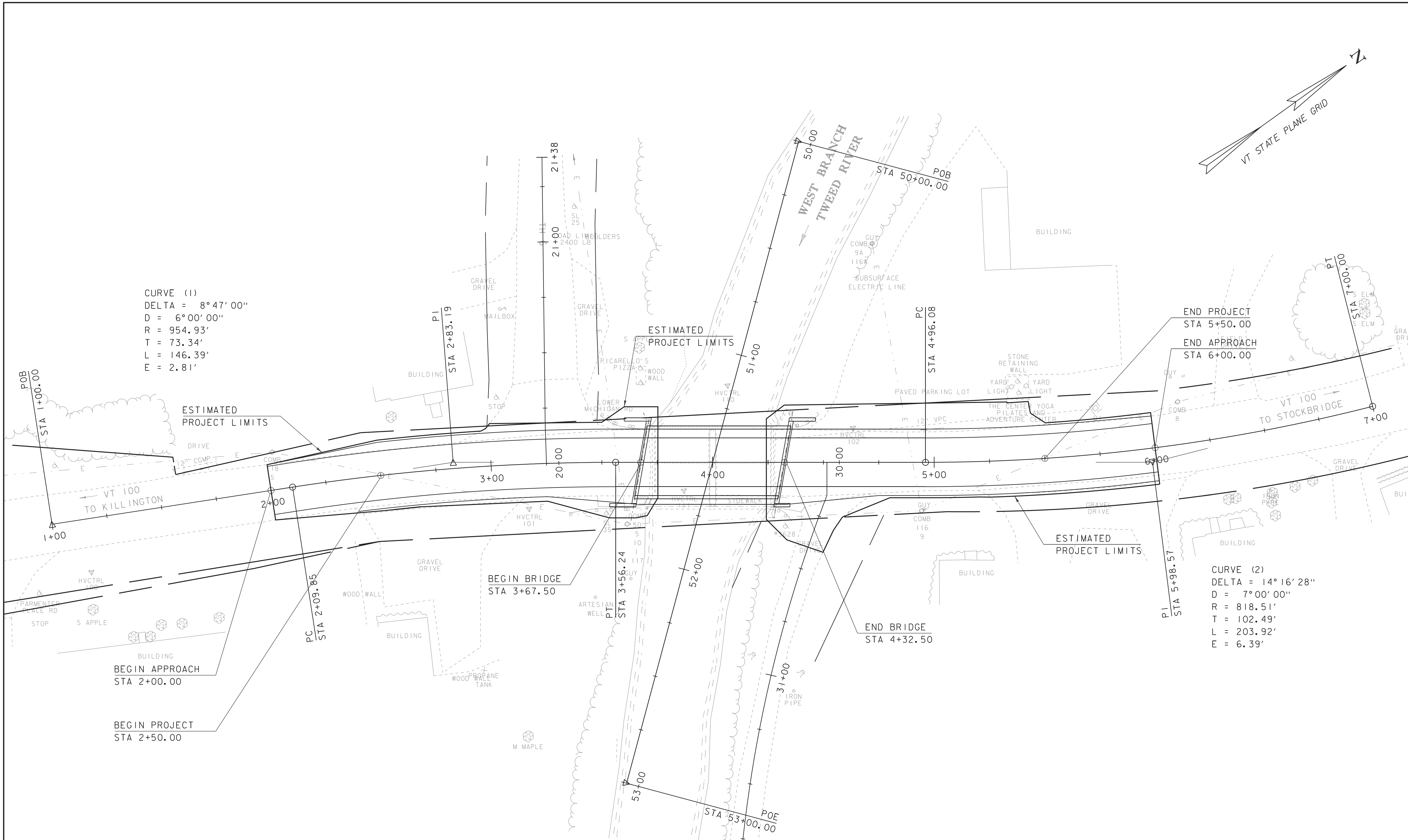

| ENVIRONMENTAL RESOURCE | LEVEL | LINESTYLE NAME | CHECKED BY | DATE |
|---|---|---|---|---|
| Wetlands | EWB.P | wetland-lt, wetland-rt | | |
| Historic/Historic District | MHBC | historic dist. | | |
| Archeological Site | LAAS | arch. area | | |
| 4f Property | MPL | 4f property | | |
| 6f Property | MPL | 6f property | | |
| Agricultural Land | LAPB | agricult. land | | |
| Fish & Wildlife Habitat | EHA | critical hab. | | |
| Flood Plains | EWB.P | fld. plains | | |
