STATE OF VERMONT
AGENCY OF TRANSPORTATION

Scoping Report

FOR

Woodstock Village BF 020-2(43)

US ROUTE 4, BRIDGE 51 OVER THE KEDRON BROOK

January 8, 2015

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I. Site Information

Bridge 51 is a Town owned bridge located on US Route 4 approximately 0.2 miles east of the junction with Vermont Route 106. The bridge has been identified as a historic resource within a historic district. The bridge is located within a village setting and allows parking on both sides of the bridge. The bridge shares its foundation with a building in the southeast quadrant. 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 Principal Arterial (Class 1 Town Highway on NHS)
Bridge Type	Concrete T-beam Bridge
Bridge Length	34 feet
Year Built	1935
Ownership	Village of Woodstock

Need

Bridge 51 carries US Route 4 across the Kedron Brook. The following is a list of deficiencies of Bridge 51 and US Route 4 in this location:

1. The existing concrete beams and deck are only in fair condition with large saturated areas with rust staining and efflorescence. There are large delaminated areas throughout and large spalled out areas with exposed rebar. The T-beams continue to deteriorate due to the saturation.

2. The existing bridge and roadway width is too narrow for the roadway classification and traffic volumes.

3. The bridge does not meet hydraulic standards.

4. The parking meters and signs along the roadway are located in the clear zone.

5. The stretch of US Route 4 through the project area is a known High Crash Location (HCL). There have been 22 crashes recorded in a five year period.

Traffic

A traffic study of this site was performed by the Vermont Agency of Transportation. The traffic volumes are projected for the years 2017 and 2037.

TRAFFIC DATA	2017	2037
AADT	10,000	10,600
DHV	1,100	1,200
ADTT	450	700
%T	3.1	4.6
%D	55	55

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 of 10,600, a DHV of 1,200, and a design speed of 25 mph for a Principal Arterial.

Design Criteria	Source	Existing Condition	Minimum Standard	Comment
Approach Lane and Shoulder Widths	VSS Table 3.3	11'/0' (22') with 8' parking lane left and right	11'/8' (38')	Substandard
Bridge Lane and Shoulder Widths	VSS Section 3.7	11'/0' (22') with 8' parking lane left and right	11'/10' (42')	Substandard
Clear Zone Distance	VSS Table 3.4	Parking Meters and signs located within clear zone	16' fill / 14' cut (1.5 behind curb)	Substandard
Banking	VSS Section 3.13	Normal Crown	8% (max)	No superelevation on low speed urban streets
Speed		25 mph (Posted)	25 mph (design)	
Horizontal Alignment	AASHTO Green Book Table 3-10b	$R = \infty$	R_{min} = 2370' @ NC	
Vertical Grade	VSS Table 3.6	-1.02% (max)	9% (max, village) for level terrain	
K Values for Vertical Curves	VSS Table 3.1	K_{sag} = 209	20 crest / 30 sag	
Vertical Clearance	VSS Section 3.8	No Issues Noted	16'-3" (min)	
Stopping Sight Distance	VSS Table 3.1	3,546'	150'	
Bicycle/Pedestrian Criteria	VSS Table 3.8	2' shoulder	3' Shoulder	Substandard for Bicycles
Bridge Railing	Structures Design Manual Section 13	Historic Concrete railing	TL-3	
Hydraulics	VTrans Hydraulics Section	Q_{50} storm event overtops the bridge and roadway	Pass Q_{50} storm event with 1.0' of freeboard	Substandard
Structural Capacity	SM, Ch. 3.4.1	Not Structurally Deficient	Design Live Load: HL-93	

Inspection Report Summary

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

7/2/2013 – Structure is in fair condition. The deck and superstructure continue to deteriorate and remain saturated in large areas with rust staining and efflorescence. There are large delaminated areas throughout and large spalled out areas in beams 8 and 9 with exposed rebar. ~JWW/JDM

06/01/2011 – Both abutment joint areas are in need of repairs. ~PLB

06/15/2009 – The overall condition of this bridge is fair due to slow but progressive deterioration of the deck soffit area, and slow, but continuous breakdown of several concrete T-beams. ~PLB

Hydraulics

The existing structure does not meet the current standards of the VTrans Hydraulic Manual. The standard is to pass a Q_{50} design storm event with 1 foot of free board. The Q_{50} storm event overtops the existing bridge and roadway. Only the $Q_{2.33}$ design storm event passes under the bridge.

The VTrans Hydraulics Section has made recommendations for either a rehabilitation project or a replacement project. These recommendations can be found in the preliminary hydraulics report in the Appendix.

