STATE OF VERMONT
AGENCY OF TRANSPORTATION

Scoping Report

FOR

Huntington BF 0211(32)

FAS ROUTE 0211, Bridge 8 OVER the Huntington River

January 30, 2014

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I. Site Information

Bridge 8 is located in a rural area along the Main Road, FAS 0211, also Town Highway 1 (TH-1) approximately 4.0 miles south of the junction with Hinesburg Hollow Road (TH-2). 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 (Class 2 Town Highway)
Bridge Type	Concrete Deck on Rolled Steel Beams
Bridge Span	63 feet long
Year Built	1934
Ownership	Town of Huntington

Need

The following is a list of the deficiencies of Bridge 8 and TH-1 in this location.

1. The bridge is listed as Functionally Deficient. The lane and shoulder widths are substandard.

2. The deck and superstructure have ratings of 5 (Fair). There is significant deterioration in the superstructure elements and in the deck, especially along the deck fascias.

3. The bridge and approach rails do not meet the current standard.

4. The horizontal curve on the north approach to the bridge does not meet the current standard. Vertical geometry standards are also not met.

Traffic

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

TRAFFIC DATA	2016	2036
ADT	1100	1200
DHV	150	160
ADTT	85	120
%T	9.8	12.9
%D	65	65

Design Criteria

The design standards for this bridge project are the Vermont State Standards, dated October 22, 1997. Minimum standards are based on an ADT < 1500 and a design speed of 45 mph.

Design Criteria	Source	Existing Condition	Minimum Standard	Comment
Approach Lane and Shoulder Widths	VSS Table 5.3	9'/2' (22')	9'/3' (24')[1]	
Bridge Lane and Shoulder Widths	VSS Table 5.3	9'/1.25' (20.5')	9'/3' (24')[1]	Substandard
Clear Zone Distance	VSS Table 5.5	1 sign in clear zone	12' fill / 10' cut	
Banking	VSS Section 5.13	Varies	8% (max)	Substandard
Speed	VSS Section 5.3	45 mph	45 mph	
Horizontal Alignment	AASHTO Green Book Exhibit 3-26	Bridge is on tangent. Northern Approach is on R=500' curve, southern approach is on R= 1500' curve	>8% banking for northern curve, 5.4% banking for southern curve	Substandard
Vertical Grade	VSS Table 5.6	Bridge located between sag vertical curves on a 2% slope	8% (max) for rolling terrain	
K Values for Vertical Curves	VSS Table 5.1	K=25 northern curve K=58 southern curve	80 crest / 70 sag	Substandard
Vertical Clearance Issues	VSS Section 5.8	None noted	14'-3" (min)	
Stopping Sight Distance	VSS Table 5.1	176' north 319' south	325'	Substandard
Bicycle/Pedestrian Criteria	VSS Table 5.8	0.25'	3' Shoulder[1]	Substandard
Bridge Railing	Structures Manual Section 13		TL-4	Substandard
Hydraulics	VTrans Hydraulics Section	Passes Q_{50} storm event with 4.5 ft. of freeboard	Pass Q_{50} storm event with 1.0' of freeboard	
Structural Capacity	SM, Ch. 3.4.1	Unknown	Design Live Load: HL-93	

[1] Vermont State Standards, Table 5.3 requires 9'/2' widths. However, Table 5.8, with shared use in mind, increases the shoulder to 3' on bridges or where truck traffic exceeds 10%. Thus, 9'/3' is proposed for both the bridge and the roadway within the project.

Inspection Report Summary

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

08/09/2012 - Bridge deck may be a candidate for a rigid overlay along with curb and fascia reconstruction. Beams are salvageable but progressive corrosion is slowly degrading strength. Steel needs extensive cleaning and painting if to remain for extended years of service. Abutments could use some general concrete repair work. Roadway geometry and limited remaining service life of the bridge

deck may prompt deck and superstructure upgrade with prestressed superstructure. Paddleboard is also missing at the northwest corner. ~ MJ/DK

08/17/2010 This bridge needs to be replaced or a rehab project in the near future. The deck needs to be replaced, it is saturated throughout. The beams need to be cleaned and painted. The fascia beams have moderate to heavy section loss. The laid up stones on the downstream end of abutment 1 are moving towards the channel. The abutments have extensive cracking with staining. The ends of abutment 1 are heavily spalled. -DCP

Hydraulics

A Preliminary Hydraulics Report was done for this project. The existing bridge configuration easily meets the hydraulic standards, passing the Q_{50} storm event with 4.5' of freeboard. Note that the Q_{50} storm applies to all Collector routes, including those on Town Highways. The bridge does not span the Bank Full Width (BFW) as determined by the VT. ANR model. The existing low beam elevation has been determined to be at elevation 788.4.

Three options were outlined in the Preliminary Hydraulics Report in the event that the bridge is replaced:

- Maintain the existing span, remove the existing stone fill constricting the channel, and maintain a low beam elevation higher than 785.3. This option does not span the calculated BFW.
- Construct the bridge with a single span normal to the river of 47 ft. and no stone fill in front of vertical abutments. Low chord should be higher than 783.2.
- Construct the bridge with a single 83 ft span normal to the river. Place stone fill in front of the abutments. This option spans the BFW. Low beam elevation should be higher than 783.1.

Utilities

Aerial: Aerial telephone lines exist on the east side of the bridge. These will likely have to be relocated for the project. Several cross the roadway, one of which is over a portion of the bridge.

Buried: Buried utilities exist south of the bridge on the east side. Impacts are not expected.

Utilities can be seen on plans in the appendix.

Right Of Way

The existing Right-of-Way has been determined to be 3 rods, or 49.5 ft. It is shown on the Layout sheet.

Resources

The resources present at this project are shown on the Existing Conditions Layout Sheet.

Biological:

Wetlands

Forested wetlands have been identified in the Northeastern quadrant of the project area. The area is roughly 2-5 acres in size and is classified as a Class II wetland, which requires a 50ft. regulatory buffer from the wetland boundary. This wetland area appears to encroach into the Right of Way for the roadway and bridge. The Huntington River is a Class B waterway, which will require efforts to minimize water quality impacts. The US Army Corps of Engineers and the State Agency of Natural Resources would have jurisdiction over activities below ordinary high water and wetlands on this project.

Wildlife Habitat

Wildlife habitat is generally good in the surrounding area and wildlife movement through the area is moderately high. Deer wintering habitats have been identified to the east of the project area. There are no mapped federal or state listed rare, threatened or endangered species in the project area.

Agricultural

With the exception of the Northeast quadrant, Prime and statewide significant soils exist throughout the project area.

Archaeological:
Archaeologically sensitive areas were identified in the Southwest and Northwest quadrants of the project area. It is unlikely that these areas will be impacted by the project.

Historic:
This is not a historic bridge or area.

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

Stormwater:
There are no stormwater concerns for this project.

II. Maintenance of Traffic

The Vermont Agency of Transportation has created 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

If a temporary bridge is chosen for traffic maintenance, a one lane bridge with alternating traffic controlled by temporary traffic signals at each end would be appropriate.

Initial investigations indicate that any temporary bridge should be located downstream of the existing structure. Features that discourage location on the upstream side include the fact that a branch of the river runs parallel to the roadway, which would require a long, expensive temporary bridge that would be difficult to install and remove. In addition, a temporary bridge on the upstream side would have impacts to Class II wetlands and require more extensive tree removal. Temporary Right of Way would be required.

Later in this report, an off-alignment alternative is discussed. Traffic would be maintained in that alternative by utilizing the existing bridge during construction. The existing bridge would be demolished after completion of the new bridge.

Advantages: Traffic flow would be maintained through the project corridor during construction.

Disadvantages: This option would require the acquisition of additional temporary rights, and would be relatively high in cost. There would be some delays and disruption to traffic, since the road would be reduced to one-way traffic, and the speed limit reduced. A downstream temporary bridge would require overhead utilities to be relocated.

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 wetlands and adjacent property owners.

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

The time required to develop a phased construction project is the same as that required to develop a project which is not phased. However, the time required to complete a phased construction project increases because some of the construction tasks have to be performed multiple times. This increase in the length of construction time along with the inconvenience of working around traffic and the effort involved in coordinating the joints between the phases causes the construction costs for phased construction to be larger than construction which is not phased. Another negative aspect of phased construction is the decreased safety of the workers and vehicular traffic, which is caused by increasing the proximity and extending the duration that workers and moving vehicles are operating in the same confined space.

Phased construction is usually considered when the benefits include reduced impacts to resources and decreased costs and development time by not requiring the purchase of additional Right Of Way.

Additional Right of Way would not be required for rehabilitation work, but would be required for all of the full replacement alternatives considered. Also, due to the width of the existing bridge, phasing is not possible without shifting the alignment of the bridge, or widening the bridge beyond that required by the standards to allow traffic to be maintained on the new structure during the second phase of construction. Therefore, phasing construction is not considered further in this report.

Option 3: Off-Site Detour

This option would close the bridge and reroute traffic. Since this is a Town-owned bridge, it would be the responsibility of the Town to determine the detour and manage the sign selection and placement. The Town would also be responsible for management of emergency services through the closure period. A possible detour that may be considered by the Town is as follows:

Use TH-30 (Moody Road) to TH-31 (Carse Road), back to TH-1 (Main Road). There are narrow bridges on both of these Class 3 gravel roads, one of which is rated for 16,000 lb (Bridge 28 on Moody Road). The through route on TH-1, Main Road, between Carse Road and Moody Road is approximately 1.0 mile. The distance between these two points on the detour is approximately 1.3 miles, so the detour adds approximately 0.3 miles to the normal through route. The total end to end distance around this detour is approximately 2.3 miles. A map of the detour can be found in the appendix.

Another potential detour was reviewed. The Town could route trucks from the VT 17 in Starksboro westward to VT 116 in Bristol, north on VT 116 to Hollow Road in Hinesburg. The detour then returns to Main Road in Huntington. The through route is 8 miles, the detour route 22 miles. The added distance on the detour is 14 miles, and the end to end distance is 30 miles. Most of this detour route is on State Highways. What is not on State Highways is Class 2 Town Highway, comparable to Main Road. Note that if traffic is to be routed onto Town Highways in other towns, agreements with those towns will be required. This route is shown in the appendix.

Advantages: Utilizing an off-site detour would eliminate the need to use a temporary bridge to maintain traffic. This would decrease the cost and amount of time required to construct a project in this location. The impacts and amount of temporary rights required to construct a project in this location would also be reduced for this option. The safety of both construction workers and the travelling public will be improved by removing traffic from the construction site. The Town's share of the project cost is reduced if an off-site detour is used.

Disadvantages: Traffic flow would not be maintained through the project corridor during construction.

III. Alternatives Discussion

Bridge 8 is described as Functionally Deficient in the latest Inspection Report, with deteriorating structural elements as well. Deficiencies include lane and shoulder width, horizontal and vertical geometry, and bridge railing. The alternatives considered here focus on correcting the deficiencies of the bridge. Some also include improvements to the roadway.

No Action

This alternative would leave the bridge in its current condition. Deterioration would continue, and maintenance efforts would need to increase. It is realistic to assume that patching or remedial repairs will be required within the next 10 years, but this solution would not significantly improve the structural status of the bridge. In addition, the substandard bridge width would not be corrected, and no improvement to horizontal or vertical geometry would be made. This alternative is not recommended.

Maintenance and Repair

Maintenance and Repair would include removal of pavement, patching the deck, cleaning and recoating the steel superstructure, replacing the bearings, minor patching of the substructure, adding a membrane and new pavement, and replacing the bridge and approach railing. This alternative is not recommended because it would not correct such deficiencies as lane and shoulder width and roadway approach geometry. The structural integrity of new rail would be difficult to establish in a patched deck. Only 10 – 20 years of extended service would be gained before a major rehab of the deck would be needed.

Alternative 1: Superstructure Replacement

An option for this bridge would include deck and superstructure replacement, and some substructure cleaning and patching. The existing substructure is in satisfactory condition (rated 6), and is stable for scour according to the bridge inspection report. It is reasonable to assume that it can safely carry anticipated traffic loads for an additional 40 years. There are some concerns that will need to be addressed:

- Bedrock is visible under the NE wingwall, so it is possible that all or some of the northern abutment is supported on rock. The exposure of some of the bottom of the northern abutment and wingwall suggests that some scour may have occurred.
- The spaces between the pillars of the original northern skeleton abutment have been filled in with concrete, possibly due to erosion or instability of the embankment.
- The southern abutment is a skeleton abutment as well. The spaces between pillars have not been filled in. There is a large volume of stone fill in front of the abutment. The Preliminary Hydraulics Report suggests removing the stone fill in front of the southern abutment to improve hydraulic performance. If the existing substructures are to remain however, careful consideration should be given to leaving the stone fill in place to provide some scour protection for the abutment, and stability and erosion protection for the stream bank.

If this alternative is chosen, the final hydraulics report and scour calculations will be helpful in evaluating the long term stability of the substructures. It may be that consideration should be given to measures that would mitigate scour, such as a cut-off wall if appropriate or an alarm device to notify town officials in the event of excessive scour.

This alternative could be constructed rapidly using either Prefabricated Bridge Units (PBUs) or NEXT Beams. The existing low beam elevation could be maintained and the project would meet hydraulic standards, but BFW would not be met. The substandard bridge lane and shoulder widths would not be corrected in this alternative. By observation, the width, configuration, and condition of the existing

substructures at the ends would make it difficult to add on to the superstructures. Because of the complexity in anchoring to older concrete, the expense, and the impacts associated with working in the stream, widening old abutments usually does not compare well with simply replacing the abutments. The approach roadway geometry would not be corrected in this alternative. This alternative could add approximately 40 years to the life of this bridge, after which time it would need to be fully replaced. Since the existing deck is quite narrow, phasing the construction would not be an option for traffic maintenance. A temporary bridge or an off-site detour could be used.

Advantages: This economical alternative would address the worst of the structural deficiencies of the existing bridge. Right-of-Way would not be required unless a temporary bridge is used.

Disadvantages: Several substandard conditions would not be corrected if this alternative is used. They include bridge and approach roadway widths, and approach roadway geometry.

Alternative 2: New Structure, Existing Alignment, 70 ft. Span

This alternative would replace the existing bridge with all new elements; deck and railing, superstructure and substructure. The various considerations are outlined below:

a. Bridge Width

The current rail to rail width is 20.5 ft. This does not meet the minimum standard of 24 feet. Since a new bridge would be expected to provide 80+ years of service, the bridge geometry should meet the minimum standards. A 24 ft. rail to rail width would be proposed.

b. Bridge Length and Skew

The existing bridge, which is 63 ft. long with an opening between abutment faces normal to the river of approximately 42 ft., meets the hydraulic standard. It has a skew of approximately 45 degrees, which matches the existing channel well. This alternative, with a 70 ft. span along the roadway and a 45 degree skew, offers a clear span normal to the river that exceeds the 42 ft. existing clear distance and meets the hydraulic standard. It does not meet the BFW.

c. Alignment

The existing horizontal and vertical alignments are substandard. The new 70 ft. bridge would be built on the existing horizontal alignment. In this scenario, the horizontal geometry could be improved by adjusting the banking of the roadway, but could not be made standard for the curve north of the bridge because the 500 ft. radius for that curve would require a bank slope that exceeds the maximum listed in the Vermont State Standards. The substandard vertical geometry, including K value and sight distance, would not be corrected. This is because the intent of this alternative is to present to the Town an option that provides a new structure but limits the scope of work and impacts along the roadway. Later in this report, an alternative is presented that includes corrections to the substandard geometry.

d. Superstructure Type

A prefabricated superstructure is beneficial for minimizing construction time, especially if the bridge is closed. A straight 70 ft. span would be a routine span for either prefabricated bridge units (PBUs) or NEXT Beams. The superstructure depth is not critical for meeting hydraulic standards.

e. Substructure Type

There is visible bedrock in the NE quadrant of the project, in the streambed, appearing to support at least a portion of the existing substructure on that side. Information from drilling logs for nearby water wells implies that the area may be underlain by gravel overlaying glacial till and that bedrock depths at these wells vary from 8 to 99 ft. No other subsurface information is available at this time. Based on this limited subsurface information, it was assumed that the substructures for this alternative would likely be cast in place vertical abutments, either founded on rock or at 6 ft. below bottom of stream. This type of substructure is not well suited for accelerated construction. Borings are needed to determine the substructure type more conclusively.

f. Maintenance of Traffic

Either temporary bridge or off-site detour would be feasible traffic maintenance methods. The town will have the choice of what duration of closure is tolerable and whether a temporary bridge is affordable, given the increase in the Town's share of the project cost if a temporary bridge is used.

Alternative 3: New Structure, Modified Alignment, 127 ft. Span

This alternative would replace the existing bridge with all new elements; deck and railing, superstructure and substructure. The various considerations are outlined below:

a. Bridge Width

The current rail to rail width is 20.5 ft. This does not meet the minimum standard of 24 feet. Since a new bridge would be expected to provide 80+ years of service, the bridge geometry should meet the minimum standards. A 24 ft. rail to rail width would be proposed.

b. Bridge Length and Skew

A 127 ft. span bridge with a 45 degree skew exceeds the 83 ft. clear span normal to the river that is required to meet the hydraulic standard.

c. Alignment

The existing horizontal and vertical alignments are substandard, although the bridge meets the hydraulic standard as is. A new 127 ft. bridge could be built on a modified alignment, slightly west of the existing, which would allow all standards to be met, except for roadway banking. Banking would meet standards on the bridge, but would run out to match the existing conditions in a shorter distance than normal, to avoid unnecessarily lengthening the project. To meet vertical geometry standards, the

bridge would be raised approximately 2.0 ft. The bridge would be constructed on a new 1250 ft. radius curve.

d. Superstructure Type

The curved 127 ft. span would probably best be done using girders and cast-in-place deck, since NEXT Beams are not common for that span length and curved (PBUs) are difficult to prefabricate and transport. Therefore, the rapid construction feature may be lost on this alternative. The superstructure depth is not critical for meeting hydraulic standards.

e. Substructure Type

There is visible bedrock in the NE quadrant of the project, in the streambed, appearing to support at least a portion of the existing substructure on that side. Information from drilling logs for water wells in this portion of the Town implies that the area may be underlain by gravel overlaying glacial till and that bedrock depths at these wells vary from 8 to 99 ft. No other subsurface information is available at this time.

Integral abutments are the preferred substructure type. This type of substructure would provide the best scour protection and is suited to rapid construction. If it is determined by borings that driving piles to a depth appropriate for integral abutments is not feasible, then cast-in-place abutments would be considered. Borings are needed to determine the substructure type more conclusively.

f. Maintenance of Traffic

Either temporary bridge or off-site detour would be feasible traffic maintenance methods. Using either a curved superstructure or cast-in-place substructures will lengthen the time of construction. The Town will have the choice of what duration of closure is tolerable and whether a temporary bridge is affordable, given the increase in the Town's share of the project cost if a temporary bridge is used.

Alternative 4: New Structure, New Alignment, 135 ft. Span

This alternative would replace the existing bridge with all new elements; deck and railing, superstructure and substructure. The various considerations are outlined below:

a. Bridge Width

The current rail to rail width is 20.5 ft. This does not meet the minimum standard of 24 feet. Since a new bridge would be expected to provide 80+ years of service, the bridge geometry should meet the minimum standards. A 24 ft. rail to rail width would be proposed.

b. Bridge Length and Skew

Alternative 4 would utilize a roadway span of 135 ft., which at a 48 degree skew, provides a clear span normal to the river that exceeds the 83 ft. recommended by the preliminary hydraulics report. The new alignment would be just far enough to the west to maintain 2 way traffic on the existing bridge during

construction. This configuration includes roadway improvements, meets the hydraulic standard, and spans the BFW.

c. Alignment

The existing horizontal and vertical alignments are substandard, but meet the hydraulic standard. A new 135 ft. bridge would be built off-alignment, west of the existing. A straight bridge would be proposed, with a curve at each end. This would allow all standards to be met with the exception of roadway banking. Banking would meet standards on the bridge, but would run out to match the existing conditions in a shorter distance than normal, to avoid unnecessarily lengthening the project. The curve radii would be approximately 1200 ft at the south end, requiring banking of approximately 6.1%, and 600 ft. at the north end, requiring banking of approximately 7.9%. The bridge and roadway at the bridge would be raised about 2 ft. above the current elevation to satisfy vertical geometry standards.

d. Superstructure Type

A prefabricated superstructure would be preferred so that construction time can be minimized. As the length proposed in this alternative is out of the normal range for NEXT Beams, PBUs would be recommended. These could be prefabricated if the bridge alignment is straight. The superstructure depth is not critical for meeting hydraulic standards.

e. Substructure Type

There is visible bedrock in the NE quadrant of the project, in the streambed, appearing to support at least a portion of the existing substructure on that side. Information from drilling logs for nearby water wells implies that the area may be underlain by gravel overlaying glacial till and that bedrock depths at these wells vary from 8 to 99 ft. No other subsurface information is available at this time.

Normally, integral abutments are the preferred substructure type. This type of substructure would provide the best scour protection and is more suited to rapid construction. If it is determined by borings that driving piles to a depth appropriate for integral abutments is not feasible, then cast-in-place abutments would be considered. Borings are needed to determine the substructure type more conclusively.

f. Maintenance of Traffic

For Alternative 4, it would be proposed that the existing bridge continue in service while the new bridge is constructed.

IV. Alternatives Summary

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

Alternative 1:	Superstructure and Deck Replacement with Traffic Maintained on Offsite Detour.
Alternative 2a:	New Structure on the existing horizontal and vertical alignments, 70 ft. span with traffic maintained on an off-site detour, cast-in-place abutments on bedrock.
Alternative 2b:	New Structure on the existing horizontal and vertical alignments, 70 ft. span with traffic maintained with a temporary bridge, cast-in-place abutments on bedrock.
Alternative 3a:	New Structure on modified horizontal and vertical alignments, 127 ft. span with traffic maintained on an off-site detour, integral abutments.
Alternative 3b:	New Structure on modified horizontal and vertical alignments, 127 ft. span with traffic maintained on a temporary bridge, integral abutments.
Alternative 4:	New Structure on new alignment, 135 ft. span, traffic maintained on old bridge, integral abutments.

V. Cost Matrix

Huntington BF 0211(32)		Do Nothing	Alt 1	Alt 2a	Alt 2b	Alt 3a	Alt 3b	Alt 4
			Super-structure Replace-ment	Existing Alignment 70 ft. Span		Modified Alignment 127 ft. Span		New Alignment 135 ft. Span
			Offsite Detour	Offsite Detour	Temp Bridge	Offsite Detour	Temp Bridge	Existing Bridge
COST[1]	Bridge Cost	$0	$289,000	$1,078,000	$1,078,000	$1,248,000	$1,248,000	$1,273,000
	Removal of Structure	$0	$29,000	$58,000	$58,000	$58,000	$58,000	$58,000
	Roadway	$0	$78,000	$387,000	$437,000	$573,000	$659,000	$687,000
	Maintenance of Traffic	$0	$10,000	$43,000	$168,000	$48,000	$198,000	$43,000
	Construction Costs	$0	$406,000	$1,566,000	$1,741,000	$1,927,000	$2,163,000	$2,061,000
	Construction Engineering + Contingencies	$0	$81,000	$445,000	$505,000	$560,000	$627,000	$597,000
	Total Construction Costs w CEC	$0	$487,000	$2,011,000	$2,246,000	$2,487,000	$2,790,000	$2,658,000
	Preliminary Engineering[2]	$0	$93,000	$353,000	$396,000	$443,000	$497,000	$474,000
	Right of Way	$0	$0	$108,000	$140,000	$135,000	$173,000	$165,000
	Total Project Costs	$0	$580,000	$2,472,000	$2,782,000	$3,065,000	$3,460,000	$3,297,000
TOWN SHARE		$0	$14,500 (2.5%)	$123,600 (5%)	$278,200 (10%)	$153,250 (5%)	$346,000 (10%)	$329,700 (10%)
SCHEDULE	Project Development Duration[3]	N/A	2 years	4 years	4 years	4 years	4 years	4 years
	Construction Duration	N/A	3 months	16 months	18 months	8 months	18 months	15 months
	Closure Duration (If Applicable)	N/A	2 weeks	16 weeks	N/A	8 weeks	NA	NA
ENGINEERING	Typical Section - Roadway (feet)	22’	22’	3-9-9-3	3-9-9-3	3-9-9-3	3-9-9-3	3-9-9-3
	Typical Section - Bridge (feet)	1.25-9-9-1.25	1.25-9-9-1.25	3-9-9-3	3-9-9-3	3-9-9-3	3-9-9-3	3-9-9-3
	Geometric Design Criteria	No Change	No Change	Improved	Improved	Meets Standard	Meets Standard	Meets Standard
	Traffic Safety	No Change	Improved	Improved	Improved	Improved	Improved	Improved
	Alignment Change	No	No	No	No	Minor	Minor	Yes
	Bicycle Access	No Change	No Change	Improved	Improved	Improved	Improved	Improved
	Hydraulic Performance	Meets Standard	Meets Standard	Meets Standard	Meets Standard	Meets Standard	Meets Standard	Meets Standard
	Pedestrian Access	No Change	No Change	Improved	Improved	Improved	Improved	Improved
	Utility	No Change	Relocation	Relocation	Relocation	Relocation	Relocation	Relocation
OTHER	ROW Acquisition	No	No	Yes	Yes	Yes	Yes	Yes
	Road Closure	No	Yes	Yes	No	Yes	No	No
	Design Life	<10 years	40 years	80 years	80 years	80 years	80 years	80 years

[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 start from the end of the Project Definition Phase.