| Endangered Species | EHA | thr. & end. spec. | | |
| Hazardous Waste | EDEFAULT | haz. waste | | |
| Stormwater | DDEFAULT | Diamond | | |
| USDA-Forest Service Lands | MJPB | Phantom | | |
| Wildlife Habitat Suit/Conn | EHA | Divide | | |

VT 100 BR 126

PROJECT NAME: PITTSFIELD
PROJECT NUMBER: BHF 022-1(24)

FILE NAME: s10b416base.dgn
PROJECT LEADER: ------
DESIGNED BY: ------
RESOURCE ID LAYOUT SHEET

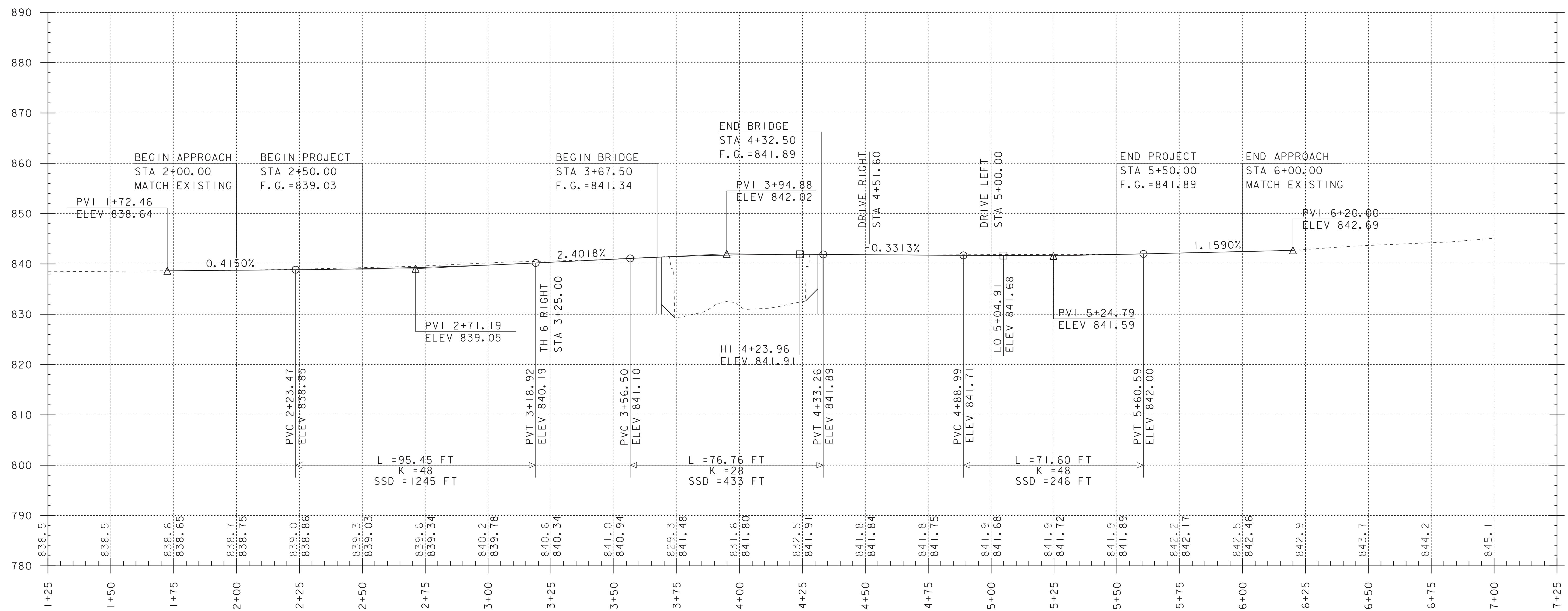
PLOT DATE: 15-AUG-2011
DRAWN BY: ------
CHECKED BY: ------
SHEET 1 OF 1