Utilities

The existing utilities are shown on the Existing Conditions Layout Sheet, and are as follows:

Municipal Utilities

- There is an existing 8'' Clay sewer main buried (approximately 5' to 6' deep) near the centerline of US Route 4 that approaches the bridge from the west. At a sewer manhole (SMH) at plan station 41+20 (+/-) LT this sewer main turns and extends down the driveway adjacent to the Post Office; from there it extends behind the Post Office and intercepts a mid-stream SMH at Channel Line Station 52+45 (+/-).

- There is an existing 8'' Ductile Iron Sewer Main which follows Kedron Brook (5' to 6' below stream bed) passing under the bridge. This sewer main passes through the previously mentioned mid-stream SMH at Channel Station 52+45 (+/-).

- There is an existing 8'' Clay sewer main buried (approximately 5' to 6' deep) which comes from High Street to a SMH in US Route 4 at plan station 43+38 (+/-) LT. This sewer main then extends along US Route 4 to the east.

- The Village has electric lines under both sidewalks which provide power to the street lights. These electric lines are located just behind the curb; on the south side of US Route 4 the electric line ends at the pull box at41+47 (+/-) RT; on the north side of US Route 4 the electric line ends at the street light at 41+45 (+/-) LT. All street lights to the west of the bridge are owned by the Village; all street lights to the east of the bridge are owned by Green Mountain Power.

- Attached to the underside of the existing bridge, under the westbound travel lane, there is an existing approximately 8'' metal pipe which is wrapped in some sort of tattered white material, possibly asbestos; this pipe passes through the curtain wall between the bridge beams at both ends of the bridge, and is suspended by hangers attached to the bottom of the bridge deck. It is assumed that this 8'' metal pipe belongs to the Village. Most likely anything inside this pipe is now abandoned. Absent any clear ownership, the Village may claim ownership of unclaimed utilities.

Municipal Utilities (Owned by Private Company):

- There is an existing 8'' cast iron water main buried 5' to 6' deep under US Route 4 through the entire project area. This main is located under the eastbound travel lane a few feet to the right of centerline. The main passes through both abutments and is clearly visible under the bridge. This main is owned by Woodstock Aqueduct Company, a privately owned water company. There are service lines to businesses in numerous locations through the entire project area.

- There is an existing 8'' cast iron water main which taps into the main along US Route 4 which extends up High Street; this main is buried 5' to 6' deep.

Public Utilities (Aerial)

- There are very few aerial utility lines within the project area; there are aerial facilities behind the buildings on the north side of US Route 4 at the west end of the bridge; the Post Office and the building to the west are serviced from behind the building from these aerial facilities.

- There are also aerial facilities which parallel US Route 4 behind the buildings on the south side of US Route 4. Service to all businesses on the south side comes from these aerial facilities.

- There is an aerial electric line which comes from the pole on High Street to a street light at plan station 43+80 (+/-) RT; this is really the only aerial line which stands a chance of being impacted by the project.

Public Utilities (Underground)

- There are 7 conduits attached to the underside of the existing bridge along the northern side. These conduits appear to be owned by FairPoint (4), Comcast (2) and GMP has one unused conduit.

- FairPoint has four buried conduits along the northerly side of US Route 4 (under the sidewalk); there are telephone manholes in the VT Route 12 intersection to the west of the bridge and in the sidewalk approximately 170' east of the bridge. There are also conduits which extend under US Route 4, up High Street and to risers on the existing pole # 73/68/10.

- Comcast has buried conduits which run adjacent to the FairPoint conduits; there is a CATV manhole in the northern sidewalk approximately 220' east of the bridge.

- Green Mountain Power has buried electric cable which passes between the two businesses at plan station 43+12 (+/-) LT for service to those two buildings. This service line then extends to the east, along the northern edge of sidewalk to an electric vault approximately 175' east of the bridge. It then continues in an easterly direction, underground, from that point.

It is anticipated that relocation of utilities will be necessary for construction. Coordination with the Municipality and Public utility companies will be necessary during design of any construction project.

Right Of Way

There is an existing 4-rod (approx.) Right-of-Way centered on US Route 4 and an existing 3-rod Right-of-Way centered on High Street, and a 1-rod Right-of-Way centered on Mechanic Street. The downstream fascia is located approximately 3 inches inside the Right-of-Way line, so it is anticipated that any construction project will require additional Right-of-Way acquisition. The existing Right-of-Way is plotted on the Existing Conditions Layout Sheet.

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

Biological:

Wetlands/Watercourses

Wetlands are not located in the project area. The surrounding area is heavily developed.