VI. Conclusion

We recommend **Alternative 3a**; to replace the entire bridge on a slightly modified alignment while maintaining traffic on an offsite detour.

Structure:

Since the Town has expressed concerns in the past regarding the roadway geometry, an alternative that greatly improves this feature (but does not fully correct the roadway banking) was chosen. Alternative 3a provides this improvement at the least cost to the Town. With an expected life of 80 years, it seems prudent to improve the geometry and safety in this area. This alternative allows the town to take advantage of the reduced local share incentive to close the road during construction.

Traffic Control:

The recommended method of traffic control is to close the bridge for eight weeks, and maintain traffic on an offsite detour. A bypass is available that would add approximately 0.3 miles to the through route, and have an end-to-end distance of 2.3 miles. The Town should consider the longer route for trucks during the closure period since the short detour will not be appropriate for trucks. Closing the road is the safest option for both the traveling public and for the contractor.

Background:

In June 2010, a Scoping Phase Report prepared by McFarland Johnson, Inc. was submitted to the Chittenden County Metropolitan Planning Organization (CCMPO). This report was reviewed and the contents carefully considered during the preparation of this report. Although there are some fundamental differences in certain basic assumptions, the direction is substantially the same in the end. The McFarland Johnson report does not make a recommendation for any of the alternatives discussed in that report over any other. Portions of the report are included in the appendix.

VII. Appendices

- Site Pictures
- Town Map
- Bridge Inspection Report
- Preliminary Hydraulics Memo
- Preliminary Geotechnical Information
- Natural Resources Memo
- Archaeology Memo
- Historic Memo
- Local and Regional Input
- Detour Routes
- Scoping Report by McFarland Johnson – June 2010
- Plans
    - Existing Conditions
    - Proposal
        - Typical Sections
        - Layouts
        - Profiles
        - Temporary Bridge Layouts

Bridge 8 Looking North

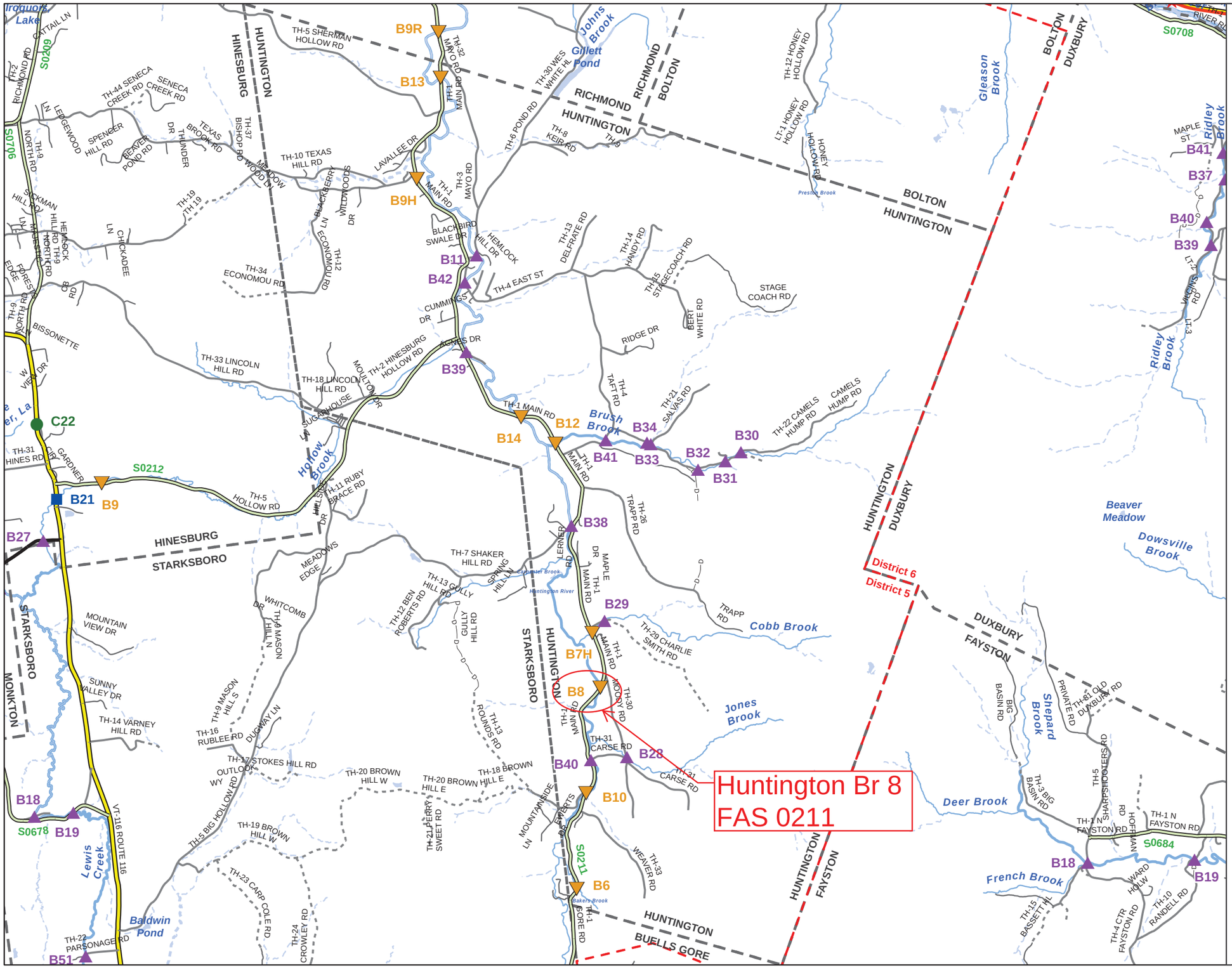
Bridge 8 Looking South

Bridge 8 Downstream Fascia Looking North

Bridge 8 Section Loss

Bridge 8 Looking North at Wingwall Deterioration, possible scour

Bridge 8 Looking South at Bridge Seats


Huntington Br 8
FAS 0211
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B51
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B21
B9
C22
S0209
S0706
S0212
S0678
S0211
S0684
S0708
District 6
District 5
HINESBURG
HUNTINGTON
RICHMOND
BOLTON
DUXBURY
STARKSBORO
MONKTON
FAYSTON
BUELLS GORE
Johns Brook
Gillett Pond
Gleason Brook
Ridley Brook
Brush Brook
Hollow Brook
Lewis Creek
Baldwin Pond
Beaver Meadow
Dowsville Brook
Cobb Brook
Jones Brook
Shepard Brook
Deer Brook
French Brook
Scale 1:61,320
N
INTERSTATE
STATE LONG
STATE SHORT
TOWN LONG
FAS/FAU
FAS/FAU HWY
INTERSTATE
STATE HIGHWAY
CLASS 1
CLASS 2
CLASS 3
CLASS 4
LEGAL TRAIL
PRIVATE
DISCONTINUED
DISTRICT
POLITICAL BOUNDARY
NAMED RIVERS-STREAMS
UNNAMED RIVERS-STREAMS
Produced by:
Mapping Unit
Vermont Agency of Transportation
August 2011
HUNTINGTON
CHITTENDEN COUNTY
DISTRICT # 5

STRUCTURE INSPECTION, INVENTORY and APPRAISAL SHEET

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

Inspection Report for HUNTINGTON **bridge no.:** 00008 **District:** 5

Located on: TR 01 FAS 211 **over** HUNTINGTON RIVER **approximately** 3.9 MI N JCT. VT.17 **Owner:** 03 TOWN-OWNED

CONDITION

Deck Rating: 5 FAIR

Superstructure Rating: 5 FAIR

Substructure Rating: 6 SATISFACTORY

Channel Rating: 7 GOOD

Culvert Rating: N NOT APPLICABLE

Federal Str. Number: 200211000804082

Federal Sufficiency Rating: 050.3

Deficiency Status of Structure: FD

AGE and SERVICE

Year Built: 1934 **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): 23

ADT: 000890 **% Truck ADT:** 06

Year of ADT: 1995

GEOMETRIC DATA

Length of Maximum Span (ft): 0060

Structure Length (ft): 000063

Lt Curb/Sidewalk Width (ft): 0.5

Rt Curb/Sidewalk Width (ft): 0.5

Bridge Rdwy Width Curb-to-Curb (ft): 20.5

Deck Width Out-to-Out (ft): 23.5

Appr. Roadway Width (ft): 022

Skew: 40

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: 0 DOES NOT MEET CURRENT STANDARD

Approach Guardrail: 0 DOES NOT MEET CURRENT STANDARD

Approach Guardrail Ends: 0 DOES NOT MEET CURRENT STANDARD

Structural Evaluation: 5 BETTER THAN MINIMUM TOLERABLE CRITERIA

Deck Geometry: 3 INTOLERABLE, CORRECTIVE ACTION NEEDED

Underclearances Vertical and Horizontal: N NOT APPLICABLE

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

Approach Roadway Alignment: 5 BETTER THAN MINIMUM TOLERABLE CRITERIA

Scour Critical Bridges: 8 STABLE FOR SCOUR

DESIGN VEHICLE, RATING, and POSTING

Load Rating Method (Inv): 1 LOAD FACTOR (LF)

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: 0 OTHER OR UNKNOWN

INSPECTION and CROSS REFERENCE

X-Ref. Route:

Insp. Date: 082012 **Insp. Freq. (months)** 24 **X-Ref. BrNum:**

INSPECTION SUMMARY and NEEDS

08/09/2012 - Bridge deck may be a candidate for a rigid overlay along with curb and fascia reconstruction. Beams are salvageable but progressive corrosion is slowly degrading strength. Steel needs extensive cleaning and painting if to remain for extended years of service. Abutments could use some general concrete repair work. Roadway geometry and limited remaining service life of the bridge deck may prompt deck and superstructure upgrade with prestressed superstructure. Paddleboard is also missing at the northwest corner. ~ MJ/DK

This bridge needs to be replaced or a rehab project in the near future. The deck needs to be replaced, it is saturated through out. The beams need to be cleaned and painted. The fascia beams have moderate to heavy section loss. The laid up stones on the down stream end of abutment 1 are moving towards the channel. The abutments have extensive cracking with staining. The ends of abutment 1 are heavily spalled. 8/17/10 DCP

VT AGENCY OF TRANSPORTATION PROGRAM DEVELOPMENT DIVISION

HYDRAULICS UNIT

TO: Chris Williams, Structures Project Manager

FROM: Ryan Lizewski, Hydraulics Project Engineer (VHB)
via Nick Wark, VTrans Hydraulic Engineer

DATE: August 15, 2013

SUBJECT: HUNTINGTON - BF-0211 (32), FAS 0211 BR 8 over the HUNTINGTON 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 1934 based on available information. The bridge is a 2-lane single span rolled beam bridge. The total width of bridge is approximately 24 feet normal to the roadway. The total span for the structure between the abutment faces is approximately 60 feet, normal to the roadway. The existing bridge has a skew of approximately 45 degrees to the river at this location. The total existing superstructure depth is approximately 4.3 feet with a low chord elevation of 788.4 feet based on the field survey. The existing abutments and piers were constructed of concrete with unknown foundations. These abutments 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 15 feet on the upstream side. The structure is located on an incised channel having a sandy-gravel streambed with some boulders and stone fill around the abutments. The bridge is located on the Huntington River approximately 2,900 feet upstream of the confluence with Cobb Brook. The bridge will pass the Q_{50} storm event and all larger events evaluated based on our preliminary project HEC-RAS model. The existing bridge meets the hydraulic standard as it provides 4.5 feet of freeboard during the Q_{50} storm. The standard requires 1 foot of freeboard at Q_{50}. We did not evaluate the scour for the existing conditions.

Recommendations

The bridge replacement option selection criteria should meet the hydraulic standard and to the extent practicable 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 existing conditions. The VANR Bank Full Width (BFW) equation estimates the width to be approximately 47 feet. The estimated BFW based on actual field conditions supports the VANR BFW of 47 feet.

It has been assumed that if the existing bridge is replaced, a replacement structure will be located in the existing roadway alignment with a roadway width expanded to match the roadway approach width of approximately 28 feet. For a replacement structure, we evaluated both vertical face and integral abutments.

Based on our analysis, the designer has flexibility on the bridge design to meet the hydraulic standards. The existing bridge meets the hydraulic standard; with a low chord elevation of 788.4 the model predicts 4.1 feet of freeboard for the Q_{50} event. However, the existing bridge does not span the BFW.

- The first option analyzed maintains the existing 60 foot clear span (42 feet normal to the stream channel) and assumes no change to the abutment walls or stone fill as shown in Figure 1. The low chord elevation may be as low as 785.3 feet and still meet the hydraulic standard, but the designers should strive for a higher low chord. However, this bridge opening does not span the BFW. For this option, the designers should consider removing the excess stone fill that was originally placed along the western abutment and downstream from the eastern abutment that is currently constricting the channel.

- A second option to better span the BFW would require a replacement bridge having a minimum single 66.5 foot clear span (47 feet normal to the stream channel) between the abutment faces with no stone fill in front of vertical abutments as shown in Figure 2. The low chord elevation may be as low as 783.2 feet while still meeting the hydraulic standard, but the designers should strive for a higher low chord. This option would require moving each abutment approximately 2.5 feet away from the river and regrading the channel in the vicinity of the bridge.

- A third option which spans the BFW would require a replacement bridge having a minimum single 118-foot clear span (83-feet normal to the stream channel) with integral abutments armored with a stone fill 1.5(h):1(v) slope as shown in Figure 3. The low chord elevation may be as low as 783.1 while still meeting the hydraulic standard, but the designers should strive for a higher low chord. This option would require moving each abutment approximately 27.5 feet away from the river and regrading the channel in the vicinity of the Bridge.

The modeling predicts a slight rise in the 100-year water surface elevations in the vicinity the bridge for the second and third option. However, within 40-feet downstream of the bridge the predicted water surface elevations return to match existing.

Ultimately ANR and the COE will need to approve the span length and we would recommend early coordination to if anything less than the minimum VANR BFW span is selected.

As noted above, scour was not reviewed during the preliminary design. However based on the velocities from the analyses, it is anticipated that Type IV 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

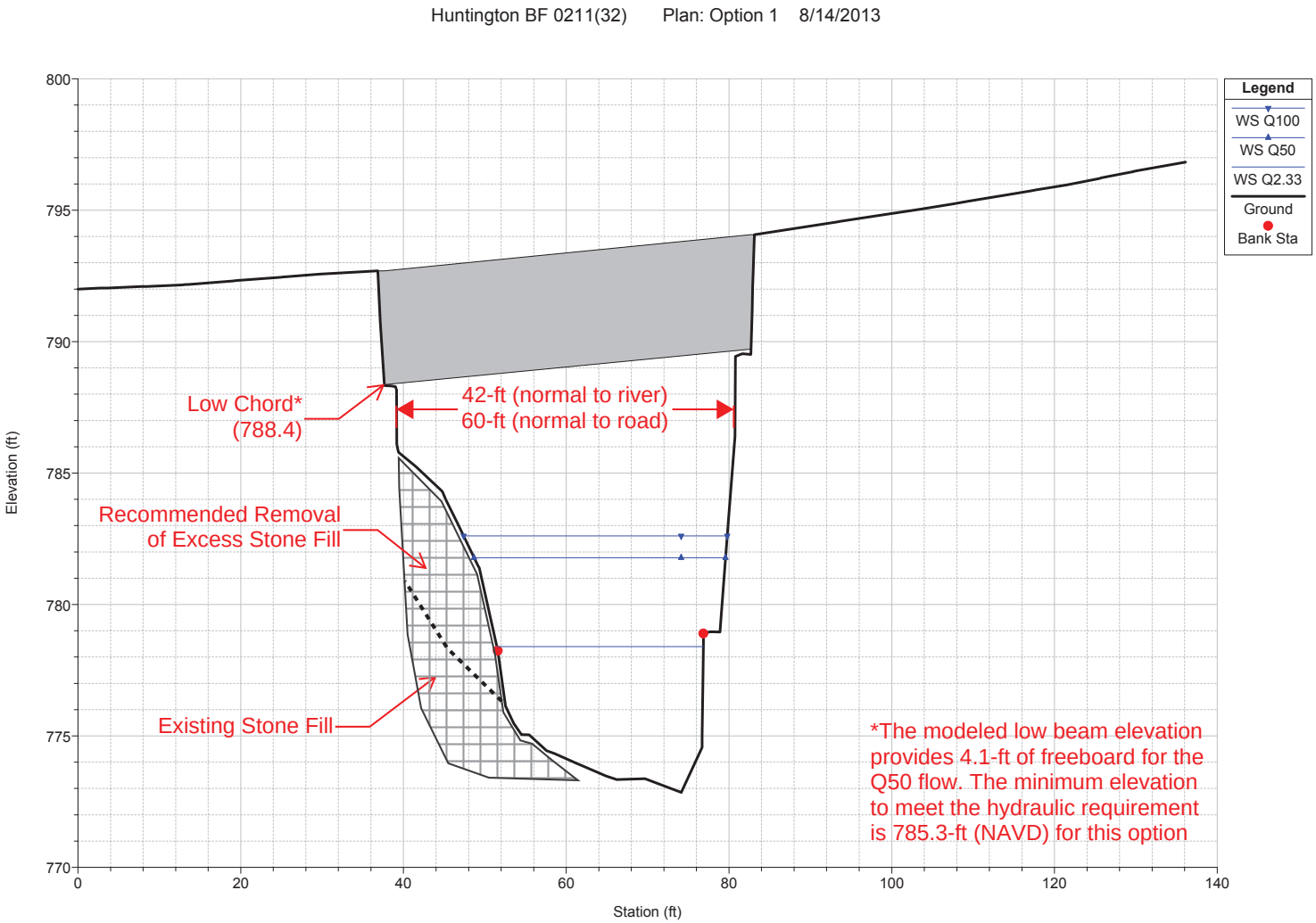

Huntington BF 0211(32) Plan: Option 1 8/14/2013
Legend
WS Q100
WS Q50
WS Q2.33
Ground
Bank Sta
Low Chord*
(788.4)
42-ft (normal to river)
60-ft (normal to road)
Recommended Removal
of Excess Stone Fill
Existing Stone Fill
*The modeled low beam elevation provides 4.1-ft of freeboard for the Q50 flow. The minimum elevation to meet the hydraulic requirement is 785.3-ft (NAVD) for this option
Elevation (ft)
Station (ft)
800
795
790
785
780
775
770
0
20
40
60
80
100
120
140

FIGURE 2

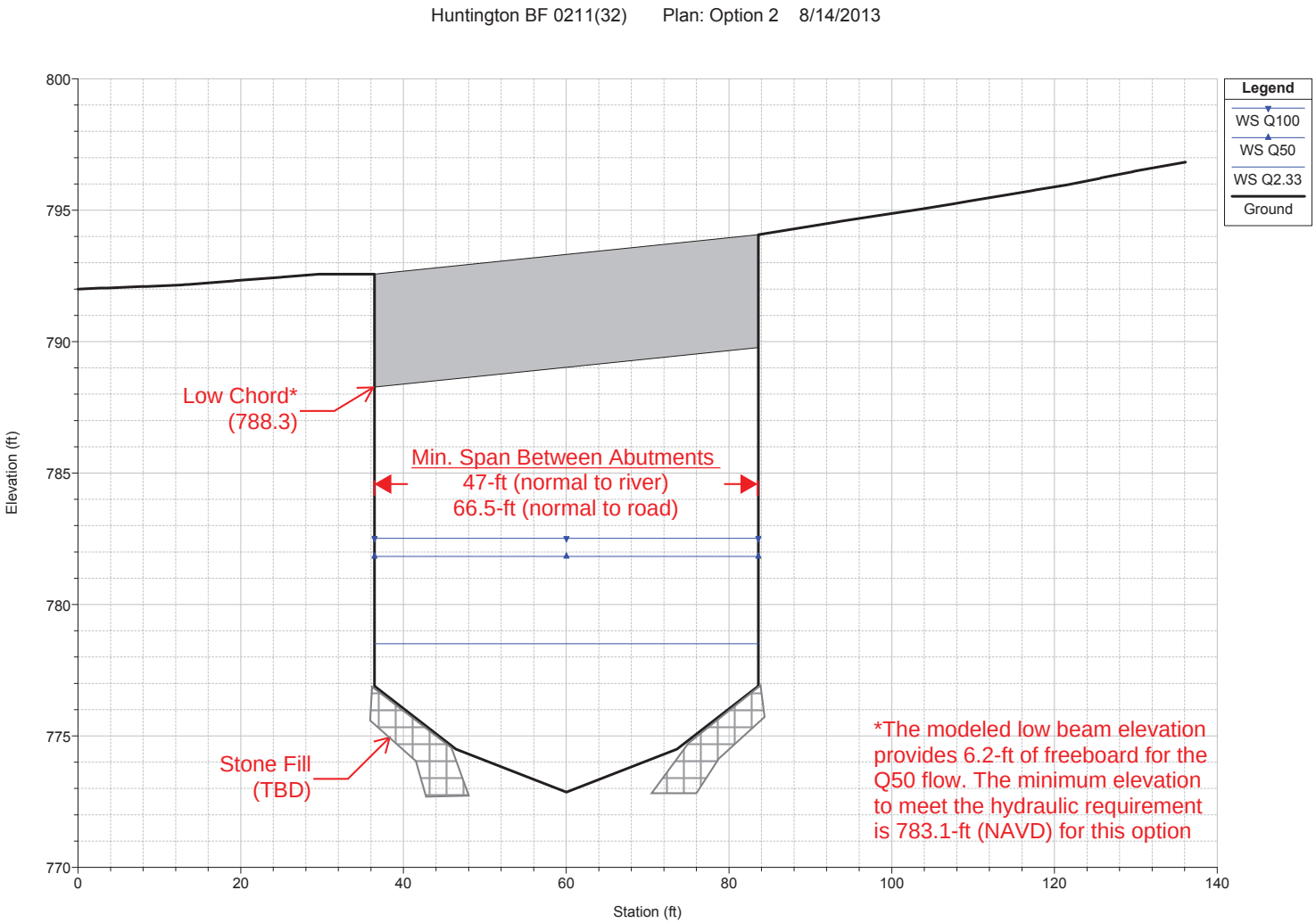
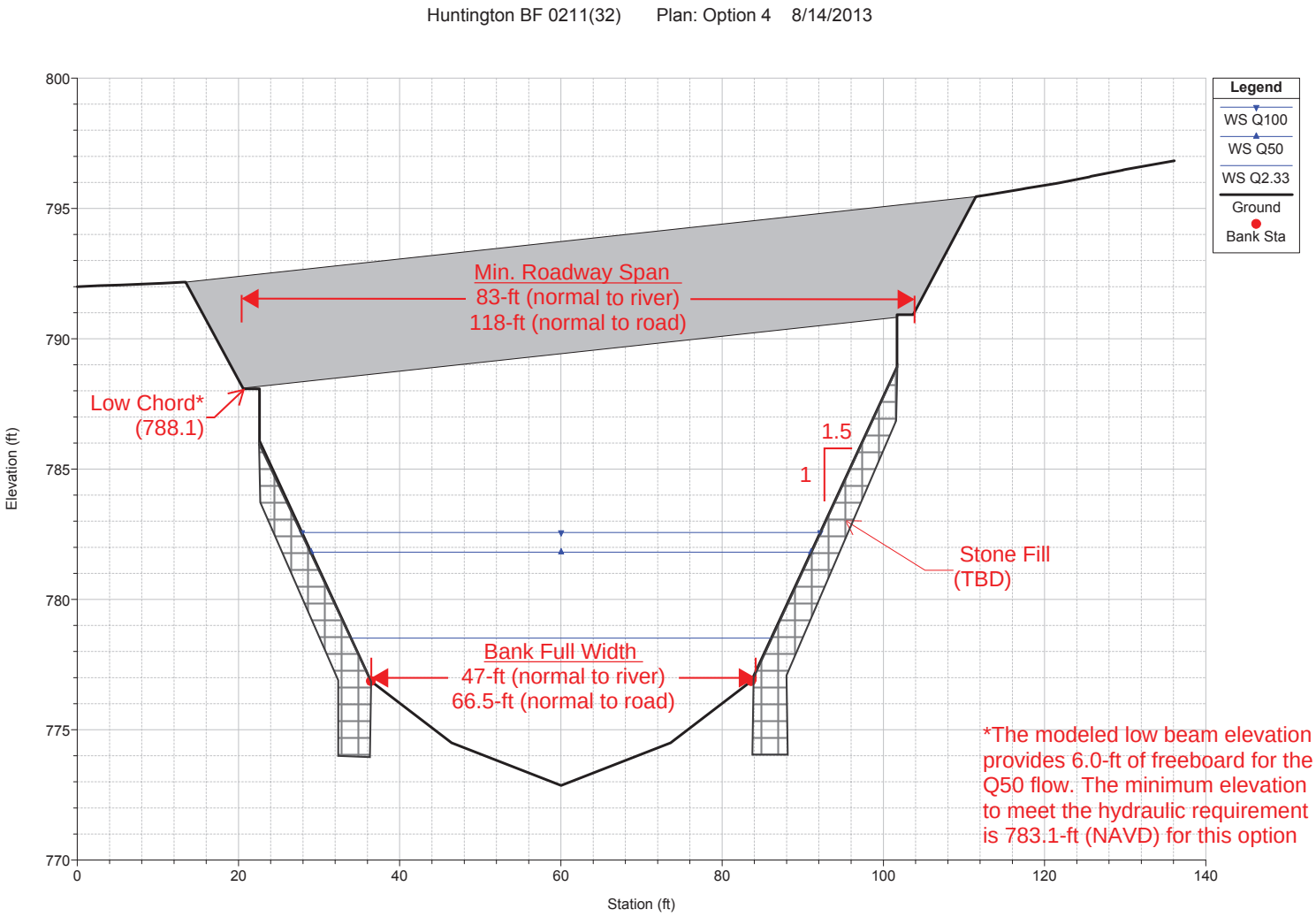