PROJECT NAME: PITTSFIELD
PROJECT NUMBER: BHF 022-1(24)

FILE NAME: s10b416bdr.dgn
PROJECT LEADER: C.P.WILLIAMS
DESIGNED BY: G.SWEENEY
LAYOUT SHEET

PLOT DATE: 27-NOV-2012
DRAWN BY: D.D.BEARD
CHECKED BY: G.SWEENEY
SHEET 1 OF 13




# PROFILE ALONG VT 100

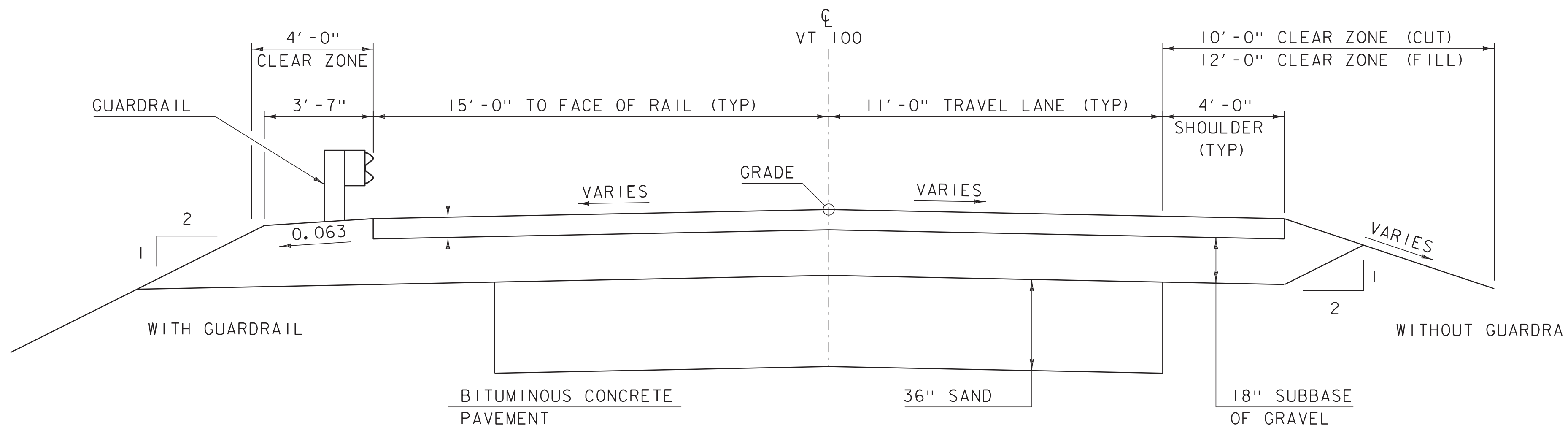
**HORIZONTAL SCALE: 1" = 20'-0"**
**VERTICAL SCALE: 1" = 10'-0"**

NOTE:

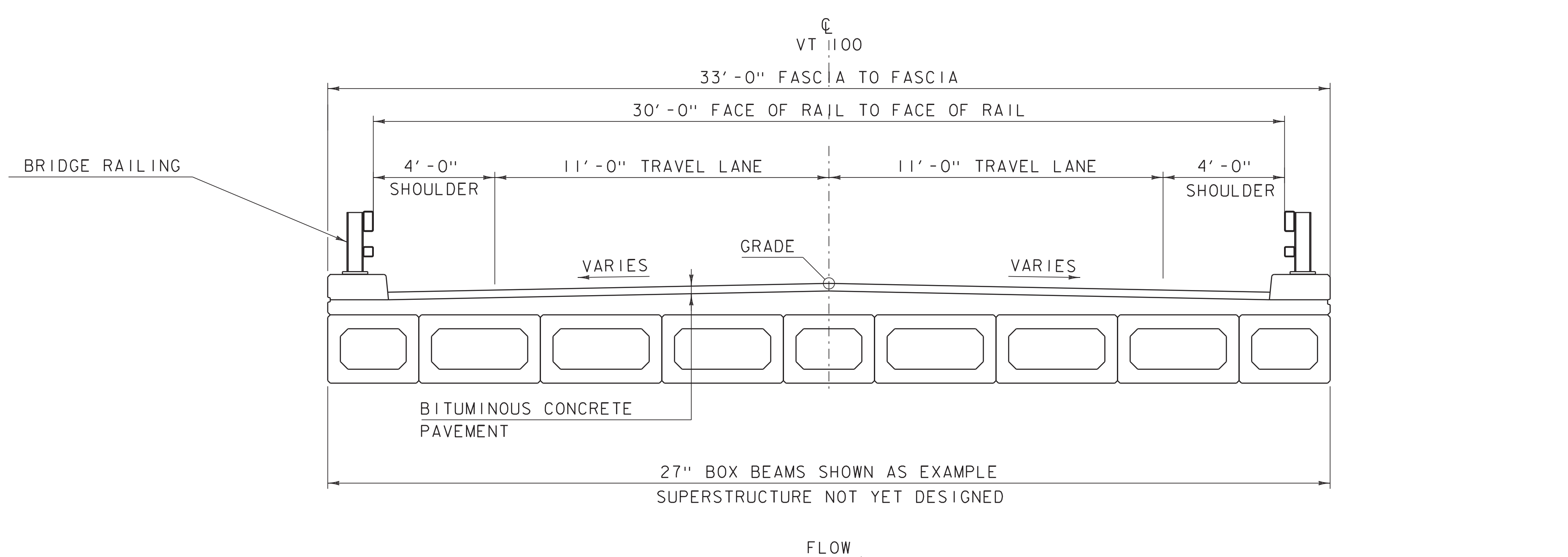
ELEVATIONS SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG PROPOSED CENTERLINE.

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

| | |
|---|---|
| PROJECT NAME: PITTSFIELD | |
| PROJECT NUMBER: BHF 022-1(24) | |
| FILE NAME: s10b416pro.dgn | PLOT DATE: 25-JUL-2012 |
| PROJECT LEADER: C.P. WILLIAMS | DRAWN BY: D.D.BEARD |
| DESIGNED BY: G.SWEENY | CHECKED BY: G.SWEENY |
| VT 100 PROFILE | SHEET 3 OF 13 |