Impact below OHW / Fisheries / AOP

Kedron Brook is the only regulated natural resource in the immediate project area, and only impacts below OHW are regulated. Kedron Brook is a coldwater trout stream and tributary of the Ottauquechee River. The current structure passes fish and other aquatic organisms. Kedron Brook is not classified as Essential Fish Habitat or a Navigable Waterway. In-stream construction would therefore be limited between July 15 and October 1, unless a Cat 2 GP is obtained under Section 404.

Species / Habitats of Special Concern

Species or habitats of special concern will not be impacted by the project since there aren't any species of special concern near the project.

Agricultural Soils / Floodplains

There are no agricultural or Floodplain Soils within the area of the project.

Hazardous Materials:

According to the Vermont Agency of Natural Resources (VANR) Vermont Hazardous Sites List, there are numerous hazardous waste sites located in the project area. It is anticipated that none of these sites will be impacted. A map of hazardous sites in the project area can be found in the Appendix.

Historic:

Bridge 51 is a historic 1935 concrete T beam structure with an ornamental concrete parapet railing. Bridge 51 is a good example of standard 1930s bridge railings, evident by the hexagonal concrete balusters.

The bridge is located within the Woodstock Village Historic District. Three of the four quadrants have contributing historic structures. The building on the NE corner has lost its historic integrity, however impacts to this are still of concern for the effect to the entire district. On the SW corner of the bridge, there is a small park which is a Section 4(f) property.

Archaeological:

A field visit was conducted on 5/14/2014 in order to assess archaeological resources in the project area generally around Bridge 51 over Kedron Brook in Woodstock Village, Windsor County, Vermont. The area of potential effect is situated in a highly developed historic downtown. There are no apparent archaeological resources given the tight development pattern. However, the

structures all date to the 19th century and should be considered archaeological sites is they are slated for demolition for construction.

Stormwater:

There are no stormwater concerns for this project.

II. Safety

The stretch of US Route 4 through the project area has had 22 crashes recorded in the last five year period. The VTrans Traffic Safety Engineer analyzed the crash data and it was found that the two crosswalks on US 4 at the intersection with Elm Street were the scene of a large proportion of the rear-end crashes that are listed under this HCL Section. The typical crash happened as a pedestrian was crossing US 4 in one of the two crosswalks on US 4 at Elm Street, when a vehicle stopped for the pedestrian and this vehicle got rear-ended by a vehicle that was following from behind. The majority of these crashes were in the westbound direction. Two happened when it was dark (these same two crashes also happened during winter when the crosswalk may not have been visible due to slush or snow).

There are other crosswalks on US 4 within this HCL section. However, they are not causing this type of crash.

The crosswalks along this section of VT 100 are contrasting well with the road surface but they do not have pedestrian signs (W11-2) with a down arrow plaque (W16-7p). Pedestrian signs with down arrows are recommended in the MUTCD but they are not required. However, the Agency "Guidelines for Pedestrian Crossing Treatments" required that they be installed at each end of a crosswalk location.

Installing these signs would bring this section up to standard in regards to crosswalk safety. To some extent, the signs could help make motorists more aware of the possibility of vehicles ahead of them stopping for pedestrians, or make the lead vehicle more aware of pedestrians and stop less abruptly for a pedestrian in the crosswalk.

There is no evidence that the on-street parking in the area of the bridge is causing rear-end crashes.

The crosswalks at the Elm Street intersection are outside of the limits for this bridge project. As such, the above recommendations should be taken into consideration as part of a future project.

III. Maintenance of Traffic

The Vermont Agency of Transportation reviews each new project to determine suitability for the 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 sooner. The Agency considers the closure option on all 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

provides enhanced safety for the workers and the travelling public while maintaining project quality. The following options have been considered:

Option 1: Off-Site Detour

This option would close the bridge and reroute traffic onto an offsite detour. Since the bridge is located on a class 1 Town Highway, it would be the responsibility of the State of Vermont to choose the preferred detour route, and to sign it according to the MUTCD manual.

There is only one route that would be an appropriate detour for passenger cars at this site. This route has an end-to-end distance of 0.56 miles, and adds approximately 0.06 miles to travel distance. The passenger car detour route is as follows:

1. US Route 4, to Elm Street, Pleasant Street, back to US Route 4 (0.56 mi end-to-end)

Since there is a sidewalk on the existing bridge, a pedestrian detour is necessary. The above route has sidewalks and would be recommended for pedestrians as well.