Huntington BF 0211(32) Plan: Option 2 8/14/2013
Legend
WS Q100
WS Q50
WS Q2.33
Ground
Low Chord*
(788.3)
Min. Span Between Abutments
47-ft (normal to river)
66.5-ft (normal to road)
Stone Fill
(TBD)
*The modeled low beam elevation provides 6.2-ft of freeboard for the Q50 flow. The minimum elevation to meet the hydraulic requirement is 783.1-ft (NAVD) for this option
Elevation (ft)
Station (ft)
800
795
790
785
780
775
770
0
20
40
60
80
100
120
140

FIGURE 3


Huntington BF 0211(32) Plan: Option 4 8/14/2013
Legend
WS Q100
WS Q50
WS Q2.33
Ground
Bank Sta
Min. Roadway Span
83-ft (normal to river)
118-ft (normal to road)
Low Chord*
(788.1)
1.5
1
Stone Fill
(TBD)
Bank Full Width
47-ft (normal to river)
66.5-ft (normal to road)
*The modeled low beam elevation provides 6.0-ft of freeboard for the Q50 flow. The minimum elevation to meet the hydraulic requirement is 783.1-ft (NAVD) for this option
Elevation (ft)
Station (ft)
800
795
790
785
780
775
770
0
20
40
60
80
100
120
140

AGENCY OF TRANSPORTATION **OFFICE MEMORANDUM**

To: Chris Williams, Project Manager, Structures

TDE CCB

From: Thomas D. Eliassen, Transportation Geologist via Christopher C. Benda, Soils and Foundations Engineer

Date: July 26, 2013

Subject: Huntington BF0211(32) Preliminary Geotechnical Information Report

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 near Bridge No. 8 on Town Highway 1 (Main Road) which crosses over the Huntington River in Huntington, Vermont. Figures 1 and 2 present views of the existing bridge.

Figure 1 Views of Bridge No. 8 Looking North (Left Photo) and Looking South (Right Photo).

This review included observations made during a site visit, the examination of historical in-house bridge boring files, as-built record plans, USDA Natural Resources Conservation soil survey records, published surficial and bedrock geologic maps and water well logs on-file at the Agency of Natural Resources.

A site visit was performed on July 16, 2013 for the purposes of assessing topographic and geologic conditions that may impact the design and/or construction of the proposed bridge. Observations were also made of existing utility locations and logistical site access conditions.

The subject bridge site occupies the north/south trending Huntington River Valley flanked by uplands rising to over 1,000 feet in elevation. The Huntington River flows in a northerly direction. The riverbed appears to be made up of sandy granular material with some cobbles and possible boulders (on the up-river side). Bedrock was observed beneath the northern abutment and along the northeastern bank of the river.

Telephone and cable lines are present along the eastern side of TH-1. Power lines cross over the bridge diagonally. These power lines are very high and it is not expected that they would interfere with drilling operations. No other evidence of any utilities were observed at or near the bridge. Access for drilling borings appears favorable.

No boring log data were found in the Soils & Foundations project database or in-house historical boring log records.

No record plans from original construction of the current bridge were found in the VTrans as-built plans digital print room.

Drilling logs from private drinking water wells in the area of a project can be helpful in anticipating what may be encountered in the subsurface. The Agency of Natural Resources Private Well Locator interactive map was reviewed for these purposes.

Eight water wells are present within approximately a ¼-mile radius from the subject project location. Based on the reported water well driller logs, the subsurface appears to be underlain by gravel overlying glacial till. Bedrock was reported at depths ranging from 8 to 99 feet below ground surface (BGS). It should be noted that these logs were developed and provided by the well drilling companies whose employees may have had little to no training in identifying soil and rock.

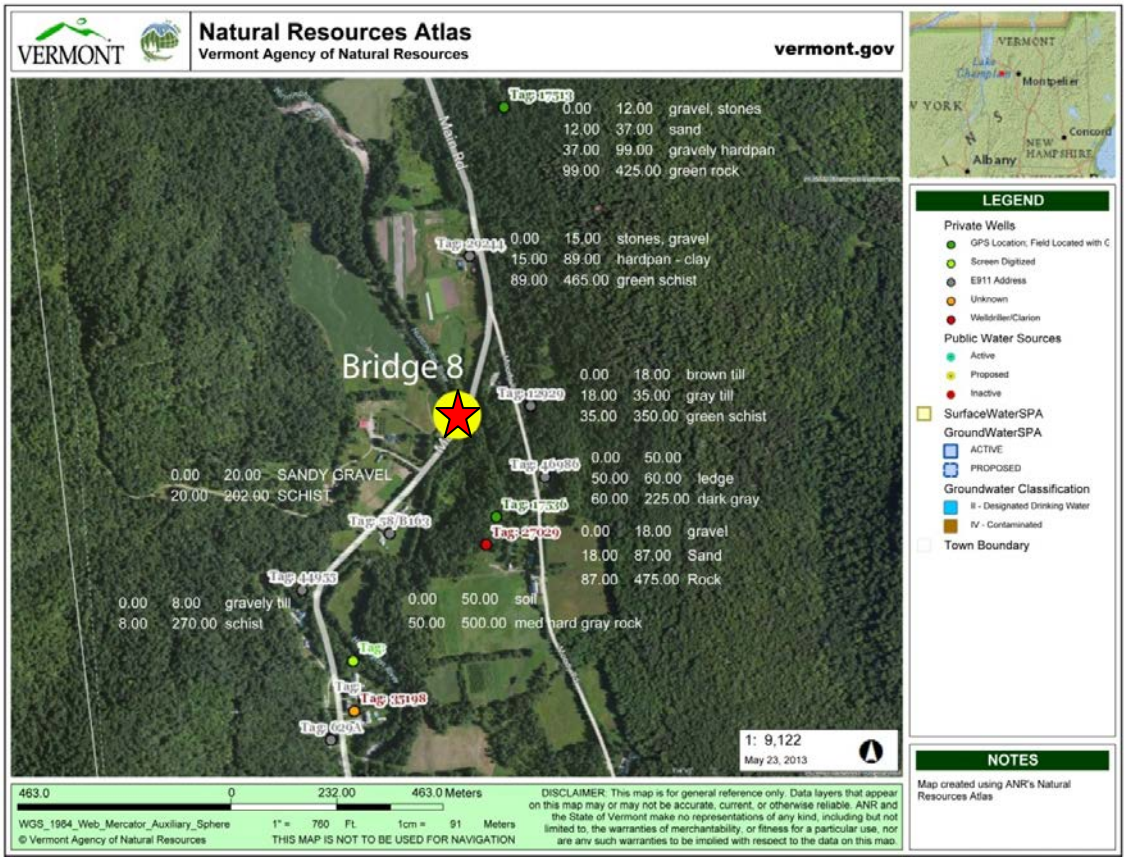


Figure 2 Water Wells in the vicinity of Bridge No. 8 showing lithologies reported on driller logs.

Based on a site visit performed on July 16, 2013, we observed that bedrock is exposed along the northern bank of the river and it appears that the existing northeastern side of the northern abutment is founded on bedrock (see Figure 3).

Figure 3 Photograph of Northern Abutment Showing the Presence of Bedrock at the Surface.

Surficial mapping conducted for the 1970 Surficial Geologic Map of Vermont indicates that the subject area is underlain by glacial Kame Terrace gravel deposits (KT) and post glacial fluvial gravel deposits (FG). Figure 4 shows surficial geologic deposits in the area of Bridge No. 8.

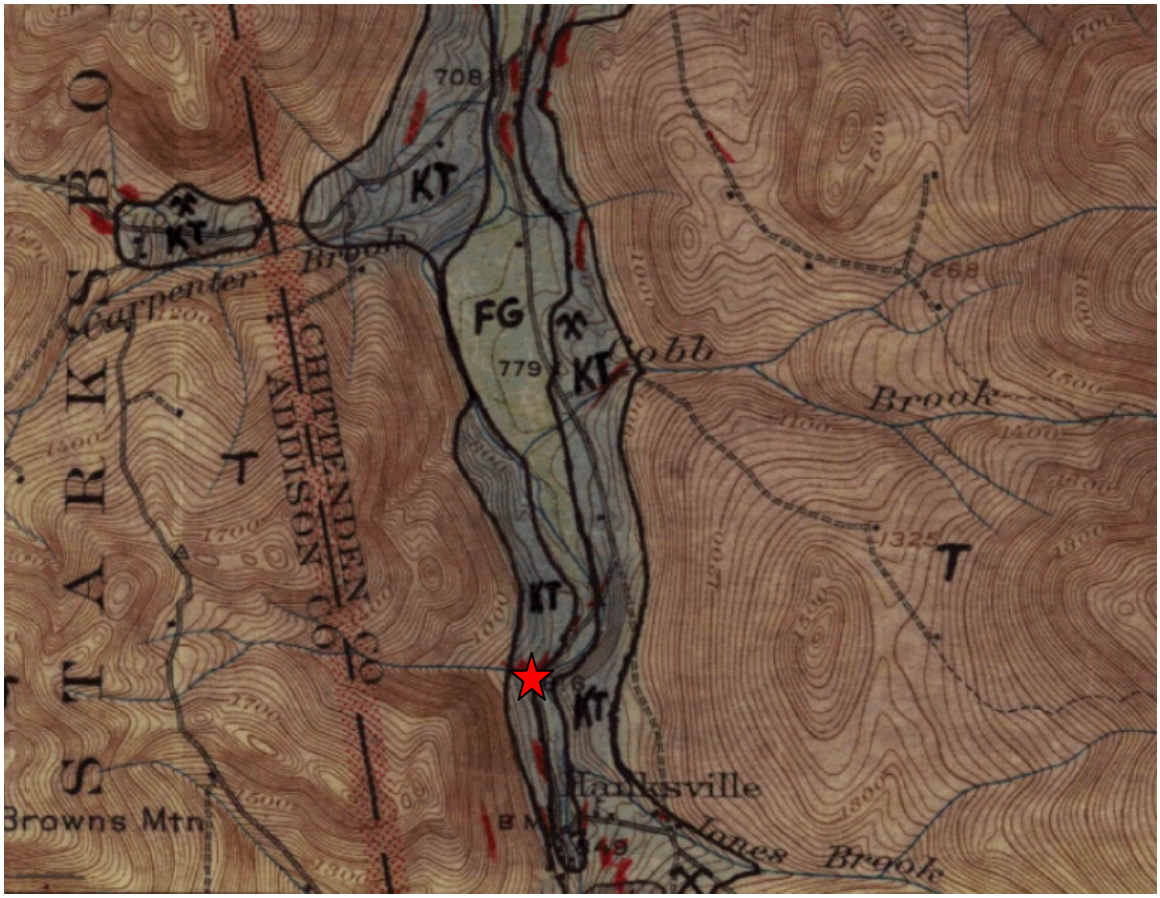


Figure 4 Portion of 15 minute quadrangle used for the 1970 Surficial Geologic Map of Vermont.

According to the 2011 bedrock map of Vermont, the project area overlies bedrock consisting of "Gray, foliated muscovite-chlorite-biotite-feldspar-quartz schist, phyllite and metagraywacke. Blue quartz, conglomeratic horizons, feldspathic biotite phyllitic metawacke with lenses of quartz, feldspar and gneiss pebble- to cobble-conglomerate" of the Pinnacle Formation.

USDA Natural Resources Conservation soil survey records indicate that surficial soils in the area of the bridge consist of Hadley very fine sandy loam and Cabot extremely stony silt loam, 3 to 25 percent slopes. Figure 5 shows soil type in the area of Bridge No. 8.

Figure 5 NRCS Map showing Soil Types in Vacinity of Bridge No. 8.

Based on the lack of detailed site specific information, we recommend drilling at a minimum, four borings at opposite at the corners of the proposed bridge in order to more fully assess the subsurface conditions at the site including, but not limited to, the soil properties, ground water conditions and the depth to bedrock. Shallow bedrock is present at the northeast corner of the northern existing abutment. In order to better assess the top of bedrock surface across the site, additional borings may be necessary.

If you have any questions, please feel free to contact us at 828-6916.

c: WEA/Read File
CCB/Project File

State of Vermont
Program Development Division
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[ttd] 800-253-0191

Agency of Transportation

To: James Brady, VTrans Environmental Specialist

From: Glenn Gingras, VTrans Environmental Biologist

Date: 5/23/2013

Subject: Huntington BF 0211(32) - Natural Resource ID

I have completed my natural resource scoping review for the above referenced project. My evaluation has included the following resources: wetlands, wildlife habitat, agricultural soils, and rare, threatened and endangered species. I have reviewed all existing mapped information and performed a site review of the project area.

Wetlands/Watercourses
There are wetlands within the project area. The wetland present is located on the northeastern side of the existing bridge. The wetland is a forested wetland. (Natural seep) The wetland identified is roughly 2-5 acres in size. During the site visit the wetland exhibited signs of wetland hydrology, vegetation and soils. This entire side of the road is mapped as hydric soils (Cabot extremely stony silt loam). Primary functions and values would be wildlife habitat and erosion control. Due the wetlands size this wetland would be classified as a Class II wetland which would have a 50 regulatory buffer boundary from the wetland boundary. A shape file with wetland boundaries is available for reference and a "dgn" can be created from it. Avoidance alternatives should be examined to avoid this area. If avoidance cannot be achieved it will be likely that further evaluation of the wetland will be required.

The Huntington River flows northwesterly through the project area. The Huntington River is a class B waterway that provides opportunity to the public for fishing, boating, and wildlife habitat. Efforts to minimize water quality impacts during construction will need to be evaluated as the project design moves forward.

There was also an intermittent small stream coming down off the northeastern slope with defined channel marks. Flows would be likely higher during storms and spring runoff.

The US Corps of Engineers (COE) and the Agency of Natural Resources- Department of Environmental Conservation would regulate all activities below ordinary high water and to wetlands. The intermittent waterway would be regulated by the COE.

Wildlife Habitat
Good Wildlife habitat exists within the surrounding area as it is a mix of forested and agricultural areas. According to VT Fish and Wildlife mapping there are mapped deer wintering areas to the east of the project area. GIS modeling suggest this area as moderately high for wildlife movement through this area. As this is a bridge project there will be a natural span of the watercourse so there will be opportunities for wildlife movement through underneath this structure.

Rare, Threatened and Endangered Species
There are no mapped federal or state listed rare, threatened or endangered species within the project area.

Agricultural Soils
Prime and statewide significant soils occur in all quadrants of the project with the exception of the northeast.

1:4,000

Huntington BF 0211(32) Resource ID

N

72°57'33.998"W, 44°15'47.002"N

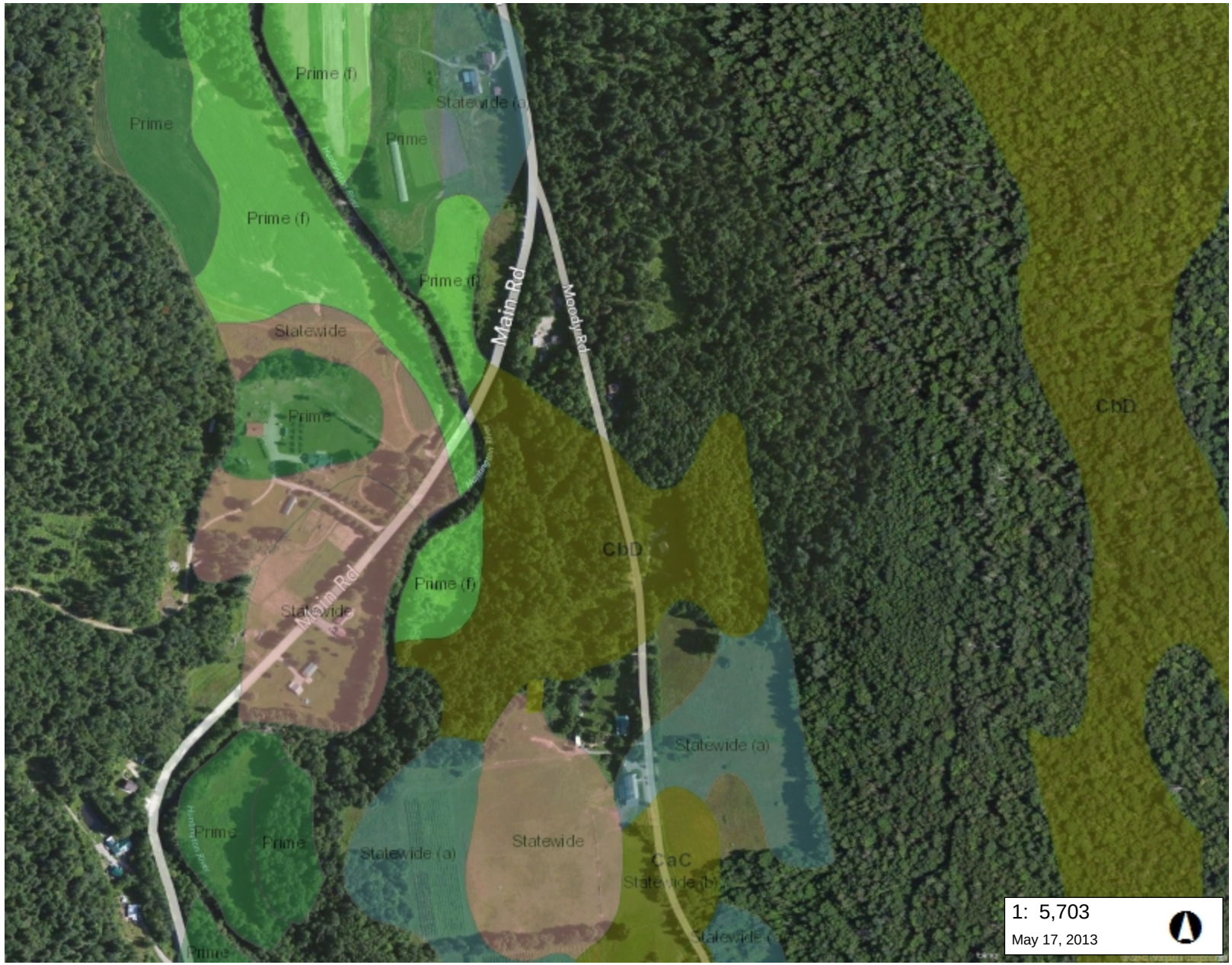
Deer Wintering Areas
Endangered Species - In House Backup
Vermont Wetlands (VSWI)
WetlandResourceID
1 (less important)
2
3
4
5 (more important)

Map created by Glenn Gingras, PDD-Environmental Section
USFWS, ANR F+W, Nongame & Natural Heritage Program

Huntington BF 0211(32)

Vermont Agency of Natural Resources

vermont.gov



LEGEND

Rare Threatened Endangered

- Threatened or Endangered
- Rare

Wetlands - VSWI

- Class 1 Wetland
- Class 2 Wetland

Wetlands - VSWI Advisory Lay

Soils - Hydric

Soils - Prime Agricultural

- Local
- Local (b)
- Not rated
- Prime
- Prime (b)
- Prime (f)
- Statewide
- Statewide (a)
- Statewide (b)
- Statewide (c)

Town Boundary

NOTES

Map created using ANR's Natural Resources Atlas

290.0 0 145.00 290.0 Meters

WGS_1984_Web_Mercator_Auxiliary_Sphere 1" = 475 Ft. 1cm = 57 Meters

© Vermont Agency of Natural Resources

THIS MAP IS NOT TO BE USED FOR NAVIGATION

DISCLAIMER: This map is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. ANR and the State of Vermont make no representations of any kind, including but not limited to, the warranties of merchantability, or fitness for a particular use, nor are any such warranties to be implied with respect to the data on this map.