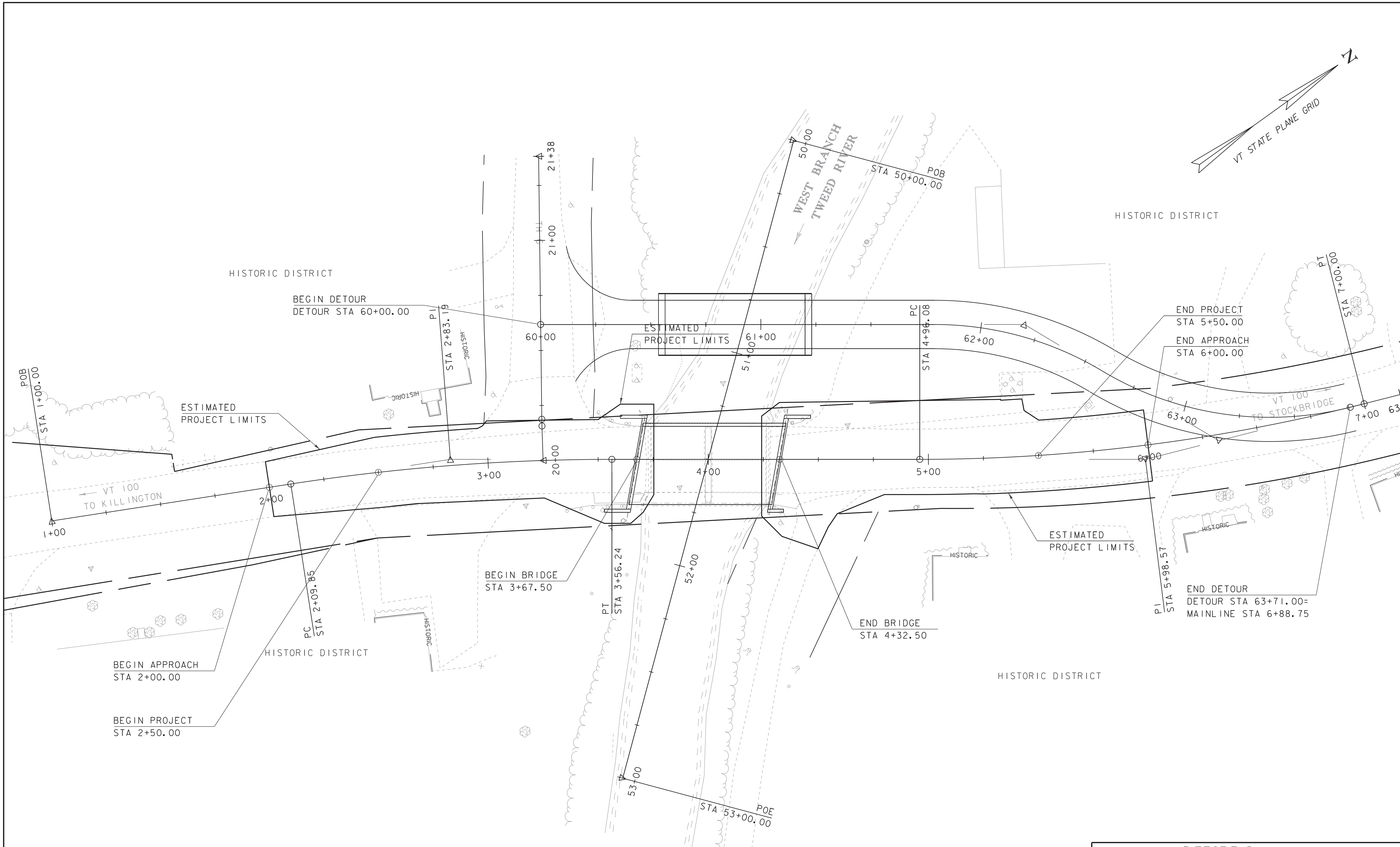



PROPOSED VT 100 TYPICAL SECTION




PROPOSED BRIDGE TYPICAL SECTION

| | |
|---|---|
| PROJECT NAME: PITTSFIELD | |
| PROJECT NUMBER: BHF 022-1(24) | |
| FILE NAME: 10b415\s10b415typical.dgn | PLOT DATE: 27-NOV-2012 |
| PROJECT LEADER: C.P.WILLIAMS | DRAWN BY: D.D.BEARD |
| DESIGNED BY: G.SWEENY | CHECKED BY: G.SWEENY |
| TYPICAL SECTIONS | SHEET 2 OF 13 |