This route is not appropriate for trucks due to geometric constraints and the volume of traffic on US Route 4. Therefore, a separate truck route would be recommended. The regional truck route has an end-to-end distance of 39.7 miles, and adds approximately 31.7 miles to travel distance. The truck detour route is as follows:

2. US Route 4, to VT Route 12, US Route 5 (VT Route 12), VT Route 44, VT Route 106, back to US Route 4 (39.7 mi end-to-end)

There is also a separate pedestrian route available. This route has an end-to-end distance of 0.24 miles, and adds approximately 0.23 miles to travel distance. It is not being chosen as the signed pedestrian detour due to steep slopes on High Street. The additional pedestrian route is as follows:

3. US Route 4, to Mechanic Street, over existing footbridge, to High Street, back to US Route 4 (0.24 mi end-to-end)

A map of these detour routes can be found in the Appendix.

Advantages: This option would eliminate the need for phasing construction, which would significantly decrease cost and time of construction. Also, this option would not have impacts to archaeological and historic resources adjacent to the bridge. This option reduces the time and cost of the project both at the development stage and construction. The Village of Woodstock would reduce their local share by 50% for choosing to close the bridge during construction per ACT 153.

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

Option 2: Phased Construction

Phased construction is the maintenance of traffic on the existing bridge while building one lane at a time of the proposed structure. This allows keeping the road open during construction, while having minimal impacts to adjacent property owners and environmental resources.

While the time required to develop a phased construction project would remain the same, the time required to complete a phased construction project increases because some of the construction tasks have to be performed multiple times. In addition to the increased design and construction costs

mentioned above, the costs also increase for phased construction because of the inconvenience of working around traffic and the effort involved in coordinating the joints between the phases. Another negative aspect of phased construction is the 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 ROW.

Due to the high volume of traffic at this site, two lanes would have to be provided for the duration of each phase if all traffic is expected to go through the project site. Additionally, since there is a sidewalk on the existing structure, pedestrian traffic should be maintained as well. In order to accommodate these requirements, four phases would be necessary for a fully phased project. This is not desirable; it would result in a longer, more expensive, and less safe construction project, as pedestrians, passenger vehicles, and construction equipment would all be present in these tight site constraints.

A safer approach at the project site is to partially phase. There are two options available:

1. Pedestrians and traffic travelling eastbound would be maintained over the bridge while it is constructed in phases, and traffic travelling westbound on US Route 4 would be detoured.

2. Two-way traffic would be maintained over the bridge while it is constructed in phases, and pedestrians would be detoured.

The detour recommended for westbound traffic and for pedestrians is listed above in Option 1. For either option, parking would be eliminated within the project limits during construction.

Option 3: Temporary Bridge

This is a very small site to attempt to fit in a temporary bridge, and there are constraints on both sides. There are buildings in every quadrant of the bridge, which are all within 15 feet from the roadway. It would be impossible to construct a temporary bridge without the removal of at least two buildings. In three of the four quadrants, the buildings are of historic significance. Additionally there is a park in the southwest quadrant that is considered a section 4(f) property, and should be avoided.

Significant additional costs would be incurred to use a temporary bridge, including the cost of the bridge itself, installation and removal, demolition of historic properties, restoration of the disturbed area, and the time and money associated with the temporary Right-of-Way. Additional permit review would be triggered by the impacts to historic properties.

A two-way temporary bridge would be appropriate based on the daily traffic volumes. However, since placement of a bridge is not feasible due to the above reasons, it will not be considered further in this report.

IV. Alternatives Discussion

Bridge 51 is not considered structurally deficient, however the existing T-beams are only in fair condition and continue to deteriorate, with large areas of delaminations on the T-beams and

continually saturated areas on the deck soffit. The travel way and shoulders on the bridge are too narrow, and the hydraulic opening is substandard.

No Action

This alternative would involve leaving the bridge in its current condition. The deck and superstructure are only in fair condition, so something will have to be done to improve this bridge in the near future. Although the bridge is not in imminent danger of collapse, it will eventually be posted for lower traffic loads. In the interest of safety to the traveling public, the No Action alternative is not recommended.

Superstructure Repair

While there are many substandard features associated with this stretch of US Route 4, such as shoulder widths, clear zone requirements, and bicycle accommodations, the superstructure is the item that will require work within the next 10 years. Thus, the primary goal of a rehabilitation option will be to rectify the superstructure issues. There are two types of superstructure rehabilitation options available for concrete structures: concrete patching and superstructure replacement.