VERMONT

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

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

Agency of Transportation

To: James Brady, Vtrans Environmental Specialist

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

Date: 5/15/2013

Subject: Huntington BF 0211(32) – Archaeological Resource ID

James,

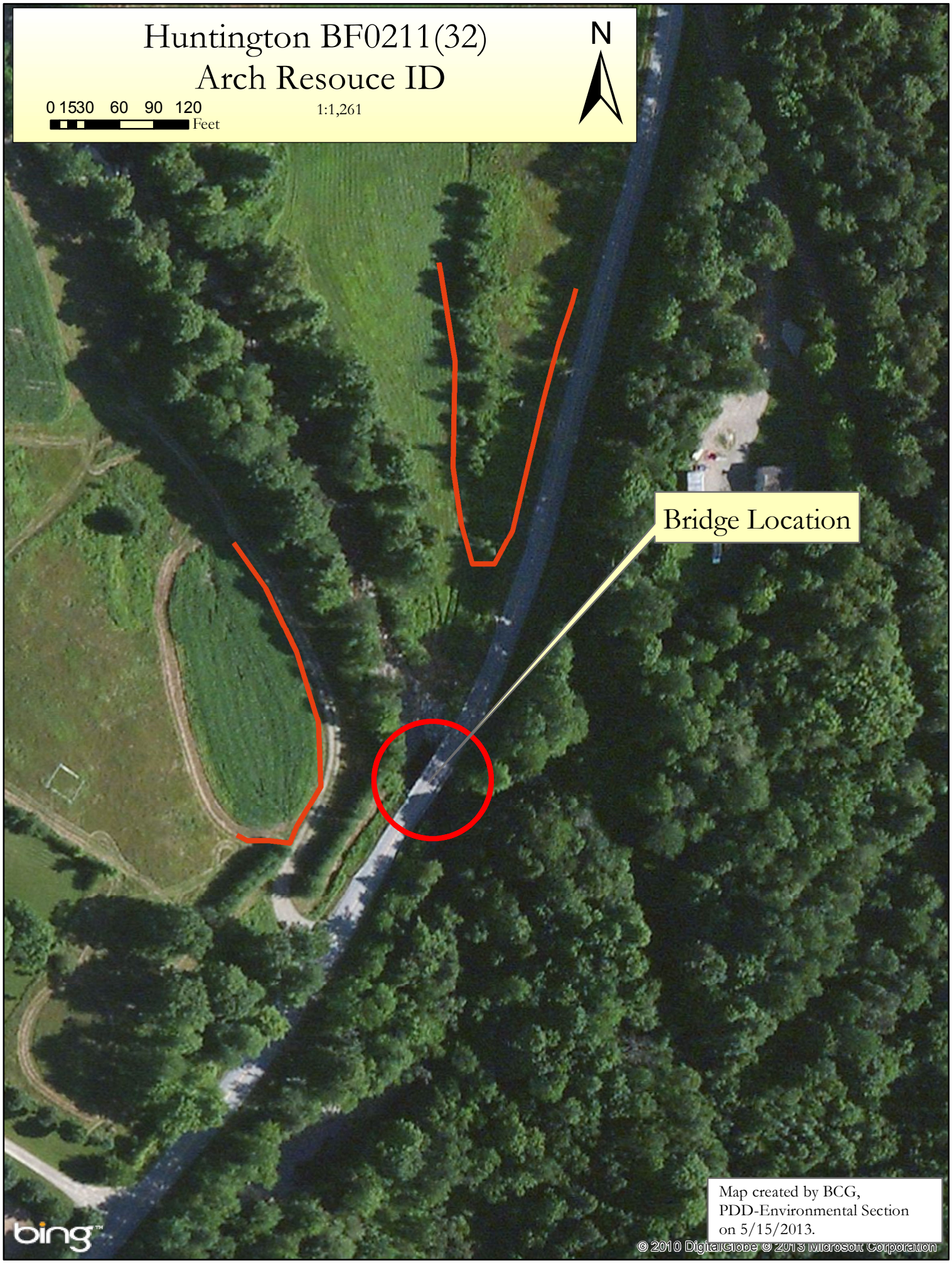
A field visit was conducted on 5/8/2013 in order to assess archaeological sensitivity in the general area around Bridge 8 along Main Road in Huntington. Two areas of archaeological sensitivity were located and mapped into the archaeology geodatabase. Both areas are shown on the attached map and are ready for inclusion into the project DGN. Please feel free to contact me with any questions or concerns.

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
Brennan.Gauthier@state.vt.us

VTrans Working to Get You There
Vermont Agency of Transportation


Huntington BF0211(32)
Arch Resouce ID
0 1530 60 90 120
Feet
1:1,261
N
Bridge Location
Map created by BCG,
PDD-Environmental Section
on 5/15/2013.
bing
© 2010 DigitalGlobe © 2013 Microsoft Corporation

Brady, James

From: O'Shea, Kaitlin
Sent: Thursday, April 25, 2013 9:43 AM
To: Brady, James
Cc: Newman, Scott; Williams, Chris
Subject: Huntington BF 0211 (32)

Hi James,

I have completed the historic resource ID for Huntington BF 0211(32). Bridge 8 is not a historic resource. There are no adjacent historic properties.

Thanks,
Kaitlin

Kaitlin O'Shea
Historic Preservation Specialist
Vermont Agency of Transportation

802-828-3962
Kaitlin.O'Shea@state.vt.us

Huntington Bridge 8 – Main Road (Sheldrake Bridge) – BF 0211(32) FAS 0211

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.

    a. Too early to tell – at this point, we are not aware of any specific events, although there are usually bicycle races on Thursday nights and two special bicycle races (Green Mountain Stage Race and the MS Bicycle Fundraiser race – both of which are usually held in August).

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

    a. Yes, there is less traffic when school is out, so the best time is July & August.

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

    a. Emergency responders are located in Huntington Center (with the fire station located approximately 3 miles north of the bridge). Alternate access for emergency vehicles would be to detour by way of Moody Road to Carse Road & back on to Main Road.

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

    a. Elementary School is in Huntington Center; Middle School is in Richmond; High School is in Jericho. Bus routes run from aprox 6:50am to 4:30pm.

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

    a. Yes – and the school bus detour would require special permission from Bob McGee, the CESU transportation director.

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

    a. No, as they could all use the Moody-Carse detour.

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?

    a. No.

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

    a. Yes, there is a narrow plank bridge on Moody Road with a 16,000 lb. weight limit that would be part of the detour. Moody and Carse Roads would probably also need to have additional chloride applied for dust control – especially around the horse farm and for the couple of houses that are located close to the road.

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

    a. No

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.

    a. Front Porch Forum for Huntington
    b. Times Ink! (Richmond-Huntington-Bolton) – usually monthly
    c. Burlington Free Press
    d. Chittenden Traffic Alert
    e. Huntington Town Clerk email distribution list
    f. Huntington Town Website.

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

    a. No

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?

    a. Yes. The north end of the bridge should be re-aligned so that the sharp curve is reduced. This has been the site of numerous accidents / near-accidents.

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

    a. Yes. The existing bridge is too narrow. It should be 24' wide. Currently there are no shoulders and the lanes are narrow.

3. What is the current level of bicycle and pedestrian use on the bridge?

    a. This is a highly traveled bridge for bicycles – for regularly scheduled organized meets/time trials, for special races, and as a recreational link for 'pleasure riders'.

There are also a few people that commute via bicycle on the Main Road, crossing this bridge. Pedestrian traffic is not as heavy, however there are walkers and runners who use the road/bridge.

4. If a sidewalk or wide shoulder is present on the existing bridge, should the new structure have one?

    a. There is no sidewalk, and one is not needed. The shoulders are not wide – and they definitely need to be widened.

5. Is there a need for a sidewalk or widened shoulder if one does not currently exist? Please explain.

    a. A sidewalk is not needed but the shoulders definitely do need to be widened to accommodate the ever-growing bicycle traffic as well as the minimal pedestrian traffic. There is considerable interest in Town in having wider shoulders for the full length of Main Road to better accommodate both bicycles and pedestrians.

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?

    a. No. This is not part of any existing town or statewide bicycle or pedestrian network.

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

    a. No.

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

    a. As previously noted, the bridge is very narrow and does not accommodate safe pedestrian or bicycle traffic.

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

    a. No.

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

    a. No.

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

    a. No.

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

    a. No.

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.

    a. No.

2. Please provide a copy of your existing and future land use map, if applicable.

    a. Not applicable.

3. Are there any existing, pending or planned development proposal that would impact future transportation patterns near the bridge? If so please explain.

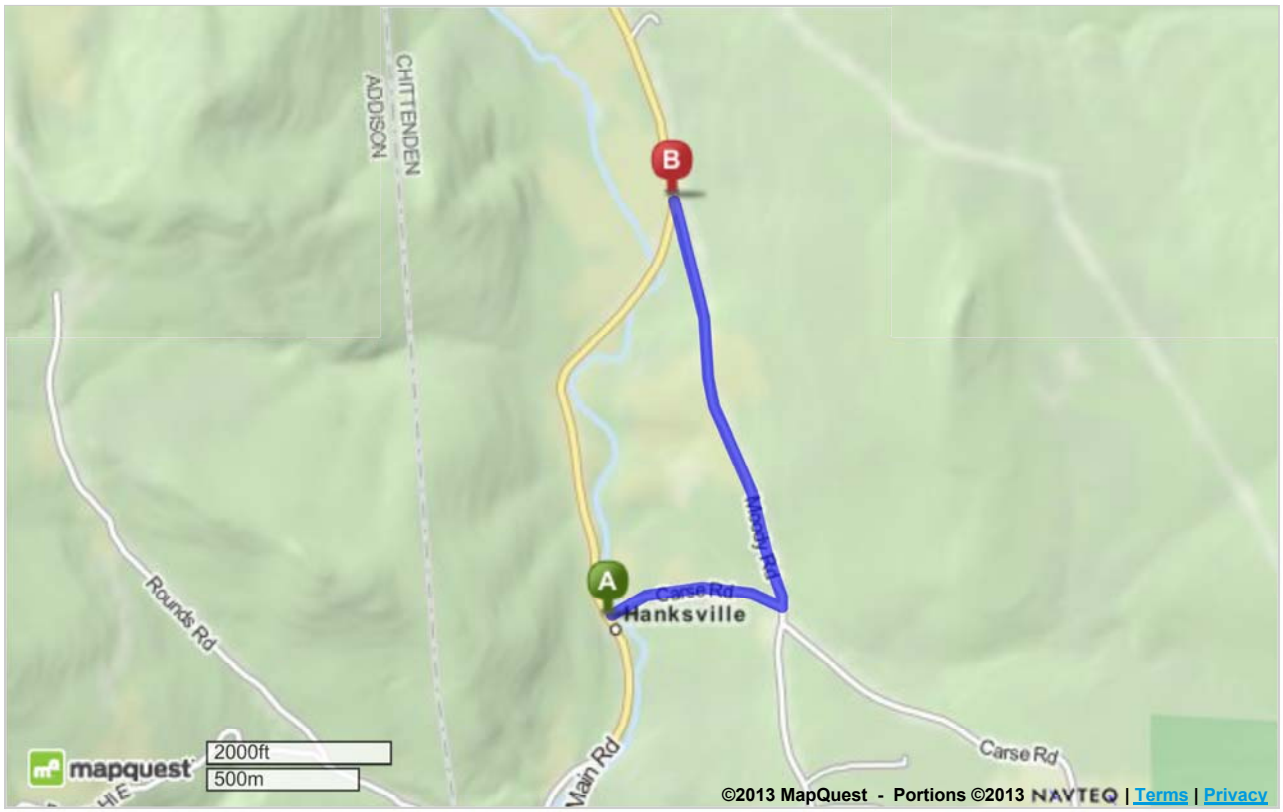
    a. No.

4. Is there any planned expansion of public transit service in the project area? If not known please contact your Regional Public Transit Provider.

    a. No.

June 26, 2013
Barbara Elliott / Yogi Alger
Town Administrator / Road Foreman

Total Travel Estimate: **1.29 miles - about 4 minutes**



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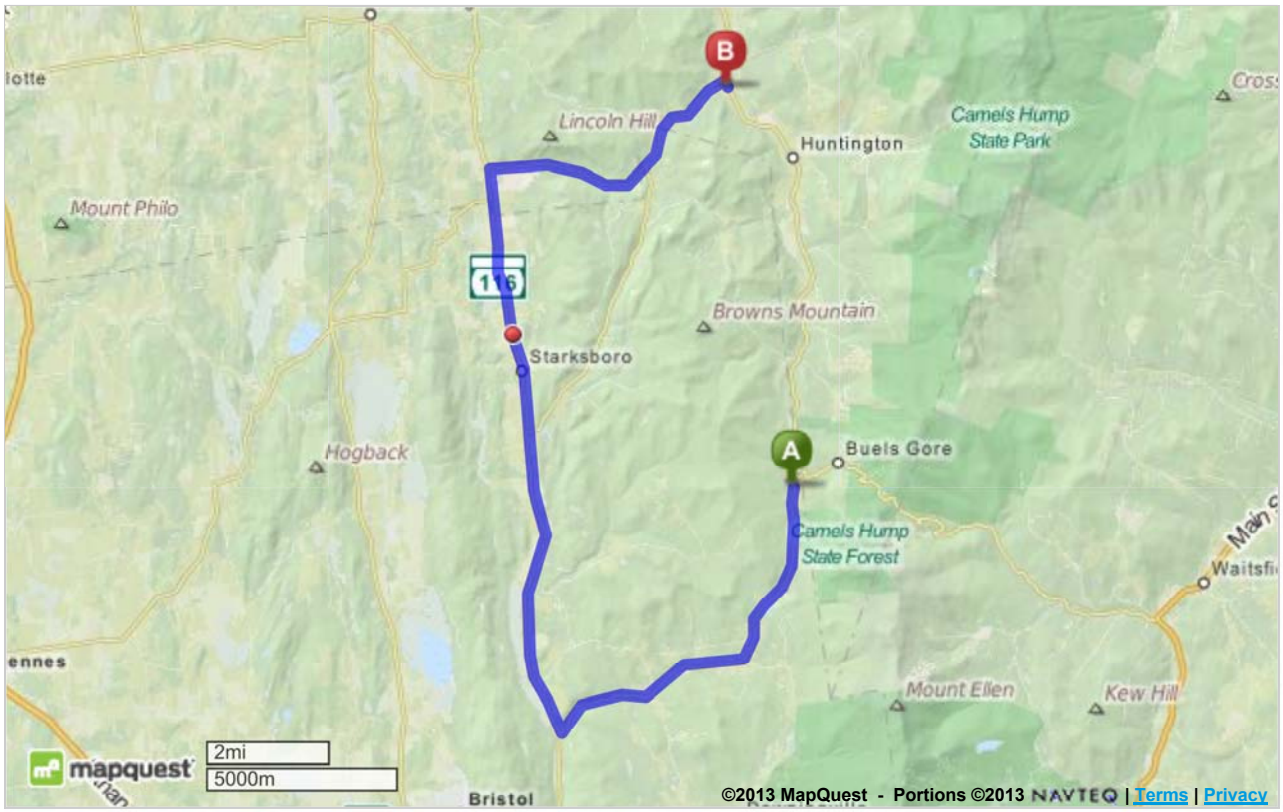
POTENTIAL TOWN DETOUR:

A-B Through Route:	1.0 miles
A-B detour route:	1.3 miles
Added Miles:	0.3 miles
End to End Distance:	2.3 miles

Total Travel Estimate: **22.02 miles - about 31 minutes**



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Potential Alternate Detour

A-B Through Route:	8 miles
A-B Detour Route:	22 miles
Added Miles:	14 miles
End to End Distance	30 miles

FINAL SCOPING REPORT

MAIN ROAD BRIDGE IMPROVEMENT
HUNTINGTON, VERMONT

SCOPING PHASE REPORT
MAIN ROAD (TOWN HIGHWAY 1)
BRIDGE NO. 8 OVER HUNTINGTON RIVER

TOWN OF HUNTINGTON, VERMONT · Chartered 1763 ·

PREPARED BY:

McFarland Johnson

53 REGIONAL DRIVE
CONCORD, NH 03301
(603) 225-2978

PREPARED FOR:

CCMPO
Chittenden County Metropolitan Planning Organization

JUNE 2010

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INTRODUCTION

This scoping report has been prepared for the Chittenden County Metropolitan Planning Organization (CCMPO) by McFarland Johnson (MJ). MJ was hired by the CCMPO to provide Phase A (scoping) design services for two bridge projects within the town of Huntington, Vermont.

This project deals with the study of alternatives for correcting existing deficiencies on the Main Road Bridge (South of the Moody Road intersection) over Huntington River in Huntington, Vermont. The bridge carries a town-maintained highway and is owned by the town.

The Scoping Phase of this project included a site visit, a Local Concerns Meeting, and an Alternatives Presentation Meeting with the Huntington Selectboard. The objective of this report is to establish the scope of the project and provide an overview of the project's key issues.

Purpose and Need Statement
Huntington Bridge No.8
Main Road over Huntington River
(South of Moody Road Intersection)
July 27, 2009

Purpose:

The purpose of the project is to improve safety and mobility for vehicular traffic, bicycles, and pedestrians along Main Road in the town of Huntington at the location of this bridge crossing.

Need:

Huntington Bridge No. 8 crosses the Huntington River on a bridge originally constructed in 1934. The current condition of the bridge and the bridge approaches is a public hazard.

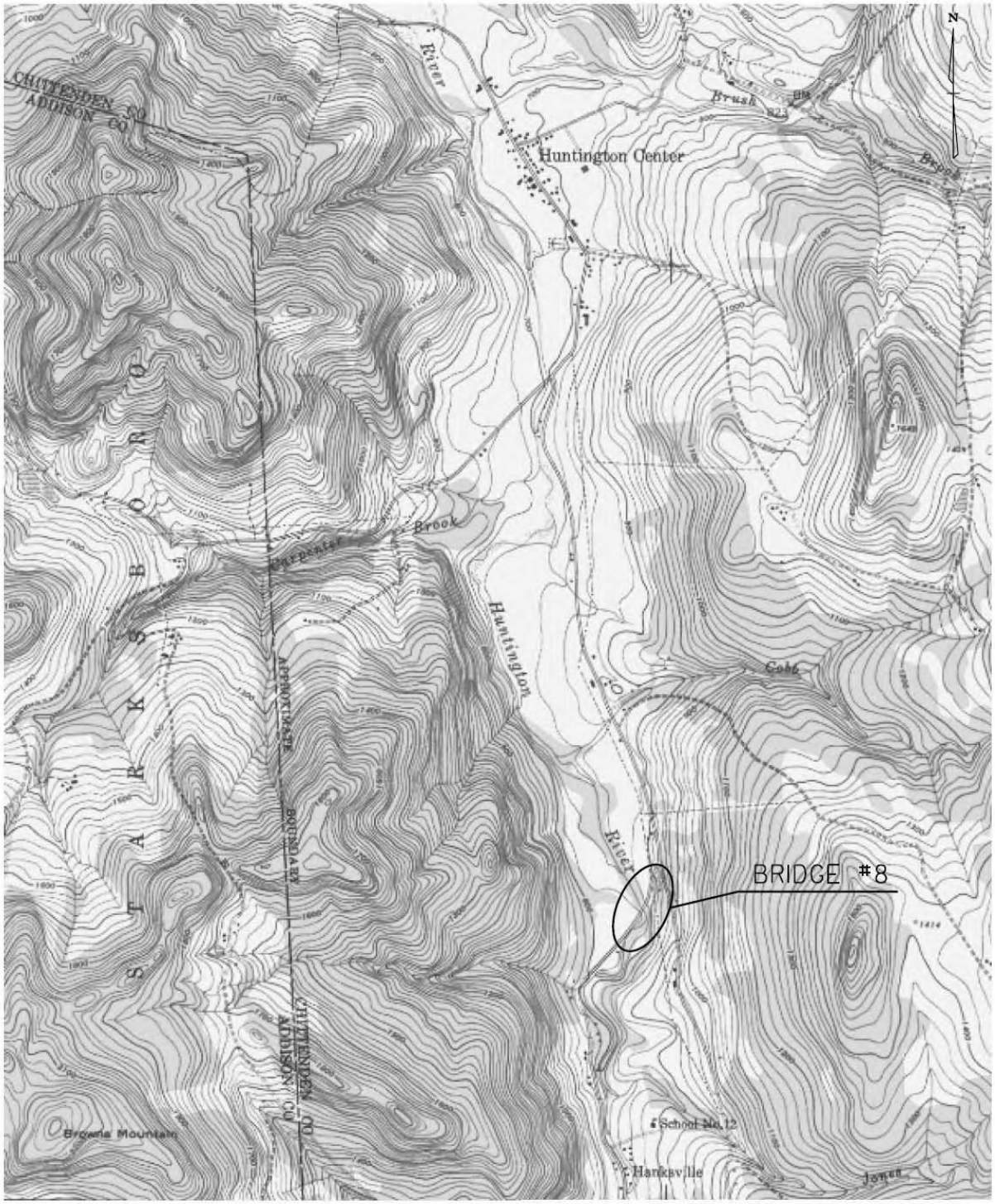
- The northeast corner of the bridge has been the site of two fatal crashes in the last twenty years. The existing approach geometry from the north constricts traffic too rapidly for the posted speed limit.

- The existing bridge width does not meet the current standards for two-way travel. The existing bridge is 20feet–6inches. Bridge shoulders are not adequate for pedestrian or bicycle travel. The Minimum bridge width should be 28feet-0inches to include two 10feet–0inches travel lanes and two 4feet–0inches shoulders to allow for bicycle and pedestrian travel.

- The deteriorated condition of the bridge itself warrants attention. Girders are scaling due to damage from roadside salt. Guard rail, approach rail, and bridge rail are functionally obsolete except where they have been replaced due to previous vehicle crashes. The most recent VTrans Sufficiency Rating for the bridge is 52.4 (out of 100).

- Approach guardrail, approach rail, and bridge rail do not meet current standards.

LOCATION MAP



0 1000 2000
SCALE

Mc Farland Johnson

TOWN OF HUNTINGTON, VERMONT - BRIDGE IMPROVEMENT PLAN

Picture No. 1 **BRIDGE ELEVATION LOOKING NORTH**

Picture No. 2 **BRIDGE ELEVATION LOOKING SOUTH**

Picture No. 3 **BRIDGE ELEVATION UPSTREAM (EAST) FACE**

Picture No. 4 **BRIDGE ELEVATION DOWNSTREAM (WEST) FACE**

TOWN OF HUNTINGTON, VERMONT - BRIDGE IMPROVEMENT PLAN

Picture No. 5 MAIN ROAD - NORTH APPROACH
LOOKING NORTH

Picture No. 6 MAIN ROAD - SOUTH APPROACH
LOOKING SOUTH

Picture No. 7 FARM DRIVE AT SOUTH APPROACH
LOOKING NORTH

Picture No. 8 IMPACTED APPROACH GUARDRAIL

TOWN OF HUNTINGTON, VERMONT - BRIDGE IMPROVEMENT PLAN

Picture No. 9 HUNTINGTON RIVER - UPSTREAM LOOKING EAST

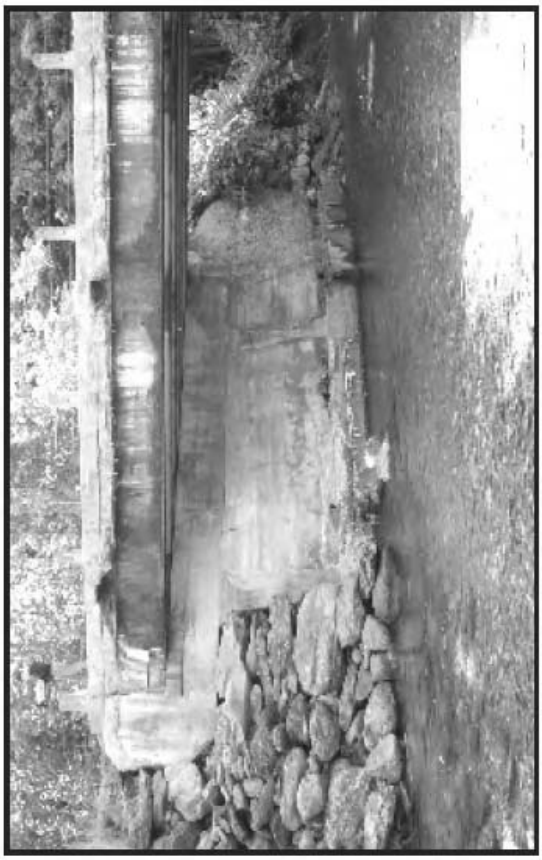
Picture No. 10 HUNTINGTON RIVER - DOWNSTREAM LOOKING WEST

Picture No. 11 NORTHWEST WINGWALL LOOKING NORTH

Picture No. 12 NORTH ABUTMENT AT WATERLINE LOOKING NORTH

TOWN OF HUNTINGTON, VERMONT - BRIDGE IMPROVEMENT PLAN

Picture No. 13 SOUTH ABUTMENT LOOKING SOUTH



Picture No. 14 NORTH ABUTMENT LOOKING NORTH

Picture No. 15 ABUTMENT SEAT

Picture No. 16 TYPICAL BEARING

TOWN OF HUNTINGTON, VERMONT - BRIDGE IMPROVEMENT PLAN

Picture No. 17 SUPERSTRUCTURE UNDERSIDE

Picture No. 18 DECK CONDITION

Picture No. 19 FASCIA DETERIORATION

Picture No. 20 BRIDGE POSTS & CABLE RAIL

BACKGROUND INFORMATION

General

The Huntington Bridge No. 8 carries Main Road (Town Highway 1) over the Huntington River. The bridge is located south of Huntington Center, approximately one-quarter mile south of the Main Road and Moody Road intersection. Main Road is classified as a Class II Town Highway and a rural major collector. The town-owned bridge was built in 1934. Huntington Bridge No. 8 is a two-lane, single-span, 63-foot long steel beam and concrete deck bridge. The current bridge measures 20 feet–6 inches wide, curb-to-curb, which is not adequate for pedestrian or bicycle traffic. The minimum required width is 28 feet–0 inches to accommodate two 10feet–0inches lanes and two 4 feet–0 inches shoulders. Main Road is posted as a 45mph speed limit. The existing approach geometry from the north constricts traffic too rapidly for the posted speed limit; refer to Picture No. 1 on Page 4. The current geometry of the bridge does not meet state and federal regulations for pedestrians, bicyclists, and motorists and will be considered in the scope of this project.