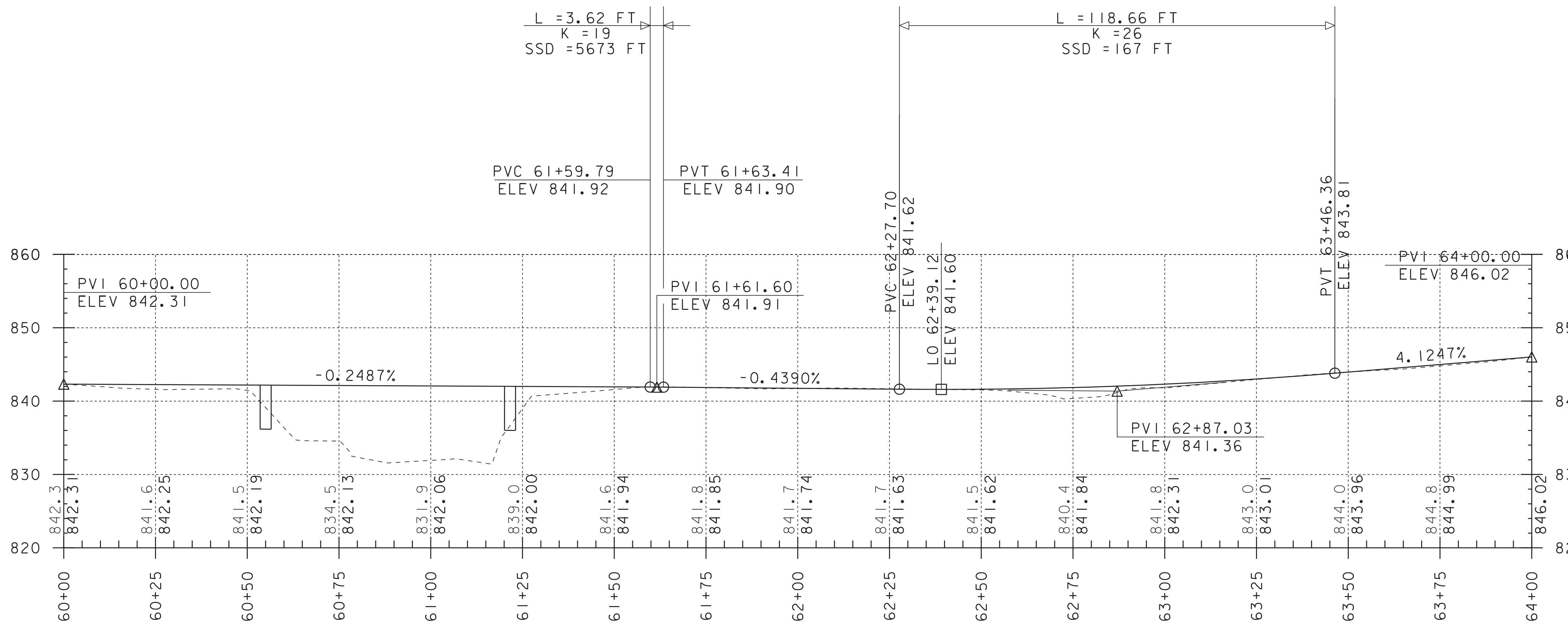



UPSTREAM DETOUR LAYOUT

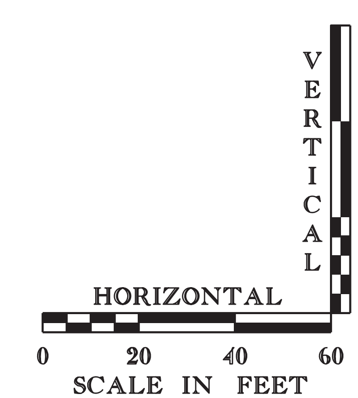
20 0 20

SCALE: 1" = 20'-0"

| | |
|---|---|
| PROJECT NAME: | PITTSFIELD |
| PROJECT NUMBER: | BHF 022-1(24) |
| FILE NAME: s10b416bdr.dgn | PLOT DATE: 25-JUL-2012 |
| PROJECT LEADER: C. WILLIAMS | DRAWN BY: D.D.BEARD |
| DESIGNED BY: ----- | CHECKED BY: G.SWEENY |
| UPSTREAM DETOUR LAYOUT SHEET | SHEET 10 OF 13 |




UPSTREAM TEMPORARY BRIDGE PROFILE




NOTE:

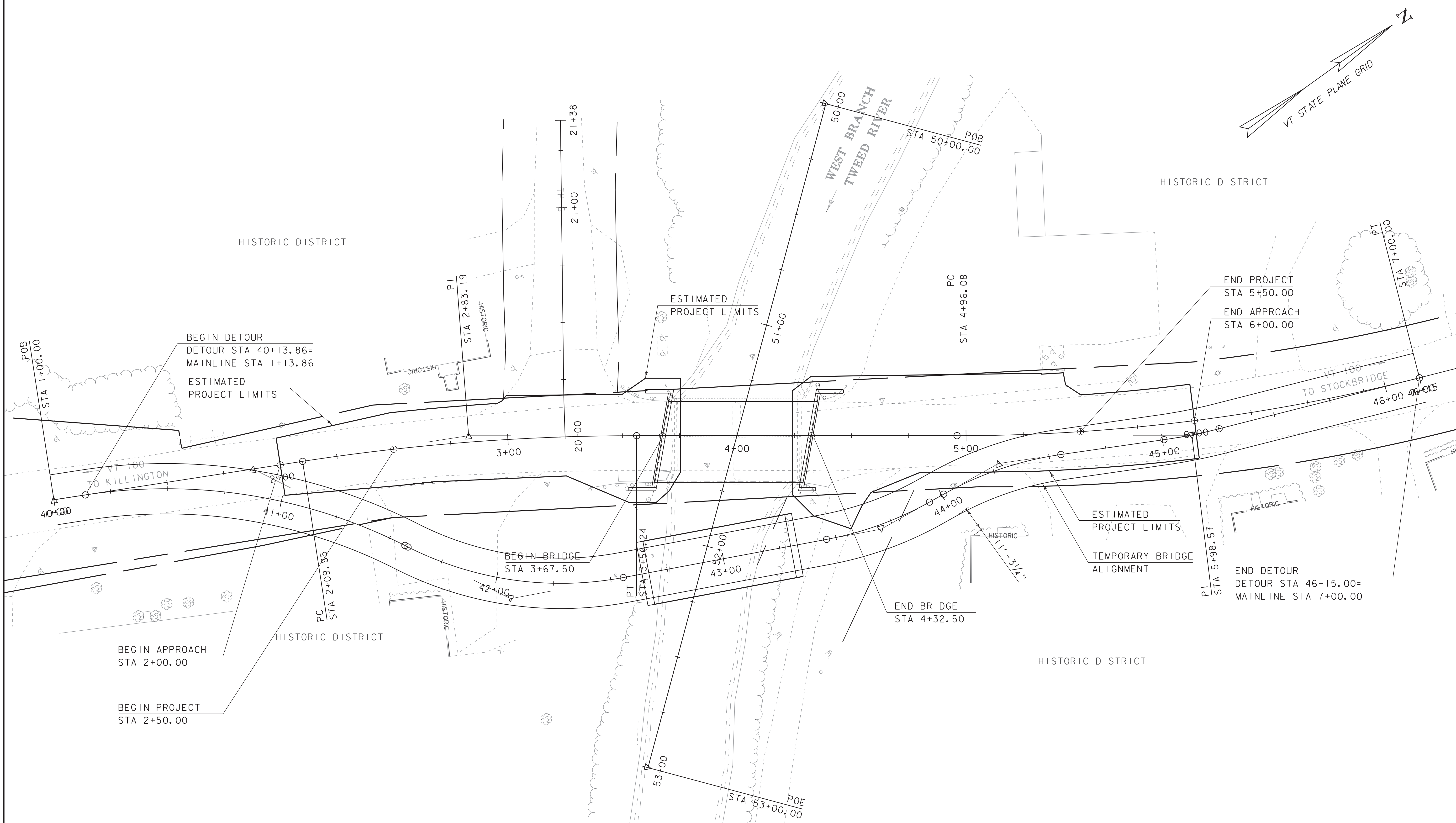
GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: PITTSFIELD
PROJECT NUMBER: BHF 022-1(24)

FILE NAME: 10b416\sl0b416tempbridge.dgn
PROJECT LEADER: C.P.WILLIAMS
DESIGNED BY: G.SWEENY
UPSTREAM TEMPORARY BRIDGE PROFILE