Alternative 1a: Superstructure Patching

Patching involves removing the deteriorated and loose concrete from the structure. Then forms are constructed such that a thin layer of new concrete can be placed to replace this removed concrete. There are several disadvantages with this method of rehabilitation in this situation. The first is that most of the patching is overhead; this requires the work to take place in difficult circumstances, where the work is taking place in the river. The concrete must be removed without spoiling the river and the new concrete must be placed from underneath the bridge. Second, having newer non-chloride laced concrete adjacent to the existing concrete usually exacerbates the rate of deterioration of the remaining concrete which surrounds the patch. This can be mitigated for approximately 15 years with the addition of sacrificial anodes into the patched structure.

Alternative 1b: Superstructure Replacement

This alternative would involve removing the existing superstructure in its entirety and placing new shallower tee beams back on the existing abutments. The advantage to performing a complete superstructure replacement over patching in this situation is that the lifespan of all new concrete would be much greater than patching. Additionally there would be repairs as follows:

- The existing bridge seats would be cut down and new bridge seats would be poured to accommodate the new superstructure.

- The existing historic concrete rail would be replaced in its entirety with a railing that meets the section 106 and section 4(f) permitting requirements for historic resources.

- There are several drainage inlets within the project limits that should be replaced during a superstructure replacement project.

- There are several utility conduits that run through the backwall of the existing structure. These continue underneath the sidewalk on either end of the bridge. These conduits will be

affected by a superstructure replacement project since they are located at the superstructure elevation. Care should be taken working around these conduits.

- Minor work to the wingwalls would be required to match back into the new substructure. The work required to the wingwalls is summarized below:

Northwest Wingwall

The northwest wingwall would be sawcut and removed down to the bridge seat elevation and recast after the new superstructure is placed.

Figure 1: Northwest Wingwall

Northeast Wingwall

The northeast wingwall would be sawcut and removed (including the historic railing) down to the bridge seat elevation and recast after the new superstructure is placed. New similar type historic bridge railing would be cast on top of the new wall portion. This railing would run from the fascia of the bridge and abut up to the adjacent building as the existing does.

Figure 2: Northeast Wingwall

Southwest Wingwall

The wall portion that runs in line with the abutment is below the bridge seat and can be left unchanged. The wall that runs along the roadway which is mounted by historic railing, should be removed and recast along with new similar type historic railing.

Figure 3: Southwest Wingwall

Southeast Wingwall

The laid up stone wall in the southeast quadrant will need to be partially removed and reset in order to place a new superstructure. The concrete topper for this wall would be removed and recast.

Figure 4: Southeast Wingwall

The existing substructure is in good condition, and it is reasonable to assume that it can safely carry anticipated traffic loads for an additional 50 years. With the exception of new bridge seats and wingwall ears to accommodate the new superstructure, no repairs are recommended to the existing substructure. Additionally, no stone fill should be placed in front of the abutments for protection; the bridge does not meet hydraulic standards and it is important not to reduce the waterway opening.

The existing lane widths and shoulders on the bridge are 11 feet wide with no shoulder; this does not meet the minimum standard of 11 feet and 10 feet respectively. In addition to the existing lane and shoulder widths, there is an 8 foot parking lane on either side of US Route 4 throughout the project area. It is proposed that 11 foot lanes with no shoulders be maintained for this alternative. It is not possible to meet the Standard without eliminating parking on US Route 4 though the project area. The bridge is located in a village setting with many businesses that rely on street parking for their customers. Eliminating the parking lanes would be detrimental to these businesses and is not recommended. Additionally, widening the entire paved area to accommodate standard width shoulders and parking is not feasible due to the close proximity of buildings to the roadway.

Advantages: This alternative would address the structural issues of the existing bridge, with minimum upfront costs. This option would have minimal impacts to adjacent properties and resources.

Disadvantages: This option would match the existing bridge width, which is substandard. Additionally, the existing bridge is inadequate hydraulically, which this option does not improve.

Maintenance of Traffic: The only possible options for traffic control at this site are an offsite detour, or partially phased construction.

Full Bridge Replacement On Alignment

The remaining substandard criteria at this site that cannot be easily rectified with a rehabilitation project are the bridge and roadway width and the substandard hydraulics. Unless the removal of businesses and parking along Route 4 in the project area is proposed, then the substandard width will remain. In order to meet the hydraulic standards, the bridge and roadway would need to be raised several feet. Due to the close proximity of buildings to the bridge, it is not feasible to raise the roadway and sidewalks. Additionally, raising the roadway would also cause a worse flooding scenario of these buildings. By maintaining the existing alignment, impacts to resources and adjacent properties will be minimized.