Structural Condition

Bridge No. 8 is inspected on a two-year frequency interval by the Vermont Agency of Transportation (VTrans). The latest inspection of the bridge was performed in 2008. A copy of the report is included in Appendix B.

VTrans supplies the Federal Highway Administration (FHWA) with inspection findings and from these findings, FHWA calculates a "sufficiency rating" for the bridge. Known as the Federal Sufficiency Rating (FSR), it is a measure of a bridge's sufficiency to remain in service and its eligibility for repair or replacement funding. The FSR is not an indication of the bridge's ability to carry traffic loads or a prediction of collapse. The FSR is calculated from a formula that considers factors such as the condition of the bridge components, the average daily traffic, and the alignment of the approach roadway. The result of the formula is a percentage, where 100 percent represents an entirely sufficient bridge and zero percent represents and entirely insufficient bridge. To qualify to get federal replacement funds, a bridge must have an FSR of 50 percent or less. To qualify for federal rehabilitation funding, a bridge must have an FSR of 80 percent or less. Results of the 2008 inspection indicate that Bridge No. 8 has an FSR of 52.4, which would make it eligible for federal rehabilitation funding.

In addition to the sufficiency rating, bridge safety inspection information is used to determine if a bridge should be classified as "structurally deficient" or "functionally obsolete." A bridge is considered "structurally deficient" if primary load-handling components are found to be in "poor" or worse condition due to deterioration and/or damage. A load limit may be imposed on the bridge to prohibit heavier vehicles from using the structure while it remains in service. Items that should be taken into consideration when determining if Bridge No. 8 is "structurally deficient" would include the "corrosion of the exterior steel beams especially on the downstream end, channel migration, gradual breakdown of the fascia/soffit area on the downstream side and heavily deteriorated concrete bridge posts along the entire right side" noted in the 2008 report. A bridge is considered "functionally obsolete" if the bridge geometrics (lane and shoulder width, bridge railing, and guardrail) do not meet current design and safety

standards. The bridge may be retrofit with devices that meet current design and safety standards or may have warning signage posted in advance of the crossing. A bridge given these classifications does not imply it is an unsafe bridge. If a bridge meets the criteria to be classified as both "structurally deficient" and "functionally obsolete," the "structurally deficient" classification will be applied. Results of the 2008 inspection indicate that Bridge No. 8 is "functionally obsolete" because it does not meet federal safety standards for bridge railing or pedestrian and bicyclist safety.

During an inspection, primary components of the bridge are examined for their condition and given a numeric rating. The numeric rating ranges from zero to nine, where a rating of zero indicates a component in failed condition and a rating of nine indicates a component in excellent condition. During the latest inspection, the abutments were assigned a condition rating of five, indicating a "fair" condition. The inspection report noted continuing deterioration of the concrete; refer to Picture No. 12 through No. 15 on Pages 6 and 7. The deck was assigned a condition rating of six, indicating a "satisfactory" condition. The majority of the deterioration to the deck was noted to be along the outside edge; refer to Picture Nos. 18 and 19 on Page 8. The steel beams and bearings were assigned a condition rating of five, indicating a "fair" condition. Rusting was observed along the members, particularly along the outside member; refer to Picture Nos. 16, 17, and 19 on Pages 7 and 8. Nonstructural portions of the bridge, such as the bridge railing and approach guardrail are given a condition appraisal rating. Similar to the structural condition rating, the appraisal rating is a numeric rating from zero to nine. The current railing system was given a zero because it does not meet current design standards; refer to Picture No. 20 on Page 8. The overall condition of the bridge was reported to be "fair" and soon to become "less than fair" due to the ongoing corrosion of the steel and deterioration of the concrete.

Horizontal Alignment

The horizontal alignment meets the requirements for a 45 MPH speed zone. The southbound shoulder width decreases as the driver approaches the bridge. This transition is more rapid than is normally recommended. A rapid transition of the shoulder as the driver approaches a bridge can encourage drivers to migrate toward the center line of the road. The cross slope of the southbound lane is adequate, but is not held across the entire roadway surface as is normally done.

Vertical Alignment

The bridge is located at the low point of a vertical curve. The slope from the north is approximately six percent (6%) and the slope from the south is approximately one and a half percent (1.5%). The vertical alignment meets state and federal guidelines.

Clear Zone

A horizontal offset is the distance from the edge of the travel lane to a hazard. Examples of common hazards include trees, telephone poles, or steep slopes that could potentially cause a vehicle to overturn if it left the road surface. The VTrans Clear Zone Policy of 1997 recommends a horizontal offset of twelve feet (12 feet) for a rural road with speed limit of 35 MPH and average daily traffic of 780 cars. There are no unprotected hazards within the clear zone at the location of the bridge.

Sight Distance

Sight distances vary along the project. There are no intersections in the immediate vicinity of the bridge and no obstructions limiting sight distance for drivers within the project limits.

Crash Data

According to the Vermont State Police records, there have been two fatal crashes in the vicinity of the bridge. In 1989 and 1990, vehicles collided with the northeast corner of the bridge. In both cases alcohol was reported to have been involved. Both crashes involved southbound vehicles, which crossed the centerline and collided with the northeast bridge rail.

Traffic

The Annual Average Daily Traffic (AADT) in 2009 was approximately 780 vehicles per day (VPD) with less than 3% truck traffic.

Right-of-Way

Please refer to the plans in Appendix E for the approximate right-of-way limits.

Intermodal/Multi-Modal

The Town of Huntington has expressed interest in providing wider shoulders for bicyclists and pedestrians.

ENVIRONMENTAL RESOURCES

Agriculture

The bridge is located in an area mapped as Hadley very fine sandy loam, frequently flooded, and Cabot extremely stony silt loam, 3 to 25 percent slopes. Hadley soils are listed as Prime Agricultural soils, and Cabot soils are neither Prime nor Statewide. There are hayfields west of the bridge.

Archeology

Hartgen Archaeological Resources was retained to evaluate the potential for impact to archaeological resources at the site. In summary, Hartgen found that most of the site is not sensitive for archaeological resources because of previous disturbance. Portions of the southwest and northwest quadrants are considered sensitive, and should be evaluated further if disturbance is anticipated in these areas. The full archaeological report is included in Appendix C.

Historical Resources

Mary Jo Llewellyn, Historic Preservation Consultant, was retained to evaluate the potential effects to historic resources at the site. In summary, Ms. Llewellyn found that a barn approximately 0.2 miles north of the bridge is eligible for the National Register, but that no adverse effects to the barn are anticipated from the project alternatives as currently scoped. The bridge itself, although older than 50 years, is not eligible for the National Register because the railing system has deteriorated beyond repair and because it is not located in a historic district. Therefore, there are no anticipated adverse effects to architectural historic resources within the APE. Ms. Llewellyn's report is included in Appendix C.

Hazardous Materials

There are no mapped hazardous waste generators or hazardous waste sites within the project area.

Floodplains

Floodplains are mapped on FEMA Community Panel Number 500036 0015 B, dated July 17, 1978. The bridge falls within the mapped 100 year floodplain.

Fish and Wildlife

The project area lies in a sparsely developed part of Vermont, with Camel's Hump State , and other conserved land extending to the east. The mountains and streams provide habitat for many species, including bear, moose, deer, fox, coyote, and fisher. Streams and rivers within the study area provide habitat for many species of mammals, reptiles, amphibians, and birds. The area east of the bridge is mapped as deer wintering habitat. The Vermont Agency of Natural Resources has records of two bears killed by vehicles about four miles south of the project area, and a moose killed by a vehicle about a mile and a half south of the bridge.

The Vermont Fish and Wildlife Department have provided information that the Huntington River is a cold water fishery that supports trout and salmon.

Rare, Threatened, and Endangered Species

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

Public Lands – Sections 4(f) and 6(f)

There are no Section 4(f) or Section 6(f) lands in the direct vicinity of the project area.

Noise

The project is not expected to affect the noise environment.

Surface Waters

The bridge crosses the Huntington River, a perennial fourth order stream that feeds into the Winooski River several miles north of the project area. The watershed of the river at the bridge measures 18.4 square miles, and extends south into Camel's Hump State Forest. The river has a gravel and cobble substrate, and widens to a broad shallow river (1feet to 2 feet deep, approximately 30 feet wide) downstream of the bridge. Upstream of the bridge, the river is narrower and steeper. Work completed for the State of Vermont River Management Section indicates a bankfull width of 48 feet for the Huntington River in this location.

Wetlands

There are Class three wetlands along the north bank of the stream west of the bridge. There are no Class II or Class I wetlands mapped in the immediate vicinity of the bridge.

ALTERNATIVES

Do Nothing Alternative

- Cost Estimate: $0
- Correct Roadway Banking: NO
- Repair or Replace Bridge Deck: NO
- Replace Girders and Bearings: NO
- Patch or Replace Abutments: NO
- Widen Bridge for Pedestrian and Bicycle Traffic: NO
- Existing or New Bridge Location: N/A
- Temporary Bridge: NO
- Impact to Adjacent Properties: NO

This alternative leaves the existing roadway and bridge as it is today, in its current condition. It is used as a benchmark for comparison to the other alternatives. Although there are no computed costs, it should be noted this alternative creates continued maintenance costs and does not meet the Purpose and Need Statment.

Alternative 1-Maintenance & Repairs

- Cost Estimate: $120,000
- Correct Roadway Banking: YES
- Repair or Replace Bridge Deck: REPAIR
- Replace Girders and Bearings: NO
- Patch or Replace Abutments: PATCH
- Widen Bridge for Pedestrian and Bicycle Traffic: NO
- Existing or New Bridge Location: EXISTING
- Temporary Bridge: NO

- Impact to Adjacent Properties: NO

Alternative 1 addresses the necessary repairs required to provide a minimum level of safety improvements. This alternative improves the roadway banking to meet current standards. The roadway pavement will be shimmed with asphalt to correct the banking deficiencies and the entire roadway will be repaved within the project limits. This alternative also repairs the bridge deck and patches the abutments. Bridge rail and approach rail are replaced to meet current design standards. This alternative maintains the existing roadway as shown in Appendix E and uses one-way traffic during daytime hours of construction to eliminate easements on the adjacent properties. This operation will have no impacts outside the right-of-way.

Benefits of this alternative include upgrading the bridge rail and approach rail, and extending the service life of the abutments and deck. The roadway banking would be brought to current design standards, but this alternative does not address the condition of the steel girders. This alterative would continue to generate maintenance costs and would require close monitoring to ensure the bridge's sufficiency. Alternative 1 is only a temporary solution and does not meet state and federal requirement for bicyclists and pedestrians.

Resources Impacted by Alternative 1

This alternative poses no significant impacts to the resources identified in the vicinity of the bridge.

Alternative 2-Rehabilitate Existing Structure In-Place with Temporary Bridge

- Cost Estimate: $460,000
- Correct Roadway Banking: YES
- Repair or Replace Bridge Deck: REPLACE
- Replace Girders and Bearings: YES
- Patch or Replace Abutments: PATCH
- Widen Bridge for Pedestrian and Bicycle Traffic: NO
- Existing or New Bridge Location: EXISTING
- Temporary Bridge: YES
- Impact to Adjacent Properties: TEMPORARY

This alternative involves replacement of the superstructure (steel beams, bearings, and bridge deck) and patches the existing abutments. The new bridge deck and steel will match the existing geometry. Bridge rail and approach rail are replaced to meet current design standards. The roadway pavement will be shimmed with asphalt to correct the banking deficiencies and the entire roadway will be repaved within the project limits. Alternative 2 maintains the existing bridge alignment and width as shown in Appendix E. This alternative is constructed using alternating one-way traffic during construction on a temporary bridge; this will require temporary easements on the adjacent properties.

Benefits of this alternative include a new superstructure, patched abutments, and upgraded bridge and approach rail. Maintenance and monitoring would still be necessary to ensure the life of the abutments.

This alternative is a longer term solution, but the roadway width does not meet state and federal guidelines for bicyclists and pedestrians.

Resources Impacted by Alternative 2

This alternative may impact the archeologically sensitive areas on the northwest side and southwest side of the bridge, as identified by Hartgen Archeological Associates.

Alternative 3-On-Alignment Rehabilitation

- Cost Estimate:
  - Alternative 3A: $900,000
  - Alternative 3B: $910,000
- Correct Roadway Banking: YES
- Repair or Replace Bridge Deck: REPLACE
- Replace Girders and Bearings: YES
- Patch or Replace Abutments: PATCH
- Widen Bridge for Pedestrian and Bicycle Traffic: YES
- Existing or New Bridge Location: EXISTING
- Temporary Bridge:
  - Alternative 3A: NO
  - Alternative 3B: YES
- Impact to Adjacent Properties:
  - Alternative 3A: MINIMAL
  - Alternative 3B: TEMPORARY

This alternative involves replacing the steel beams, bearings, and bridge deck (the superstructure) and the existing abutments are patched and widened. The new bridge deck and steel will be constructed using a new geometry in order to meet the state and federal guidelines for bicyclists and pedestrians. New bridge and approach rail are replaced and the roadway pavement will be shimmed with asphalt to correct the banking deficiencies and the entire roadway will be repaved within the project limits. Alternative 3 maintains the existing bridge location as shown in Appendix E. Alternative 3A would allow alternating one-way traffic on the existing bridge during each construction phase, which would not impact the adjacent properties. Alternative 3B of would utilize a one-way temporary bridge with alternating traffic for the duration of the reconstruction; this would require temporary easements on adjacent properties.

Benefits of this alternative include an extended life for the abutments, upgraded bridge and approach rail, as well as a four foot shoulder for bicycle and pedestrian traffic. Alternative 3 is estimated at $875,000, but monitoring would still be necessary on the existing section of the abutments to ensure the longevity of the bridge.

Resources Impacted by Alternative 3

This alternative may impact the archeologically sensitive areas on the northwest side and southwest side of the bridge, as identified by Hartgen Archeological Associates.

Alternative 4-On-Alignment Reconstruction

- Cost Estimate:
  - Alternative 4A: $1,480,000
  - Alternative 4B: $1,350,000
- Correct Roadway Banking: YES
- Repair or Replace Bridge Deck: REPLACE
- Replace Girders and Bearings: YES
- Patch or Replace Abutments: REPLACE
- Widen Bridge for Pedestrian and Bicycle Traffic: YES
- Existing or New Bridge Location: EXISTING
- Temporary Bridge
  - Alternative 4A: NO
  - Alternative 4B: YES
- Impact to Adjacent Properties:
  - Alternative 4A: MINIMAL
  - Alternative 4B: TEMPORARY

This alternative involves reconstructing a new bridge. The steel beams, bearings, bridge deck, and abutments are replaced. The new bridge will be constructed using a new geometry in order to meet the state and federal guidelines for bicyclists and pedestrians. New bridge rail and approach rail are replaced and the roadway pavement will be shimmed with asphalt to correct the banking deficiencies and the entire roadway will be repaved within the project limits. Alternative 4A would allow alternating one-way traffic on the existing bridge during each construction phase, which would not impact the adjacent properties. Alternative 4B of would utilize a one-way temporary bridge with alternating traffic for the duration of the reconstruction; this would require temporary easements on adjacent properties.

Benefits of this alternative include upgraded bridge and approach rail, new abutments and superstructure, as well as a four foot shoulder for bicycle and pedestrian traffic. Although the upfront cost to this alternative is substantial, the result is a bridge that will entail minimal maintenance and monitoring.

Resources Impacted by Alternative 4

This alternative may impact the archeologically sensitive areas on the northwest side and southwest side of the bridge, as identified by Hartgen Archeological Associates.

Alternative 5-Off-Alignment Reconstruction

- Cost Estimate: $1,540,000
- Correct Roadway Banking: YES
- Repair or Replace Bridge Deck: REPLACE
- Replace Girders and Bearings: YES
- Patch or Replace Abutments: REPLACE
- Widen Bridge for Pedestrian and Bicycle Traffic: YES
- Existing or New Bridge Location: NEW
- Temporary Bridge: NO
- Impact to Adjacent Properties: YES

This alternative involves constructing a new bridge adjacent to the existing bridge. The new bridge is constructed to current design standards. Alternative 5 has minimal impact on traffic during construction. Traffic utilizes the existing bridge until the new bridge is completed. Once the new bridge is completed, traffic shifts over to the new alignment and the existing bridge is removed. This alternative includes new approaches, steel beams, bearings, bridge deck, and bridge abutments.

Benefits of this alternative include upgraded bridge and approach rail, new abutments and superstructure, as well as a four foot shoulder for bicycle and pedestrian traffic. An additional benefit of this alternative is the use of the existing bridge to handle traffic while a new bridge is constructed adjacent to it. In effect, the current roadway and bridge will act as the detour during construction. Although the upfront cost to this alternative is substantial, the result is a bridge that will entail minimal maintenance and monitoring. The disadvantage to this alternative is that it will require additional roadway reconstruction in order to accommodate the new alignment and will require land from adjacent properties.

Resources Impacted by Alternative 5

This alternative may impact the archeologically sensitive areas on the northwest side and southwest side of the bridge, as identified by Hartgen Archeological Associates.

MEETINGS

The scoping process of this bridge included a site visit, a Local Concerns Meeting that included the Huntington Selectboard, and an Alternatives Presentation Meeting that included the Selectboard.

Site Visit

McFarland Johnson visited the site July 20, 2009 and has done previous evaluation of the structures within the town of Huntington.

Local Concerns Meeting

A Local Concerns Meeting was held July 20th, 2009 at the Huntington Town Offices. Attendees included the Huntington Selectboard, the Huntington Town Administrator, the CCMPO, and McFarland Johnson. (See appendix D for meeting minutes)

Alternatives Presentation Meeting

An Alternative Presentation Meeting was held January 13th, 2010 at the Huntington Town Offices. Attendees included the Huntington Selectboard, the Huntington Town Administrator, the CCMPO, McFarland Johnson, and two adjacent property owners. (See appendix D for meeting minutes)

HUNTINGTON BRIDGE #8
MAIN ROAD OVER HUNTINGTON RIVER
(SOUTH OF MOODY ROAD INTERSECTION)

		Do Nothing	Maintenance and Repairs	Rehabilitate Existing Structure	Rehabilitate and Widen Existing Structure		On-Alignment Reconstruction		Off-Alignment Reconstruction
			Alternative 1	Alternative 2	Alternative 3A	Alternative 3B	Alternative 4A	Alternative 4B	Alternative 5
			Staged Construction	*Temporary Bridge*	*Staged Construction*	*Temporary Bridge*	*Staged Construction*	*Temporary Bridge*	*N/A*
Costs	Roadway	$0	$60,000	$60,000	$300,000	$300,000	$300,000	$300,000	$690,000
	Structure	$0	$60,000	$200,000	$600,000	$410,000	$1,180,000	$850,000	$850,000
	Detour	$0	$0	$200,000	$0	$200,000	$0	$200,000	$0
	TOTAL ESTIMATE ($)	**$0**	**$120,000**	**$460,000**	**$900,000**	**$910,000**	**$1,480,000**	**$1,350,000**	**$1,540,000**
Engineering	Approach Typical Section	*INSUFFICIENT*	*NO CHANGE*	*NO CHANGE*	*4-10-10-4*	*4-10-10-5*	*4-10-10-4*	*4-10-10-4*	*4-10-10-4*
	Alignment Change	*NO*	*NO*	*NO*	*MINIMAL*	*MINIMAL*	*MINIMAL*	*MINIMAL*	*YES*
	Bicycle Access	*NO*	*NO*	*NO*	*YES*	*YES*	*YES*	*YES*	*YES*
	Hydraulic Performance	*NO CHANGE*	*NO CHANGE*	*NO CHANGE*	*BETTER*	*BETTER*	*BETTER*	*BETTER*	*BETTER*
	Utilities	*NO IMPACT*	*NO IMPACT*	*NO IMPACT*	*NO IMPACT*	*NO IMPACT*	*NO IMPACT*	*NO IMPACT*	*NO IMPACT*
Impacts	Agricultural	*NO*	*NO*	*NO*	*YES*	*YES*	*YES*	*YES*	*YES*
	Archeological	*NO*	*NO*	*POTENTIALLY*	*POTENTIALLY*	*POTENTIALLY*	*POTENTIALLY*	*POTENTIALLY*	*POTENTIALLY*
	Historic Structures, Sites, Districts	*NO*	*NO*	*POTENTIALLY*	*POTENTIALLY*	*POTENTIALLY*	*POTENTIALLY*	*POTENTIALLY*	*POTENTIALLY*
	Hazardous Materials	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*
	Floodplain	*NO*	*NO*	*NO*	*POTENTIALLY*	*POTENTIALLY*	*POTENTIALLY*	*POTENTIALLY*	*POTENTIALLY*
	Fish & Wildlife	*NO*	*NO*	*POTENTIALLY*	*POTENTIALLY*	*POTENTIALLY*	*POTENTIALLY*	*POTENTIALLY*	*POTENTIALLY*
	Rare/Threaten/Endanger Species	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*
	Public Lands - Sec 4(f)	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*
	LWCF - Section 6(f)	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*
	Noise	*NO CHANGE*	*NO CHANGE*	*NO CHANGE*	*NO CHANGE*	*NO CHANGE*	*NO CHANGE*	*NO CHANGE*	*NO CHANGE*
	Wetlands	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*
Local Issues	Concerns	*SAFETY*	*SAFETY*	*SAFETY*	*NO CONCERNS*	*NO CONCERNS*	*NO CONCERNS*	*NO CONCERNS*	*NO CONCERNS*
	Aesthetics	*UNCHANGED*	*MINIMAL*	*MINIMAL*	*IMPROVED*	*IMPROVED*	*IMPROVED*	*IMPROVED*	*IMPROVED*
	Community Character	*UNCHANGED*	*UNCHANGED*	*UNCHANGED*	*UNCHANGED*	*UNCHANGED*	*UNCHANGED*	*UNCHANGED*	*UNCHANGED*
	Economic Impacts	*POSSIBLE*	*MAINT. OF EX. BRIDGE*	*MAINT. OF EX. BRIDGE*	*NONE*	*NONE*	*NONE*	*NONE*	*NONE*
	Conform to Regional Transp. Plan	*NO*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*
	Satisfies Purpose&Need Statement	*NO*	*NO*	*NO*	*YES*	*YES*	*YES*	*YES*	*YES*
Permits	ACT 250	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*	*0*	*NO*
	401 Water Quality	*NO*	*NO*	*NOT LIKELY*	*LIKELY*	*LIKELY*	*LIKELY*	*LIKELY*	*LIKELY*
	404 COE Permit	*NO*	*NO*	*NOT LIKELY*	*YES*	*YES*	*YES*	*YES*	*YES*
	Stream Alteration	*NO*	*NO*	*NOT LIKELY*	*LIKELY*	*LIKELY*	*LIKELY*	*LIKELY*	*LIKELY*
	Conditional Use Determination	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*
	Stormwater Discharge	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*
	Lakes & Ponds	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*
	T E Species	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*
	SHPO	*NO*	*NO*	*NO*	*TBD*	*TBD*	*TBD*	*TBD*	*TBD*

McFarland Johnson

Updated: March 10, 2010

RECOMMENDATIONS

	Do Nothing	ALT 1	ALT 2	ALT 3A	ALT 3B	ALT 4A	ALT 4B	ALT 5
Cost	$0	$120,000	$460,000	$900,000	$910,000	$1.48 M	$1.35 M	$1.54 M
Correct Roadway Banking	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Repair or Replace Deck	N/A	Repair	Replace	Replace	Replace	Replace	Replace	Replace
Replace Girders & Bearings	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Patch or Replace Abutments	N/A	Patch	Patch	Patch	Patch	Replace	Replace	Replace
Widen Bridge	No	No	No	Yes	Yes	Yes	Yes	Yes
New or Existing Location	N/A	Existing	Existing	Existing	Existing	Existing	Existing	New
Temporary Bridge	No	No	Yes	No	Yes	No	Yes	No
Impact to Adjacent Properties	No	Minimal	Temp.	Temp.	Minimal	Temp.	Minimal	Yes

Alternatives Summary

Alternative 1- Maintenance and Repairs
Alternative 2- Rehabilitate Existing Structure
Alternative 3A- Rehabilitate and Widen Existing Structure Using Staged Construction
Alternative 3B- Rehabilitate and Widen Existing Structure Using a Temporary Bridge
Alternative 4A- On-Alignment Reconstruction Using Staged Construction
Alternative 4B- On-Alignment Reconstruction Using a Temporary Bridge
Alternative 5- Off-Alignment Reconstruction

When selecting an alternative, the town discussions should include whether the bridge should be widened for bicycle and pedestrian traffic, whether the abutments will be patched or replaced, and whether the bridge construction will be phased or utilize a off-alignment temporary bridge.