PLOT DATE: 25-JUL-2012
DRAWN BY: D.D.BEARD
CHECKED BY: G.SWEENY



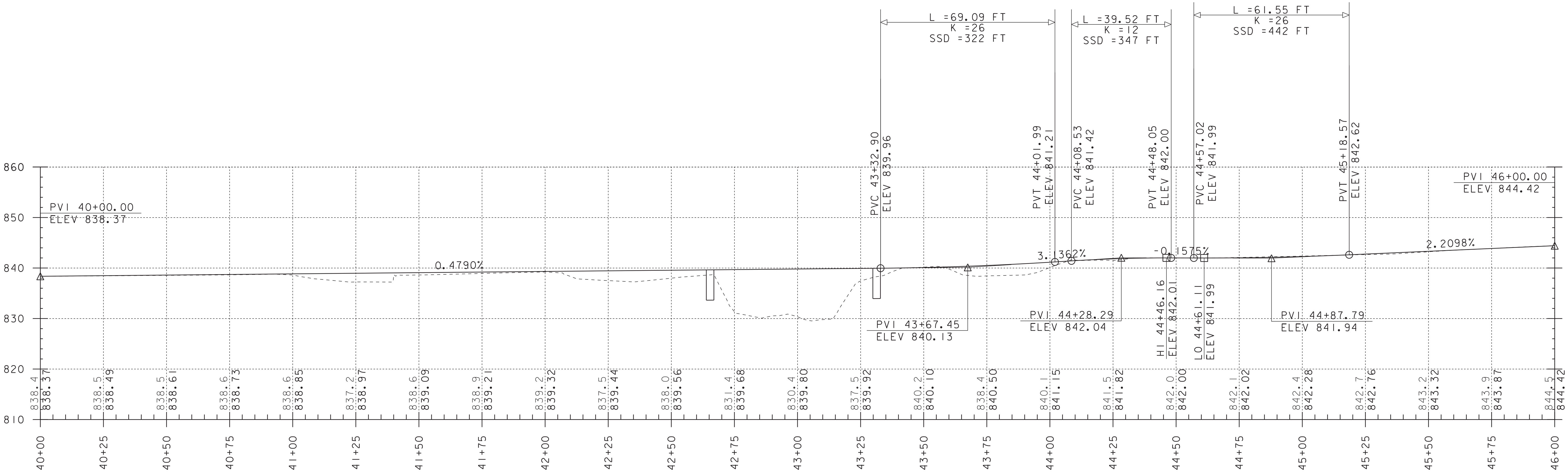

## DOWNSTREAM DETOUR LAYOUT

20 0 20

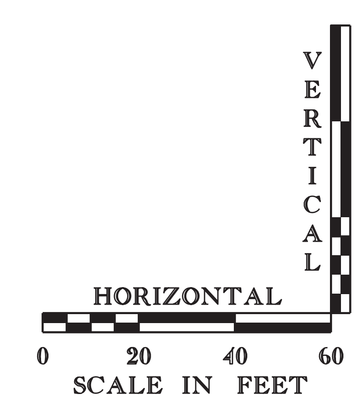
SCALE: 1" = 20'-0"

| | |
|---|---|
| PROJECT NAME: | PITTSFIELD |
| PROJECT NUMBER: | BHF 022-1(24) |

| | |
|---|---|
| FILE NAME: s10b416bdr.dgn | PLOT DATE: 25-JUL-2012 |
| PROJECT LEADER: C. WILLIAMS | DRAWN BY: D.D.BEARD |
| DESIGNED BY: ----- | CHECKED BY: G.SWEENY |
| DOWNSTREAM DETOUR LAYOUT SHEET | SHEET 12 OF 13 |




DOWNSTREAM TEMPORARY BRIDGE PROFILE




NOTE:

GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

| | |
|---|---|
| PROJECT NAME: PITTSFIELD | |
| PROJECT NUMBER: BHF 022-1(24) | |
| FILE NAME: 10b416\sl0b416tempbridge.dgn | PLOT DATE: 25-JUL-2012 |
| PROJECT LEADER: C.P.WILLIAMS | DRAWN BY: D.D.BEARD |
| DESIGNED BY: G.SWEENY | CHECKED BY: G.SWEENY |
| DOWNSTREAM TEMPORARY BRIDGE PROFILE | SHEET 13 OF 13 |