Due to the constraints at the project site discussed above, only the current horizontal and vertical alignments will be considered. This alternative would replace the existing bridge with a new superstructure as well as a new substructure at the existing location. The various considerations under this option include: the bridge width and length, skew, superstructure type and substructure type.

a. Bridge Width

The existing lane widths and shoulders on the bridge are 11 feet wide with no shoulder; this does not meet the minimum standard of 11 feet and 10 feet respectively. In addition to the existing lane and shoulder widths, there is an 8 foot parking lane and an 8 foot sidewalk on each side of US Route 4 throughout the project area. It is proposed that 11 foot lanes with 1 foot shoulders be maintained for this alternative. It is not possible to meet the Standard without eliminating parking

on US Route 4 though the project area. The bridge is located in a village setting with many businesses that rely on street parking for their customers. Eliminating the parking lanes would be detrimental to these businesses and is not recommended. Additionally, widening the entire paved area to accommodate standard width shoulders and parking is not feasible due to the close proximity of buildings to the roadway. A 56 foot width fascia to fascia distance is proposed in order to match the existing site conditions.

b. Bridge Length and Skew

The existing bridge is 31 feet long with a skew of 45 degrees. This provides a clearspan normal to the channel of approximately 21 feet. Vertical abutments with a bridge length of 36 feet will be appropriate here due to exposed bedrock, which inhibits the use of integral abutments. A skew of 45 degrees will be recommended in order to match the site conditions.

c. Superstructure Type

A prefabricated structure will be the preferred choice, due to decreased construction time. The possible 36' length bridge types that can accommodate a 45 degree skew, that are most commonly used in Vermont are box beams with a structural overlay, solid slabs, and steel beams with a composite concrete deck. The superstructure depth is critical for hydraulics; none of the above options would meet the hydraulic standard without raising the roadway, however the shallowest beam available should be chosen to maximize the hydraulic performance.

d. Substructure Type

Both the eastern and western abutments are founded on spread footings. It is unknown whether or not these footings are founded on bedrock. It is likely that new substructures would also be founded on spread footings. Any rapid construction alternative should have sufficient subsurface information to verify the in-situ conditions before design is complete. In order to reduce construction time, precast abutment components may be used where possible. The preliminary geotechnical report can be found in the Appendix.

e. Maintenance of Traffic:

The only possible option for traffic control at this site is an offsite detour.

V. Alternatives Summary

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

Alternative 1: Superstructure Patching with Traffic Maintained with Off-Peak Short Term Lane Closures
Alternative 2a: Superstructure Replacement with Traffic Maintained on Off-Site Detour
Alternative 2b: Superstructure Replacement with 2-Way Vehicular Traffic Maintained with Phased Construction and an Offsite Pedestrian Detour
Alternative 2c: Superstructure Replacement with Pedestrian and 1-Way Eastbound Vehicular Traffic Maintained with Phased Construction and an Offsite Detour for Westbound Traffic
Alternative 3: Full Bridge Replacement with Traffic Maintained on Off-Site Detour