It is likely that Alternative 1 repairs will be required in the interim until a more complete rehabilitation or repair strategy can be implemented. The decision to patch the existing abutments or reconstruct the abutments is difficult because estimating the life of a patched abutment is not an exact science. With the investment in the replacement of the rest of the bridge, new abutments provide the greatest security.

The advantages of construction using a temporary bridge are, typically, faster construction and more area available for staging. A temporary bridge also removes traffic from the work zone therefore providing a safer and more effective area for workers. Alternative 2 cannot use staged construction because it does not include widening of the existing structure, and therefore would not provide adequate width for staged construction.

Property owners that attended the public meetings were very concerned about the right-of-way implications for Alternative 5. There were some concerns about the impacts from the temporary bridge, but the off-alignment temporary bridge was not ruled out. Staging the construction using alternating one-way traffic would likely take longer, but would have less impact to the adjacent properties.

Included in the report are cost estimates for use by the Town to budget for the project depending on whether the Town selects to either rehabilitate or reconstruct the bridge (likely alternatives 3 or 4). For estimate purposes the higher estimate of the “A” or “B” can be budgeted with the traffic control option to be selected during the final design process.

MEETING MINUTES

APPENDIX D

McFarland Johnson

McFarland-Johnson, Inc.
53 Regional Drive
Concord, NH 03301-8500
Phone: 603-225-2978
Fax: 603-225-0095
Web: www.mjinc.com

July 22, 2009 Job No. 17288.00

MEETING MINUTES MEMO

Attendees:
Huntington Selectboard

Ed Wildman	Huntington Town Administrator
Christine Forde	CCMPO
Ron Joy, P.E.	McFarland-Johnson, Inc.
Darren Benoit, P.E.	McFarland-Johnson, Inc.

Date**: 7/20/09 7:00 PM**
Location:Huntington Town Offices

RE: Local Concerns Meeting Huntington Bridges (Nos. 8 & 10)

The Local Concerns Meeting for two Huntington bridges (Bridge 8 Main Road over the Huntington River, South of Moody Road intersection, and Bridge 10 Main Road over the Huntington River at the Parker Beane Road intersection) was scheduled during the Huntington Selectboard's meeting. Two adjacent property owners were in attendance.

Christine Forde began the meeting by introducing McFarland-Johnson.

Darren Benoit described the scoping process, highlighting the opportunities for the public to be involved in the design process. He described the anticipated project schedule, returning in September to present the design alternatives; and one to two additional months to submit the scoping report. Conclusion of the scoping report would bring McFarland-Johnson to the end of its design contract.

Darren described the design constraints for Bridge 8, then Ron Joy described the condition of the bridge. At the conclusion of the presentation Darren opened the floor to questions.

The Town Administrator noted that there had been three fatalities at the bridge over the course of the last 20 years. ***Later it was verified that there had been two fatalities on record in 1990 and 1991***

There was discussion of the northerly approach to the bridge. The speed limit is posted at 45 mph and the curve appears to be substandard. Darren noted the curve was acceptable for the posted speed, but the cross slope may not be sufficient. ***Further investigation shows that the northerly curve is appropriate for the posted speed and the cross slope in the southbound lane is appropriate, but the northbound lane is significantly flatter. The restricted width of the bridge forces a constriction of the road that is not compatible to the posted speed. This constriction may compel southbound drivers to move into the northbound lane. Once a driver crosses the yellow line the cross slope would not be compatible with the posted speed. The combination of the constriction and the cross slope experienced by a vehicle straddling the yellow line are the likely causes of any discomfort felt by southbound drivers.***

Darren and Ron gave a brief overview of the Bridge 10 design constraints then opened the floor to questions.

It was pointed out that the approach rail from the north offered little protection from an errant vehicle plunging over the embankment into the stream. In response to a question about interim measures MJ suggested any improvement to the approach rail could be done immediately.

McFarland Johnson

McFarland-Johnson, Inc.
53 Regional Drive
Concord, NH 03301-8500
Phone: 603-225-2978
Fax: 603-225-0095
Web: www.mjinc.com

January 15, 2010 Job No. 17288.00

MEETING MINUTES MEMO

Attendees:

Huntington Selectboard	
Ed Wildman	Huntington Town Administrator
Christine Forde	CCMPO
Ron Joy, P.E.	McFarland-Johnson, Inc.
Darren Benoit, P.E.	McFarland-Johnson, Inc.
Justin Rich	Property Owner
Rose King	Property Owner

Date**: 1/13/10 7:00 PM**
Location: Huntington Town Offices

RE: Alternatives Presentation Meeting Huntington Bridges (Nos. 8 & 10)

The Alternatives Presentation Meeting for two Huntington bridges (Bridge 8 Main Road over the Huntington River, South of Moody Road intersection, and Bridge 10 Main Road over the Huntington River at the Parker Beane Road intersection) was scheduled during the Huntington Selectboard's meeting. Two adjacent property owners were in attendance.

Christine Forde began the meeting by introducing McFarland-Johnson.

Darren Benoit described the scoping process, highlighting the role of the Alternatives Presentation Meeting.

Bridge #8

Darren provided a brief introduction to the alternatives, then Ron Joy described the bridge alternatives. The alternatives included:

- Do nothing-No Build
- Alternative #1-Maintenance Alternative
- Alternative #2-Reabilitate Existing Structure-Temporary Detour
- Alternative #3-On Alignment Reconstruction-Staged Construction
- Alternative #4-On-Alignment Reconstruction-Temporary Detour
- Alternative #5-Off Alignment Reconstruction

Comments from the property owners present included concern about right-of-way impacts, especially with Alternative #5. The existing ground along the Alternative is significantly lower than the existing road which would require a lot of secondary grading and would leave the surrounding landscape looking odd after the project is done.

There was a question about why the alternatives were not on the opposite side of the road. The opposite side of the road was less desirable geometrically and would require significant utility relocations.

The property owners were also concerned with losing top quality topsoil during the project only to have the contractor replace the material with a lower grade allowable by the VTrans Standard Specifications. Final plans for this project should require that the topsoil is stock piled and reused on site. It should be made clear on the plans that topsoil material shall not be removed from the site.

The Town was expecting to complete the maintenance alternative regardless of the Alternative chosen.

Bridge #10

Darren provided a brief introduction to the alternatives, then Ron Joy described the bridge alternatives. The alternatives included:

- Do nothing-No Build
- Alternative #1-Maintenance Alternative
- Alternative #2-Reabilitate Existing Structure-Temporary Detour
- Alternative #3-On Alignment Reconstruction-Staged Construction
- Alternative #4-On-Alignment Reconstruction (Existing Abutments)-Temporary Detour
- Alternative #5-On-Alignment Reconstruction (New Abutments)-Temporary Detour

The Town has obtained estimates to do the abutment repair regardless of any alternative chosen. They have had a local contractor in to discuss the bridge. They provided a price for the abutment repair and suggested a similar detour if one was needed.
The Selectboard asked some general questions about the remaining life cycles of the bridges and how the implementation of some minor repairs would impact the life of the structures. MJ responded that life of bridges is not an exact science, but that the deterioration of a structure is geometric once it begins to break down.

There was a question about which of the two structures should be prioritized. With the knowledge that there have been fatalities at Bridge 8, the Selectboard answered their own question.
MJ will write up Initial Scoping Reports for each of the bridges and provide some guidance for a draft recommendation based upon what was discussed

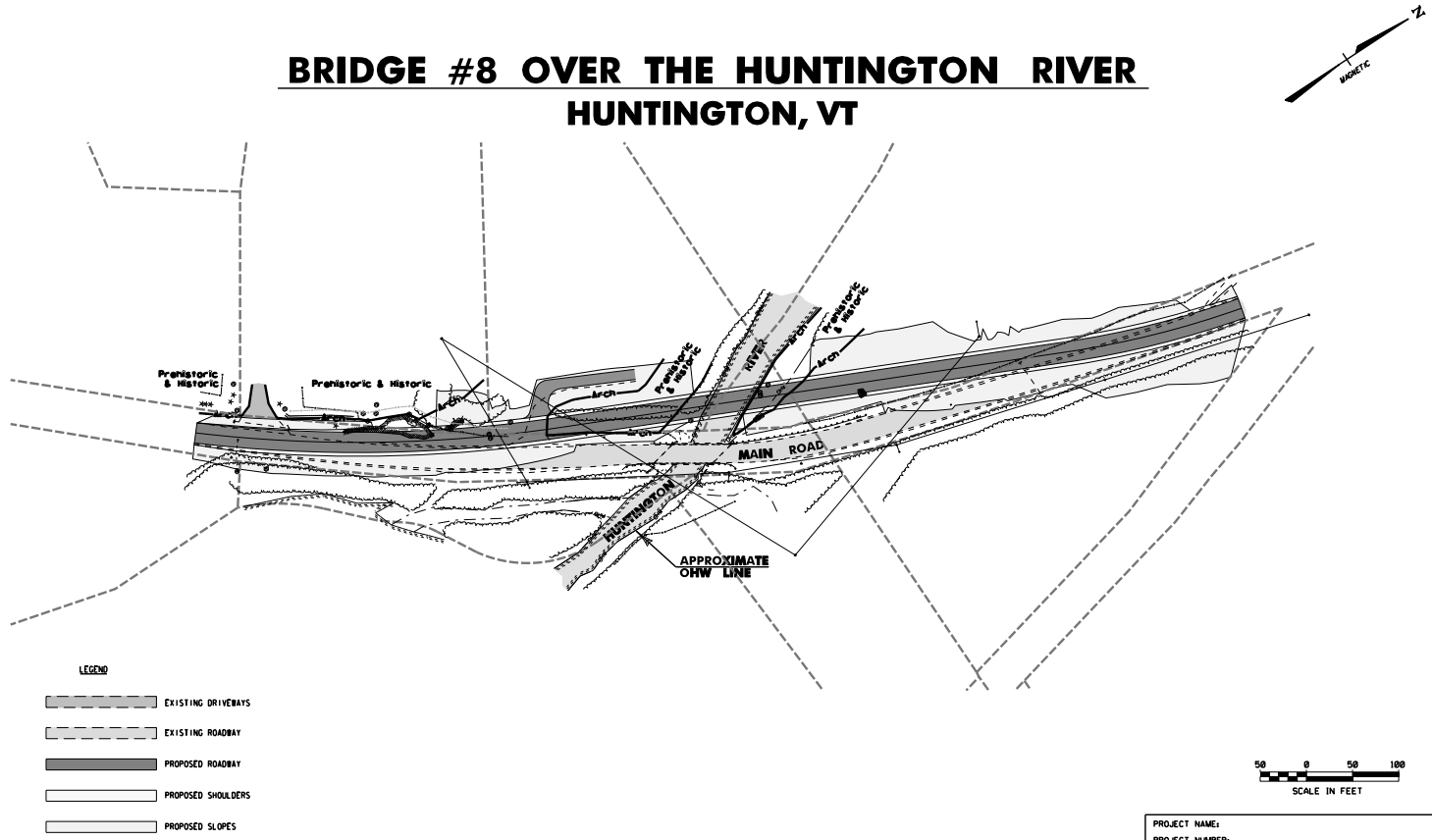
PLANS

APPENDIX E

ALTERNATIVE 5 – OFF ALIGNMENT RECONSTRUCTION

BRIDGE #8 OVER THE HUNTINGTON RIVER

HUNTINGTON, VT



LEGEND

- EXISTING DRIVEWAYS
- EXISTING ROADWAY
- PROPOSED ROADWAY
- PROPOSED SHOULDERS
- PROPOSED SLOPES

50 0 50 100
SCALE IN FEET

Mc Farland Johnson

PROJECT NAME:
PROJECT NUMBER:

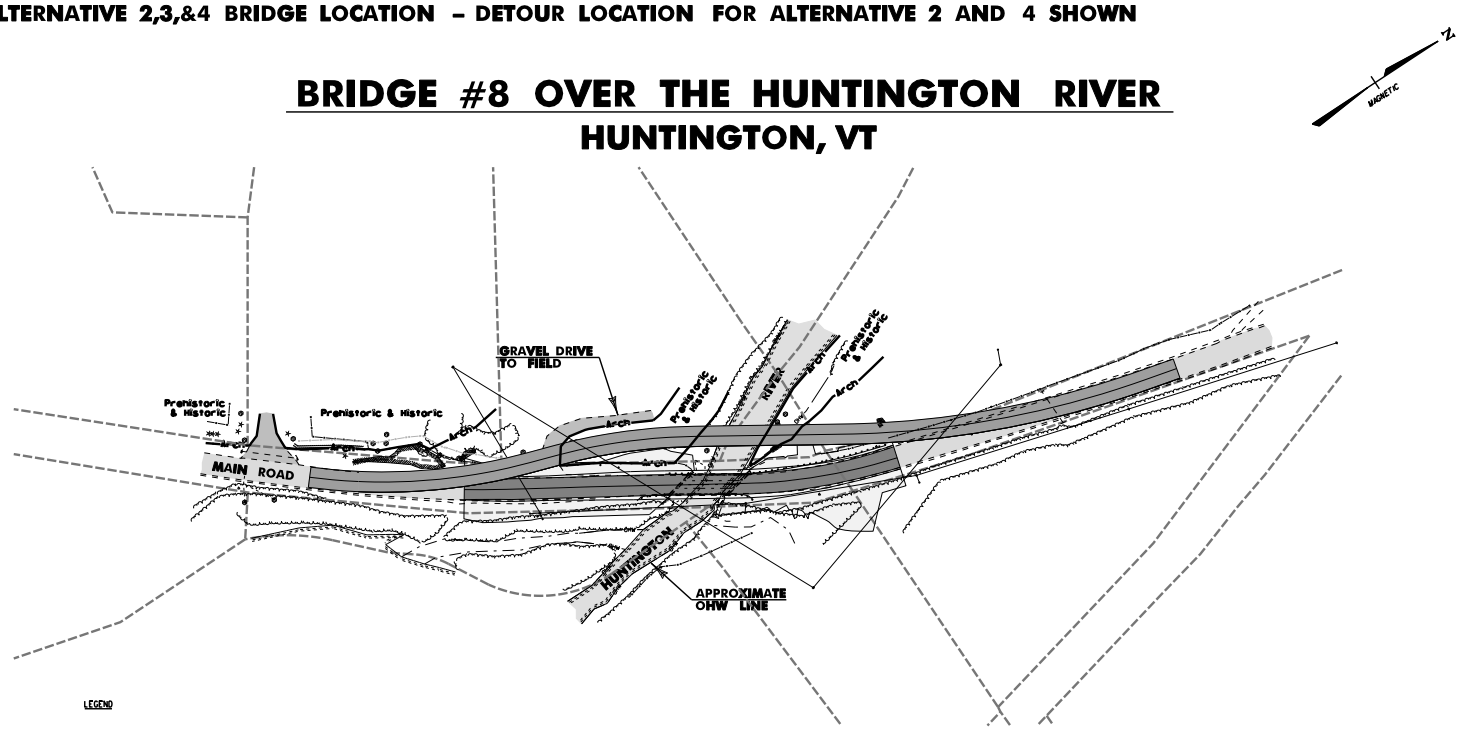
FILE NAME: COLOR 1001.dgn
PROJECT LEADER: DMB
DESIGNED BY:

PLOT DATE: $$$$DATE$$$
DRAWN BY:
CHECKED BY:
SHEET OF

ALTERNATIVE 2,3,&4 BRIDGE LOCATION – DETOUR LOCATION FOR ALTERNATIVE 2 AND 4 SHOWN

BRIDGE #8 OVER THE HUNTINGTON RIVER

HUNTINGTON, VT



LEGEND

- EXISTING DRIVEWAYS
- EXISTING ROADWAY
- PROPOSED ROADWAY
- PROPOSED SHOULDERS
- PROPOSED SLOPES
- DETOUR

50 0 50 100
SCALE IN FEET

Mc Farland Johnson

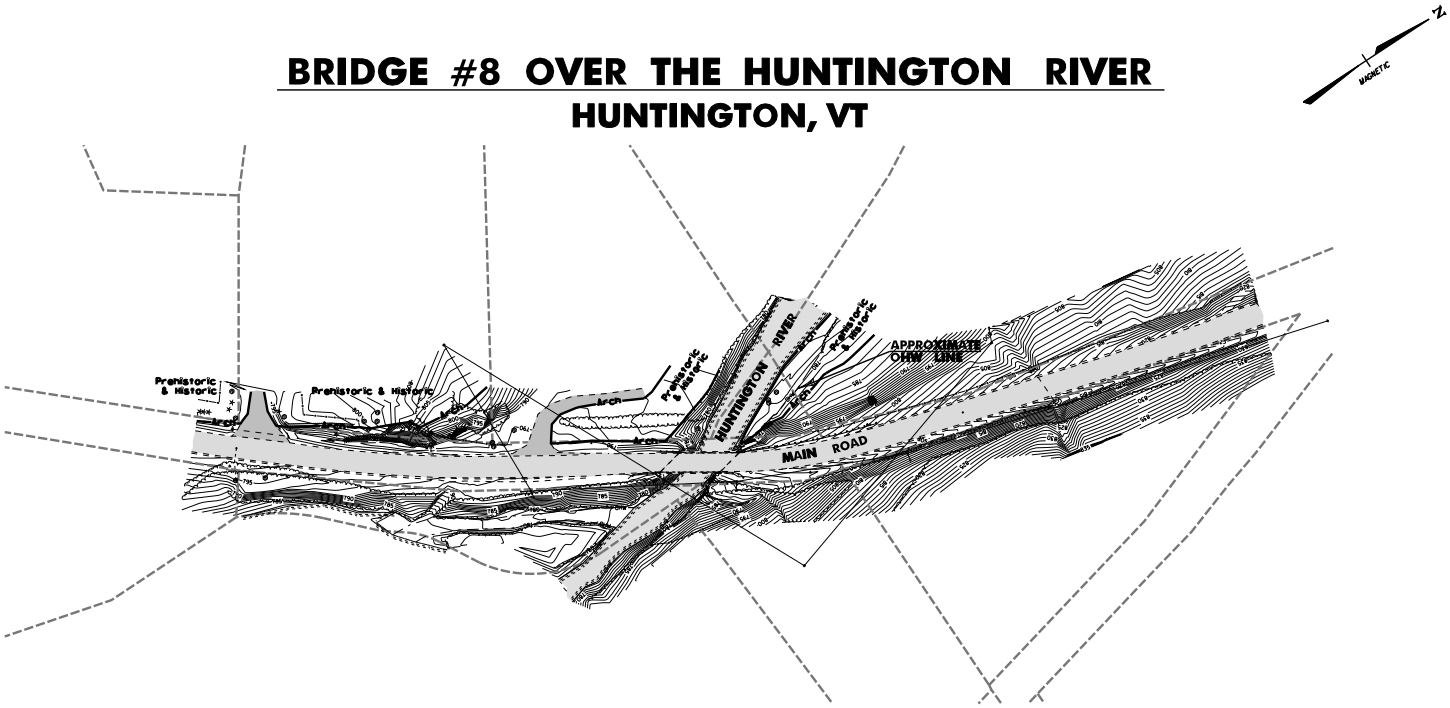
PROJECT NAME:
PROJECT NUMBER:

FILE NAME: COLOR 1001.dgn
PROJECT LEADER: DMB
DESIGNED BY:

PLOT DATE: $$$$DATE$$$
DRAWN BY:
CHECKED BY:
SHEET OF

BRIDGE #8 OVER THE HUNTINGTON RIVER

HUNTINGTON, VT



LEGEND

EXISTING DRIVEWAYS

EXISTING ROADWAY

50 0 50 100

SCALE IN FEET

Mc Farland Johnson

PROJECT NAME:

PROJECT NUMBER:

FILE NAME: COLOR 1001.dgn

PROJECT LEADER: DMB

DESIGNED BY:

PLOT DATE: $$$$DATE$$$

DRAWN BY:

CHECKED BY:

SHEET OF

KING, JOSEPH A.
& ROSEMARY L.

LYMAN-CLARKE, LINDSAY M.
AND RICH, JUSTIN W.

KING, JOSEPH A.
& ROSEMARY L.

CROSS, MATTHEW L.