VI. Cost Matrix[1]

Woodstock Village BF 020-2(43)		Do Nothing	Alt 1	Alt 2a	Alt 2b	Alt 2c	Alt 3
			Superstructure Patching	Superstructure Replacement			Full Bridge Replacement
			Short Term Lane Closures	Offsite Detour	2-Way Traffic Maintained by Phasing w/ Offsite Pedestrian Detour	Pedestrian and 1-Way Eastbound Vehicular Traffic Maintained by Phasing w/ Offsite Detour for Westbound Vehicular Traffic	Offsite Detour
COST	Bridge Cost	$0	$116,000	$426,000	$596,400	$596,400	$1,023,000
	Removal of Structure	$0	$0	$29,000	$52,200	$52,200	$77,000
	Roadway	$0	$76,000	$184,000	$202,400	$202,400	$386,000
	Maintenance of Traffic	$0	$21,000	$31,000	$124,000	$136,400	$46,000
	Construction Costs	$0	$213,000	$670,000	$975,000	$988,000	$1,532,000
	Construction Engineering + Contingencies	$0	$64,000	$201,000	$293,000	$297,000	$460,000
	Total Construction Costs w CEC	**$0**	**$276,900**	**$871,000**	**$1,267,500**	**$1,284,400**	**$1,991,600**
	Preliminary Engineering[2]	**$0**	**$74,550**	**$201,000**	**$292,500**	**$296,400**	**$383,000**
	Right of Way	**$0**	**$19,170**	**$60,300**	**$87,750**	**$88,920**	**$137,880**
	Total Project Costs	$0	$370,620	$1,132,300	$1,647,750	$1,669,720	$2,512,480
	Annualized Costs	$0	$24,800	$22,700	$33,000	$33,400	$31,500
TOWN SHARE			$18,531 (5%)	$28,310 (2.5%)	$82,390 (5%)	$83,490 (5%)	$125,630 (5%)
SCHEDULING	Project Development Duration[3]		4 years	4 years	4 years	4 years	4 years
	Construction Duration		3 months	6 months	9 months	9 months	8 months
	Closure Duration (If Applicable)		N/A	3 weeks	N/A	N/A	6 weeks
ENGINEERING	Typical Section - Roadway (feet)	22'	22'	22'	22'	22'	22'
	Typical Section - Bridge (feet)	8 (park)-1-11-11-1-8 (park)	8 (park)-2-11-11-2-8 (park)	8 (park)-2-11-11-2-8 (park)	8 (park)-2-11-11-2-8 (park)	8 (park)-2-11-11-2-8 (park)	8 (park)-2-11-11-2-8 (park)
	Geometric Design Criteria	Substandard width	Substandard width	Substandard width	Substandard Width	Substandard Width	Substandard width
	Traffic Safety	No Change	Improved	Improved	Improved	Improved	Improved
	Alignment Change	No	No	No	No	No	No
	Bicycle Access	No Change	No Change	No Change	No Change	No Change	No Change
	Hydraulic Performance	Substandard	Substandard	Substandard	Substandard	Substandard	Substandard
	Pedestrian Access	No Change	No Change	No Change	No Change	No Change	No Change
	Utility	No Change	No Change	Relocation	Relocation	Relocation	Relocation
OTHER	ROW Acquisition	No	Yes	Yes	Yes	Yes	Yes
	Road Closure	No	No	Yes	No	No	Yes
	Design Life	<10 years	15 Years	50 years	50 Years	50 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 are starting from the end of the Project Definition Phase.

VII. Conclusion

We recommend **Alternative 2a**; to replace the existing superstructure while maintaining traffic on an offsite detour.

Structure:
While the superstructure patching option has the lowest upfront costs, a superstructure replacement has a lower per year cost based on a 50 year design life compared to a 15 year design life. The existing substructures are in good condition, and it is reasonable to assume that they can last another 50 years.

The proposed structure will match the existing geometry in regards to width, vertical, and horizontal alignment. The existing structure does not meet the minimum hydraulic standard; however, none of the alternatives evaluated will meet the standard due to the site constraints present. Therefore, the new superstructure should be chosen based on the minimum depth.

Traffic Control:
The recommended method of traffic control is to close the bridge for three weeks, and maintain traffic on an offsite detour. The detour for this project location would add approximately 0.06 miles to the through route, and have an end-to-end distance of 0.56 miles. This detour is not appropriate for large trucks, and as such, a separate detour route for trucks is recommended.

The ADT on US Route 4 through the project area is 10,000, which is considered relatively high. The option to close the road is the least expensive and the safest option compared to phasing.

Additionally, by closing the bridge to traffic during construction, and not constructing a temporary bridge structure, the local share is reduced by 50% per VT Legislation Act 153 of 2012.

Utilities:
Overhead and underground utilities will need to be relocated; coordination should take place early in the design phase.

Design Criteria:
US Route 4: US Route 4 currently has several substandard design features through the project area; the bridge and roadway widths, the clear zone, and hydraulic performance are substandard. For this alternative, parking meters and signs will be removed and reset outside the clear zone within the project limits. While the clear zone requirements will be met, the substandard widths and hydraulics will remain unchanged due to site constraints. A design exception should be obtained for these substandard features.

VIII. Appendices

- Site Pictures
- Town Map
- Bridge Inspection Report
- Hydraulics Memo
- Preliminary Geotechnical Information
- Natural Resources Memo
- Archeology Memo
- Historic Memo
- Hazardous Sites Map
- Local Input
- Detour Map
- Plans
    - Existing Conditions
    - Proposed Typical Sections, Layout, and Profile
    - Traffic Control Sheets

Looking east over the bridge.

Looking west over the bridge.

Looking Upstream.

Looking downstream.

Cracking and saturation of existing T-beams.

Effllouressnce and crack saturation.

Fascia and T-beam deterioration.

Sidewalk deterioration.