GUILFOY, EDWIN
& MARGARET

BENCH MARK BM13
RAILROAD SPIKE IN
ROOT OF LARGE CHERRY
ELEV. = 790.90

VT STATE PLANE GRID

HUNTINGTON RIVER
FLOW

STA 40+00.00
PC
STA 40+13.25
PT
STA 41+20.93
PI
STA 40+67.11
POE
STA 52+00.00
PC
STA 43+80.17
PT
STA 45+21.16
PI
STA 52+00.00
POB
STA 50+00.00
PI
STA 50+00.00
PI
STA 44+51.14

BARBED WIRE FENCE
GRAVEL DRIVE
SIGN "NO SWIMMING"
BARBED WIRE FENCE
SIGN XX-X
FENCE
FAS 0211
TO STARKSBORO
FAS 0211
TO RICHMOND
41+00
42+00
43+00
44+00
45+00
46+00
50+00
51+00
GRAVEL DRIVE
TELEPHONE 5
TELEPHONE JUNCTION BOX
GUY
TELEPHONE 172
TELEPHONE 88A
WATER COURSE
ARCH
UT
P L

EXISTING CURVE 1
DELTA = 4°06'48"
D = 3°49'11"
R = 1500.00'
T = 53.87'
L = 107.69'
E = 0.97'

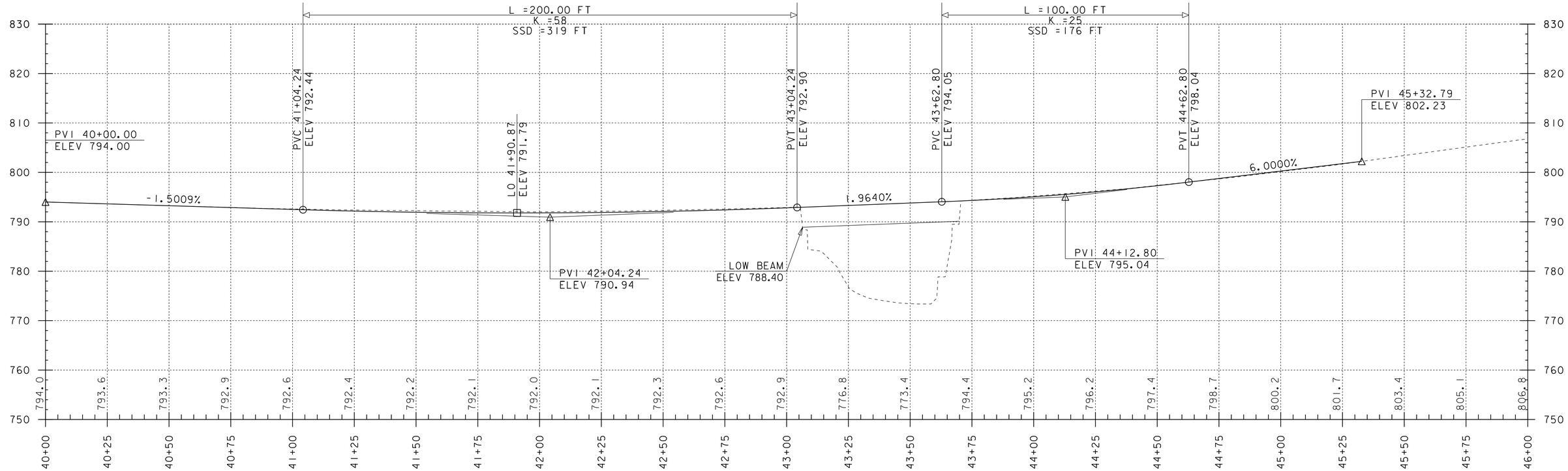
EXISTING CURVE 2
DELTA = 16°09'24"
D = 11°27'33"
R = 500.00'
T = 70.97'
L = 140.99'
E = 5.01'

EXISTING BRIDGE DATA
SINGLE SPAN ROLLED BEAM
BUILT 1934
63' LENGTH, 20'-6" C-C

EXISTING CONDITIONS

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

PROJECT NAME: HUNTINGTON	
PROJECT NUMBER: BF 0211(32)	
FILE NAME: 13j080/s13j080border.dgn	PLOT DATE: 13-JAN-2014
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: O.M.DARISSE
DESIGNED BY: ------	CHECKED BY: ------
EXISTING CONDITIONS	SHEET 1 OF 21



FAS 0211 PROFILE

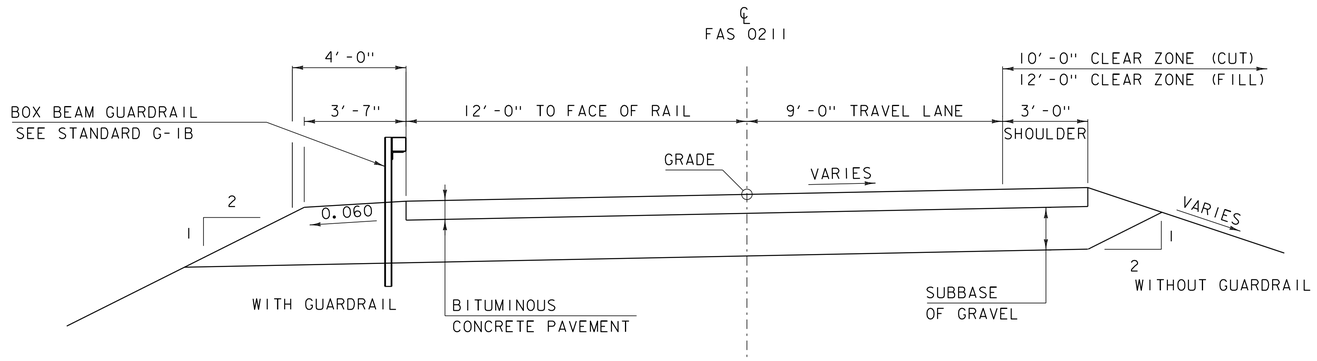
SCALE: HORIZONTAL 1" = 20'-0"
VERTICAL 1" = 10'-0"

NOTE:

GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

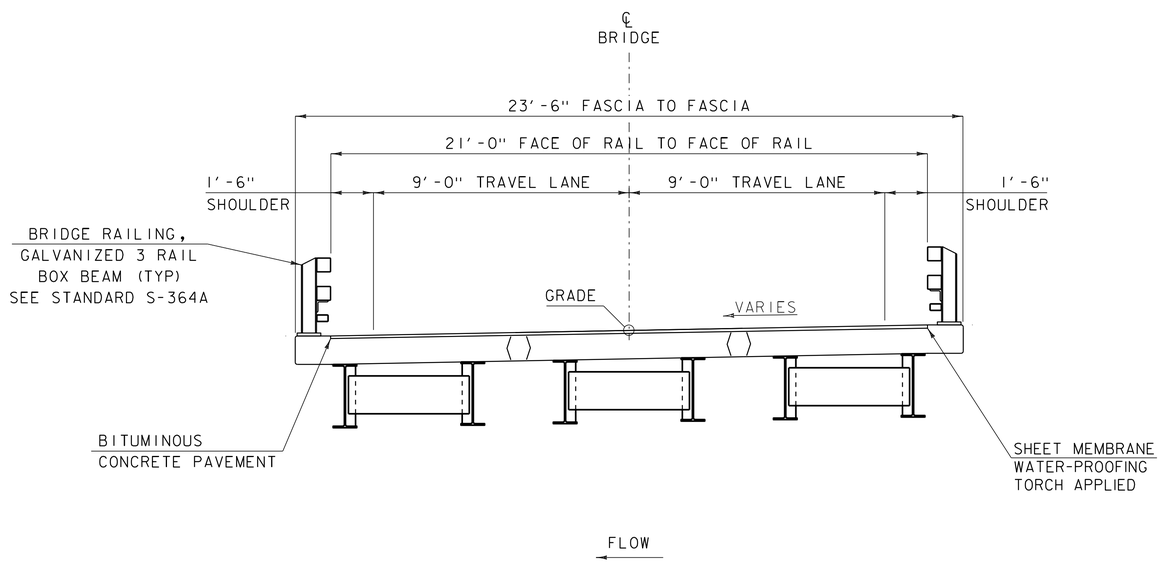
GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: HUNTINGTON	
PROJECT NUMBER: BF 0211(32)	
FILE NAME: 13J080/13J080profile.dgn	PLOT DATE: 13-JAN-2014
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
PROFILE SHEET	SHEET 2 OF 21



PROPOSED FAS 0211 TYPICAL SECTION

SCALE 3/8" = 1'-0"



ALTERNATIVE 1 PROPOSED BRIDGE TYPICAL SECTION

SCALE 3/8" = 1'-0"

NOTE: PBUs 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: HUNTINGTON
PROJECT NUMBER: BF 0211(32)

FILE NAME: 13J080\s13J080typical.dgn
PROJECT LEADER: C.P.WILLIAMS
DESIGNED BY: ----------
ALTERNATIVE 1 TYPICAL SECTIONS

PLOT DATE: 13-JAN-2014
DRAWN BY: O.M.DARISSE
CHECKED BY: ------
SHEET 3 OF 21

BENCH MARK BM13
RAILROAD SPIKE IN
ROOT OF LARGE CHERRY
ELEV. = 790.90

BEGIN APPROACH
STA 11+50.00

BEGIN PROJECT
STA 12+75.00

END PROJECT
STA 14+00.00

END NEW APPROACH
STA 15+30.00

PROJECT CONCEPTUAL
CONSTRUCTION LIMITS

POE
STA 52+00.00

HUNTINGTON RIVER
FLOW

STA 52+00.00
PI

52+00

VT STATE PLANE GRID

N

STA 10+00.00
PC
STA 10+13.25

BARBED WIRE
FENCE

GRAVEL
DRIVE

SIGN
"NO SWIMMING"

BARBED WIRE
FENCE

SIGN
XX-X

FAS 0211
TO STARKSBORO

11+00

12+00

13+00

45°

51+00

14+00

15+00

16+00

FAS 0211
TO RICHMOND

TELEPHONE
88A
15+30

GRAVEL
DRIVE

TELEPHONE
5
173

GUY

TELEPHONE
JUNCTION BOX

GUY

POB
STA 50+00.00

TELEPHONE
172

WATER COURSE

STA 14+51.14
PI

STA 15+21.16
PT

PI
STA 10+67.11

PT
STA 11+20.93

50+00

1.5" DIA IRON PIPE
18" ABOVE GROUND

STA 50+00.00
PI

PC
STA 13+80.17

EXISTING CURVE 1
DELTA = 4°06'48"
D = 3°49'11"
R = 1500.00'
T = 53.87'
L = 107.69'
E = 0.97'

EXISTING CURVE 2
DELTA = 16°09'24"
D = 11°27'33"
R = 500.00'
T = 70.97'
L = 140.99'
E = 5.01'

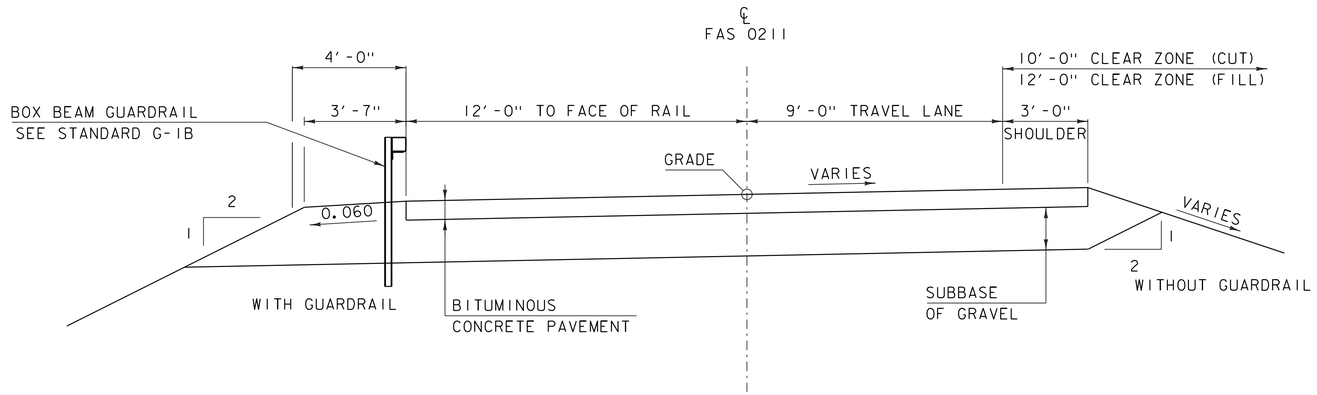
BEGIN BRIDGE
STA 13+07.00

END BRIDGE
STA 13+70.00

ALTERNATIVE 1

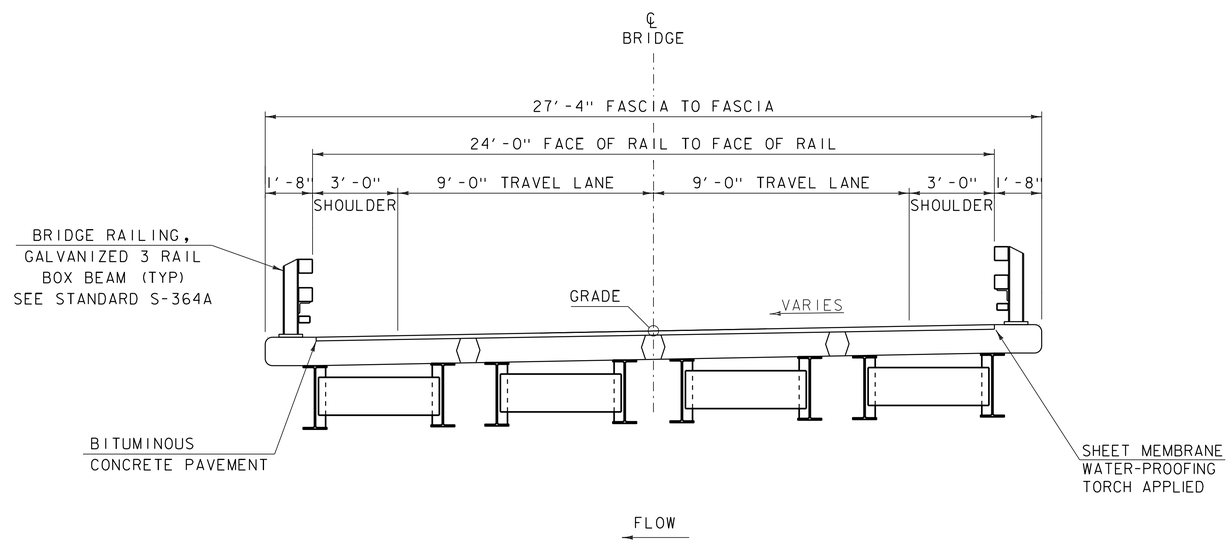
SCALE 1" = 20'-0"
20 0 20

PROJECT NAME: HUNTINGTON	
PROJECT NUMBER: BF 0211(32)	
FILE NAME: 13J080/s13J080border.dgn	PLOT DATE: 13-JAN-2014
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: O.M.DARISSE
DESIGNED BY: ------	CHECKED BY:
ALTERNATIVE 1 LAYOUT	SHEET 4 OF 21



PROPOSED FAS 0211 TYPICAL SECTION

SCALE 3/8" = 1'-0"



ALTERNATIVE 2a, 2b, 4 PROPOSED BRIDGE TYPICAL SECTION

SCALE 3/8" = 1'-0"

NOTE: PBUs 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: HUNTINGTON
PROJECT NUMBER: BF 0211(32)

FILE NAME: 13J080\s13J080typical.dgn
PROJECT LEADER: C.P.WILLIAMS
DESIGNED BY: ----------
ALTERNATIVE 2a, 2b, 4 TYPICAL SECTIONS

PLOT DATE: 13-JAN-2014
DRAWN BY: O.M.DARISSE
CHECKED BY: ------
SHEET 5 OF 21

BEGIN APPROACH
STA 11+50.00

BEGIN NEW PAVING
STA 12+00.00

BEGIN PROJECT
STA 12+50.00

END PROJECT
STA 14+25.00

END NEW PAVING
STA 14+75.00

END APPROACH
STA 15+25.00

VT STATE PLANE GRID

BENCH MARK BM13
RAILROAD SPIKE IN
ROOT OF LARGE CHERRY
ELEV. = 790.90

HUNTINGTON RIVER
FLOW

POE
STA 52+00.00

PC
STA 10+00.00

PC
STA 10+13.25

BARBED WIRE FENCE

GRAVEL DRIVE

SIGN "NO SWIMMING"

BARBED WIRE FENCE

SIGN

FENCE

ARCH

FAS 0211
TO STARKSBORO

45°

52+00

STA 52+00.00
PI

16+00 FAS 0211
TO RICHMOND

15+00

11+00

12+00

13+00

51+00

14+00

TELEPHONE
88A
15+50

GRAVEL DRIVE

TELEPHONE
5
173

GUY

TELEPHONE GUY
JUNCTION BOX

POB
STA 50+00.00

PI
STA 10+67.11

PT
STA 11+20.93

50+00

PI

STA 50+00.00

TELEPHONE
172

WATER COURSE

STA 14+51.14
PI

STA 15+21.16
PT

PC
STA 13+80.17

PROJECT CONCEPTUAL
CONSTRUCTION LIMITS

DIA IRON PIPE
18" ABOVE GROUND

PROPOSED CURVE 1
DELTA = 4°06′48″
D = 3°49′11″
R = 1500.00′
T = 53.87′
L = 107.69′
E = 0.97′

PROPOSED CURVE 2
DELTA = 16°09′24″
D = 11°27′33″
R = 500.00′
T = 70.97′
L = 140.99′
E = 5.01′

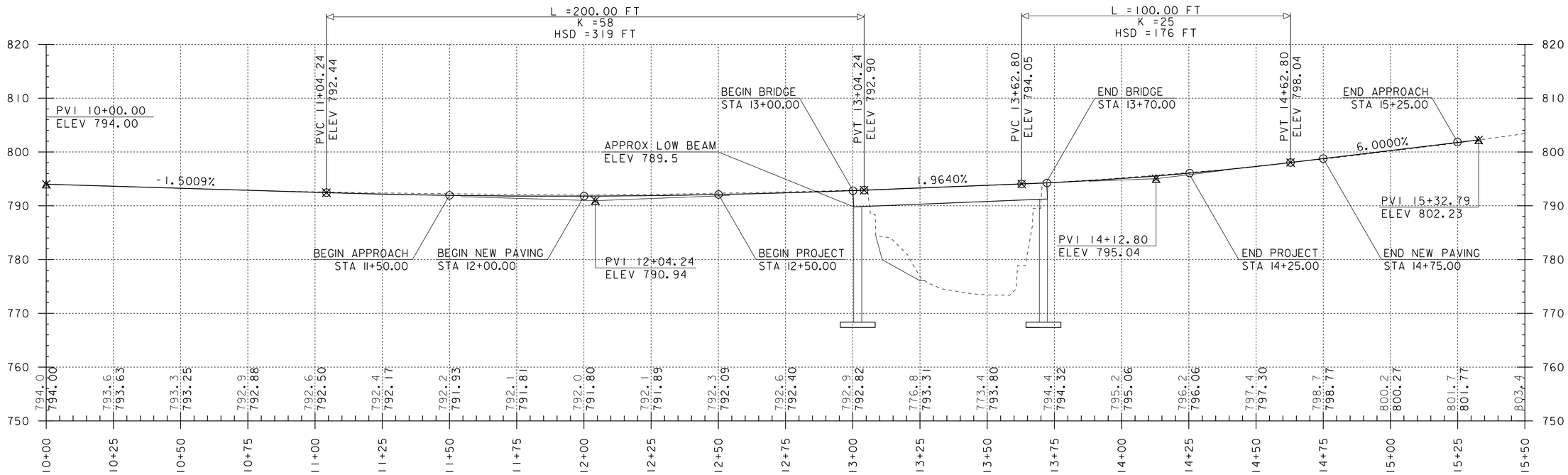
BEGIN BRIDGE
STA 13+00.00

END BRIDGE
STA 13+70.00

ALTERNATIVE 2a, 2b

SCALE 1" = 20′-0"
20 0 20

PROJECT NAME: HUNTINGTON	
PROJECT NUMBER: BF 0211(32)	
FILE NAME: 13j080/s13j080border.dgn	PLOT DATE: 13-JAN-2014
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: O.M.DARISSE
DESIGNED BY: ------	CHECKED BY: ------
ATLERNATIVE 2a, 2b LAYOUT	SHEET 6 OF 21



ALTERNATIVE 2a, 2b PROFILE

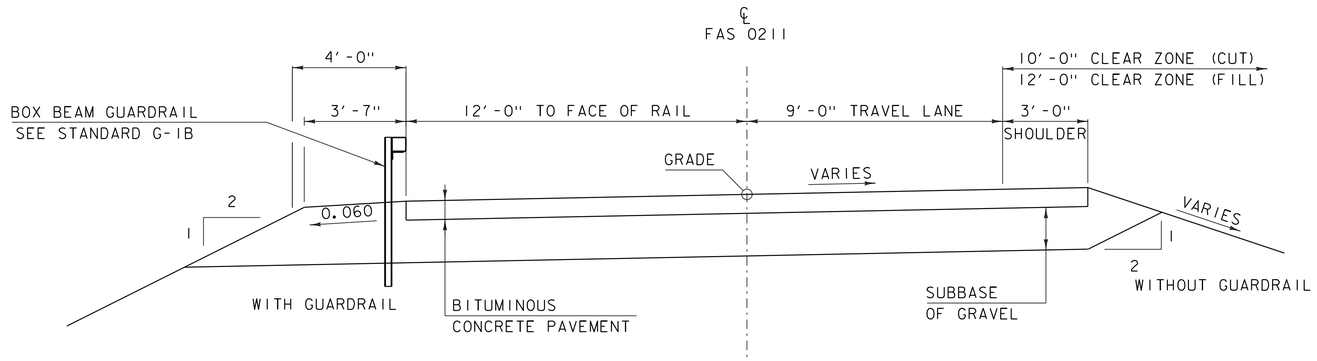
SCALE: HORIZONTAL 1" = 20'-0"
VERTICAL 1" = 10'-0"

NOTE:

GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

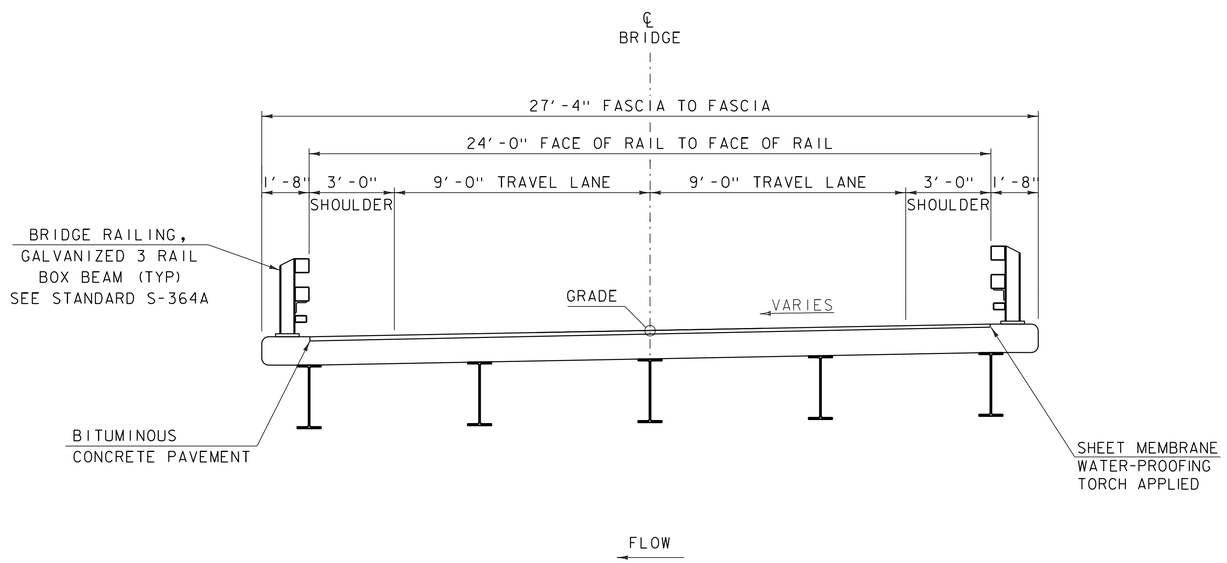
GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: HUNTINGTON	
PROJECT NUMBER: BF 0211(32)	
FILE NAME: 13j080/s13j080profile.dgn	PLOT DATE: 13-JAN-2014
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: O.M.DARISSE
DESIGNED BY: ------	CHECKED BY: ------
ALTERNATIVE 2a, 2b PROFILE	SHEET 7 OF 21



PROPOSED FAS 0211 TYPICAL SECTION

SCALE 3/8" = 1'-0"



ALTERNATVE 3a, 3b PROPOSED BRIDGE TYPICAL SECTION

SCALE 3/8" = 1'-0"

NOTE: PBUs SHOWN FOR EXAMPLE,
SUPERSTRUCTURE NOT YET DESIGNED

MATERIAL TOLERANCES

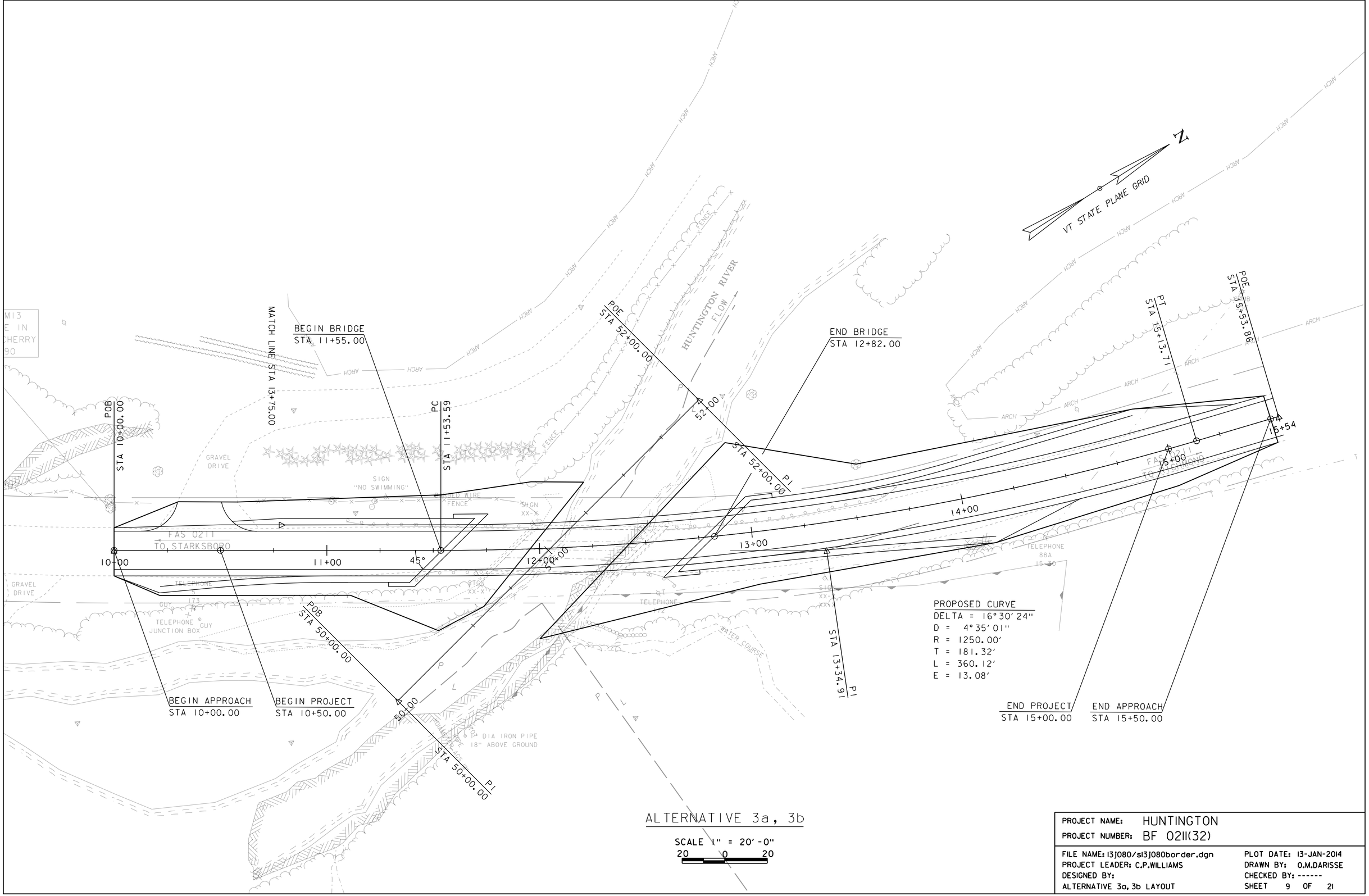
(IF USED ON PROJECT)

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

PROJECT NAME: HUNTINGTON
PROJECT NUMBER: BF 0211(32)

FILE NAME: 13J080\s13J080typical.dgn
PROJECT LEADER: C.P.WILLIAMS
DESIGNED BY: ----------
ALTERNATIVE 3a, 3b TYPICAL SECTIONS

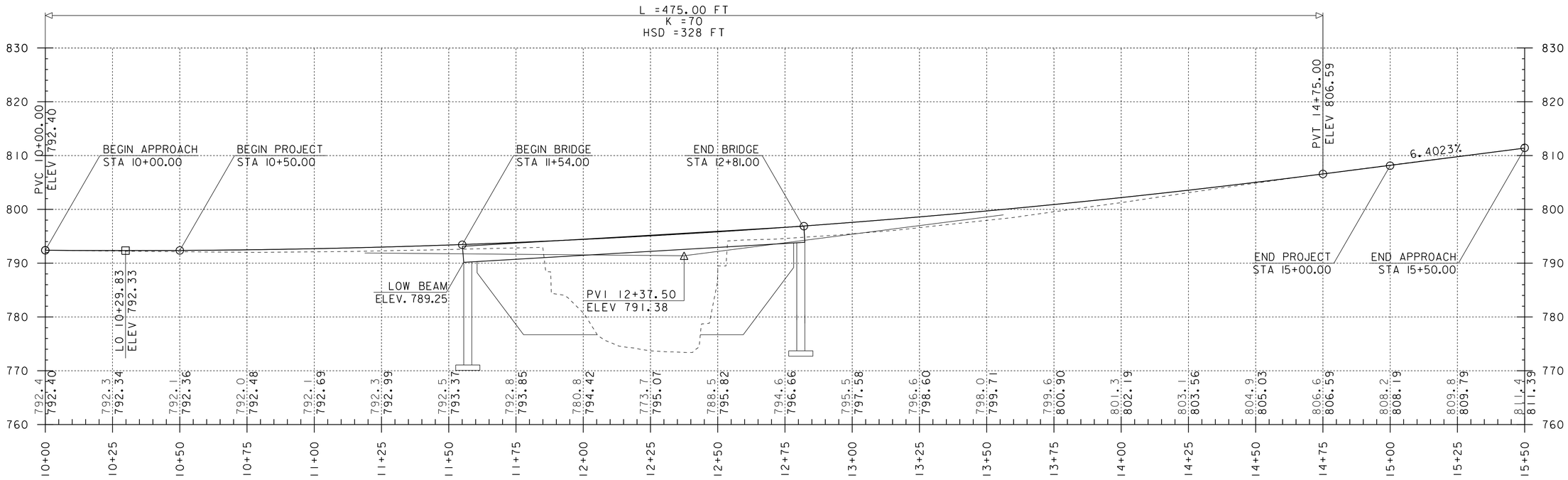
PLOT DATE: 13-JAN-2014
DRAWN BY: O.M.DARISSE
CHECKED BY: ------
SHEET 8 OF 21



ALTERNATIVE 3a, 3b

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

PROJECT NAME: HUNTINGTON	
PROJECT NUMBER: BF 0211(32)	
FILE NAME: 13J080/s13J080border.dgn	PLOT DATE: 13-JAN-2014
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: O.M.DARISSE
DESIGNED BY:	CHECKED BY: ------
ALTERNATIVE 3a, 3b LAYOUT	SHEET 9 OF 21



ALTERNATIVE 3a, 3b PROFILE

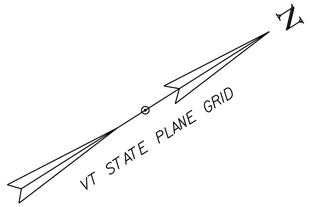
SCALE: HORIZONTAL 1" = 20'-0"
VERTICAL 1" = 10'-0"

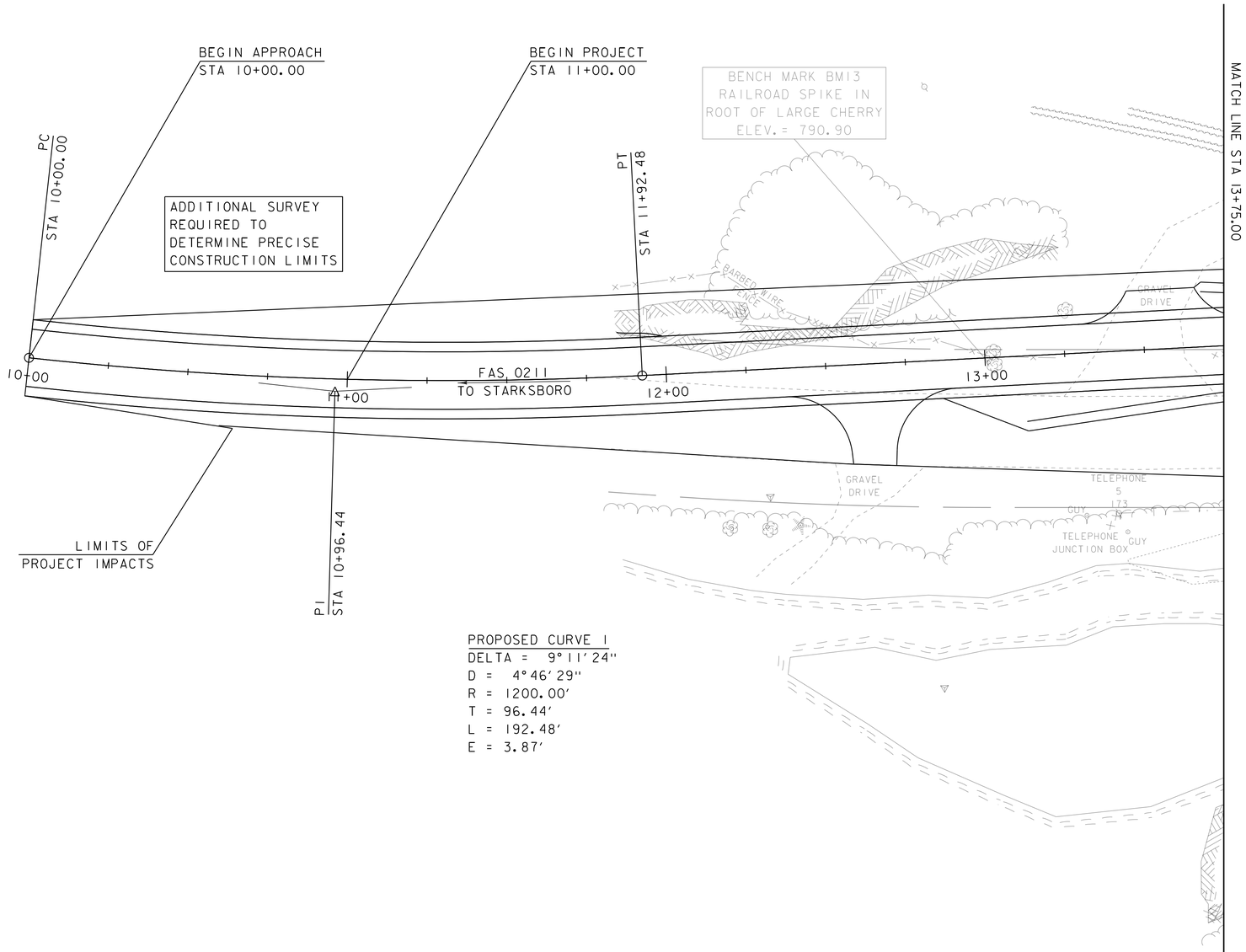
NOTE:

GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: HUNTINGTON	
PROJECT NUMBER: BF 0211(32)	
FILE NAME: 13j080/s13j080profile.dgn	PLOT DATE: 13-JAN-2014
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: O.M.DARISSE
DESIGNED BY: ------	CHECKED BY: ------
ALTERNATIVE 3a, 3b PROFILE	SHEET 10 OF 21





ALTERNATIVE 4

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

PROJECT NAME: HUNTINGTON	
PROJECT NUMBER: BF 0211(32)	
FILE NAME: 13j080/s13j080border.dgn	**PLOT DATE:** 13-JAN-2014
PROJECT LEADER: C.P.WILLIAMS	**DRAWN BY:** O.M.DARISSE
DESIGNED BY: ------	**CHECKED BY:** ------
ALTERNATIVE 4	**SHEET** 11 **OF** 21

BEGIN BRIDGE
STA 14+80.00

END BRIDGE
STA 16+15.00

VT STATE PLANE GRID

MATCH LINE STA 13+75.00

POE
STA 52+00.00

HUNTINGTON RIVER
FLOW

END PROJECT
STA 17+50.00

END APPROACH
STA 17+50.00

PT
STA 18+53.88

FAS 0211
TO RICHMOND

18+54

18+00

17+00

16+00

15+00

14+00

52+00

STA 52+00.00
PT

48°

SIGN
"NO SWIMMING"

BARBED WIRE
FENCE

FENCE

SIGN
XX-X

51+00

STA 17+31.67
PC

STA 17+92.99
PI

LIMITS OF
PROJECT IMPACTS

TELEPHONE
88A
15-30

ADDITIONAL SURVEY
REQUIRED TO
DETERMINE PRECISE
CONSTRUCTION LIMITS

POB
STA 50+00.00

TELEPHONE
172

SIGN
XX-X
XXXX

WATER COURSE

PROPOSED CURVE 2
DELTA = 11°40′12″
D = 9°32′57″
R = 600.00′
T = 61.32′
L = 122.21′
E = 3.12′

50+00

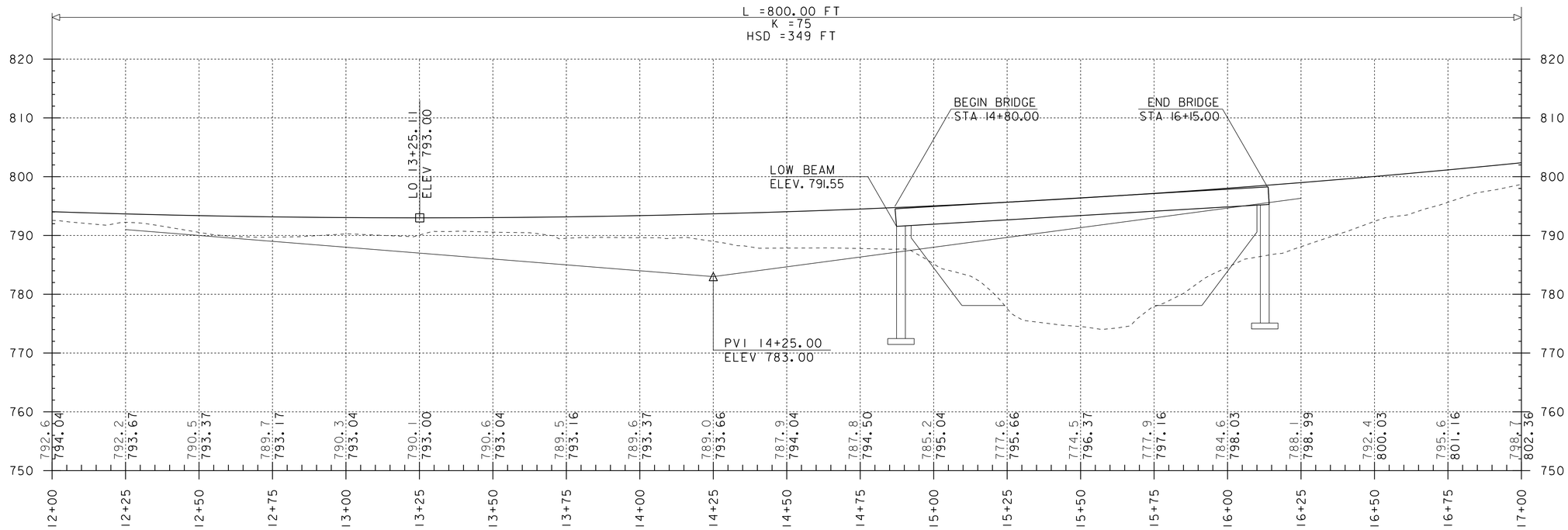
DIA IRON PIPE
18" ABOVE GROUND

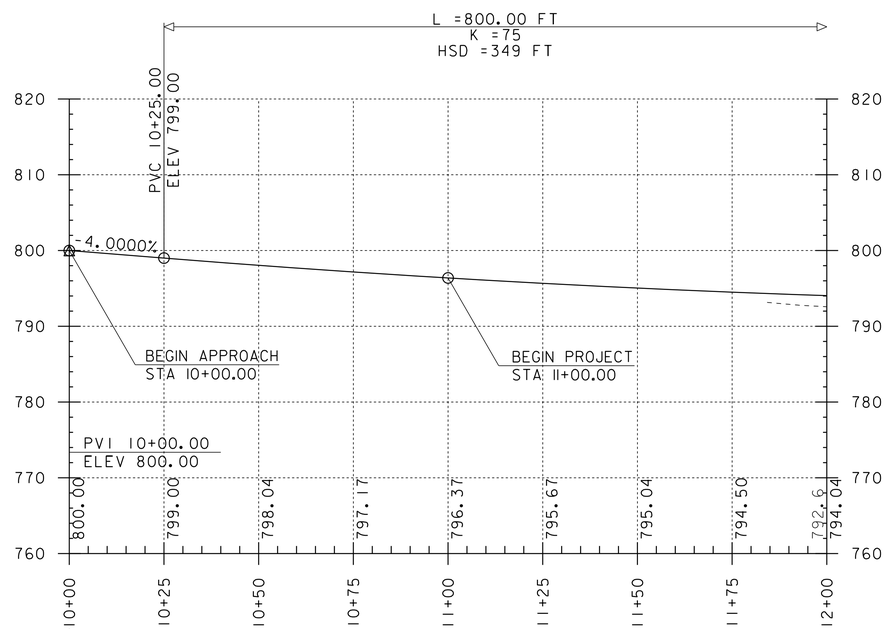
STA 50+00.00
PI

ALTERNATIVE 4

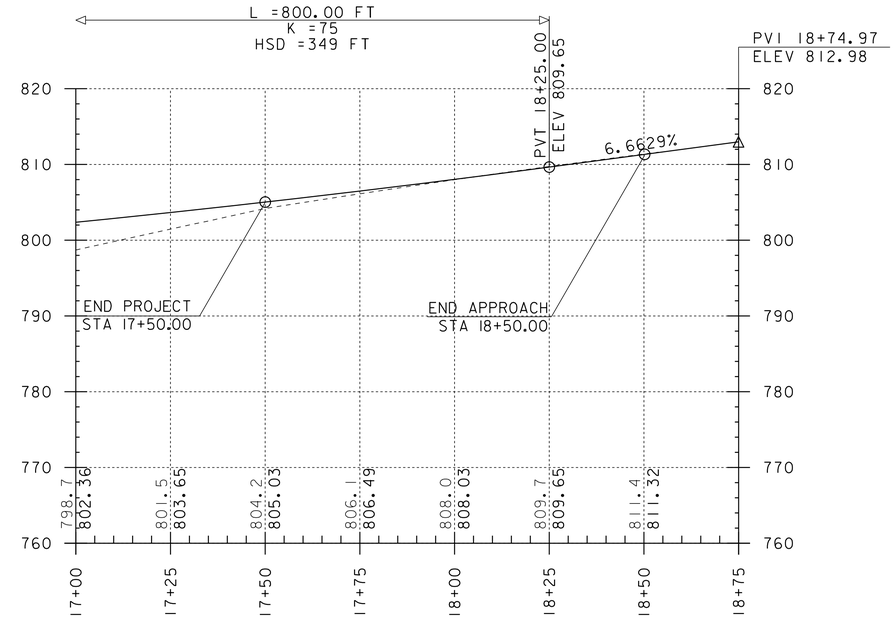
SCALE 1" = 20′-0"
20 0 20

PROJECT NAME: HUNTINGTON	
PROJECT NUMBER: BF 0211(32)	
FILE NAME: 13j080/sl3j080border.dgn	PLOT DATE: 13-JAN-2014
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: O.M.DARISSE
DESIGNED BY: ------	CHECKED BY: ------
ALTERNATIVE 4 LAYOUT	SHEET 12 OF 21





ADDITIONAL SURVEY NEEDED TO DETERMINE PRECISE CONSTRUCTION LIMITS



ALTERNATIVE 4 PROFILE

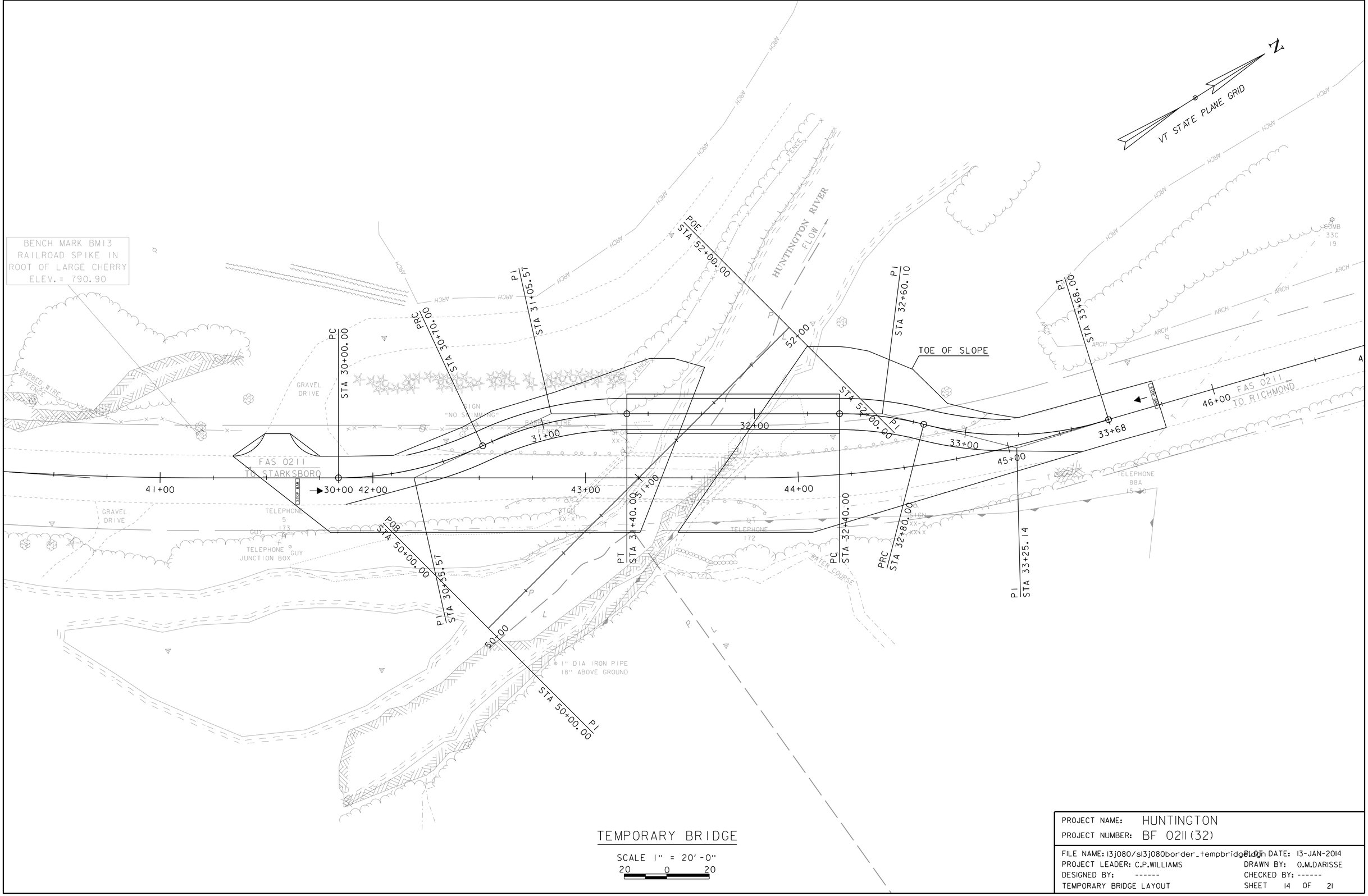
SCALE: HORIZONTAL 1" = 20'-0"
VERTICAL 1" = 10'-0"

NOTE:

GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: HUNTINGTON	
PROJECT NUMBER: BF 0211(32)	
FILE NAME: 13J080/s13J080profile.dgn	PLOT DATE: 13-JAN-2014
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: O.M.DARISSE
DESIGNED BY: ------	CHECKED BY: ------
ALTERNATIVE 4 PROFILE	SHEET 13 OF 21



TEMPORARY BRIDGE

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME: HUNTINGTON	
PROJECT NUMBER: BF 0211(32)	
FILE NAME: 13j080/s13j080border_tempbridge.dgn	PLOT DATE: 13-JAN-2014
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: O.M.DARISSE
DESIGNED BY: ------	CHECKED BY: ------
TEMPORARY BRIDGE LAYOUT	SHEET 14 OF 21