Barnard Brook
TH-427 OLD RIVER RD
MOORE PL VILLAGE
TH-428 RIVER ST
TH-423 MOORE PL
TH-425 NORTH ST
B15
Ottauquechee River
TH-402 BENSON PL
TH-3 ELM ST
B71
TH-5 PLEASANT ST
TH-1 PLEASANT ST
TH-1 CENTRAL ST
TH-405 BOND ST
TH-414 FORD ST
TH-403 SLAYTON TER
TH-434 STANTON ST
TH-419 LINCOLN ST
TH-407 CHARLES ST
TH-5 PLEASANT
TH-43 BIRCH WY
BIRCH WY
TH-436 THOMAS AV
TH-100 MILL ST
TH-72 LINCOLN
TH-5 HARTLAND HILL RD
MAXHAM MEADOW WY
US-4 WOODSTOCK RD
TH-1 E WOODSTOCK RD
US-4 E WOODSTOCK RD
TH-78 SAWYER RD
B51
TH-424 MOUNTAIN AV
TH-428 RIVER ST
CB73
TH-2 THE GREEN
TH-1 THE GREEN
TH-422 MECHANIC ST
TH-410 COURT ST
TH-416 HIGH ST
TH-438 DOUBLEDAY WAY
TH-417 HIGHLAND AV
HIGHLAND AV EXT
TH-32 FRENCHS RD
EATON PL
TH-92 BLACKBRIAR RD
TH-413 EATON PL
TH-429 ROSE HILL
TH-31 ROSE HILL
B50
TH-1 CHURCH ST
TH-1 JAMES PAINT ST
TH-431 SCHOOL ST
TH-411 CROSS ST
B72
TH-404 BILLINGS PL
TH-415 GOLF AV
TH-421 MAPLE ST
GOLF AV
TH-435 SWAIN ST
SWAIN ST
HATHORN HILL
TH-420 LINDEN HILL
TH-430 TERRACE ST
TH-426 PINE ST
TH-409 COLLEGE HILL RD
US-4 WOODSTOCK RD
TH-412 DARTMOUTH LN
HINSMAN WY
TH-6 PROSPECT ST
TH-69 EVERGREEN CT
TH-432 SHURTLEFF LN
TH-406 BORDER LN
BORDER LN
TH-52 COLLEGE HILL RD
TH-117 SHURTLEFF LN
TH-4 CHURCH HILL RD
TH-4 SOUTH ST
TH-102 BLANKEY COTTAGE LN
VT-106 SOUTH RD
Kedron Brook

WOODSTOCK VILLAGE BR 51
BF 020-2(43)

N

Scale 1:8,836

- 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

WOODSTOCK VILLAGE
WINDSOR COUNTY
DISTRICT # 4

STRUCTURE INSPECTION, INVENTORY and APPRAISAL SHEET

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

Inspection Report for WOODSTOCK VILLAGE **bridge no.:** 00051 **District:** 4

Located on: US 00004 ML **over** KEDRON BROOK **approximately** 0.2 MI E JCT. VT.106 **Owner:** 03 TOWN-OWNED

CONDITION

Deck Rating: 5 FAIR

Superstructure Rating: 5 FAIR

Substructure Rating: 7 GOOD

Channel Rating: 7 GOOD

Culvert Rating: N NOT APPLICABLE

Federal Str. Number: 200020005114242

Federal Sufficiency Rating: 071

Deficiency Status of Structure: ND

AGE and SERVICE

Year Built: 1935 **Year Reconstructed:** 0000

Service On: 5 HIGHWAY-PEDESTRIAN

Service Under: 5 WATERWAY

Lanes On the Structure: 02

Lanes Under the Structure: 00

Bypass, Detour Length (miles): 32

ADT: 010700 **% Truck ADT:** 09

Year of ADT: 1998

GEOMETRIC DATA

Length of Maximum Span (ft): 0030

Structure Length (ft): 000034

Lt Curb/Sidewalk Width (ft): 8

Rt Curb/Sidewalk Width (ft): 7

Bridge Rdwy Width Curb-to-Curb (ft): 54.2

Deck Width Out-to-Out (ft): 57

Appr. Roadway Width (ft): 040

Skew: 42

Bridge Median: 0 NO MEDIAN

Min Vertical Clr Over (ft): 99 FT 99 IN

Feature Under: FEATURE NOT A HIGHWAY OR RAILROAD

Min Vertical Underclr (ft): 00 FT 00 IN

STRUCTURE TYPE and MATERIALS

Bridge Type: CONCRETE T-BEAM

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

Kind of Material and/or Design: 1 CONCRETE

Deck Structure Type: 1 CONCRETE CIP

Type of Wearing Surface: 6 BITUMINOUS

Type of Membrane 0 NONE

Deck Protection: 0 NONE

APPRAISAL *AS COMPARED TO FEDERAL STANDARDS

Bridge Railings: 1 MEETS CURRENT STANDARD

Transitions: 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: 9 SUPERIOR TO DESIRABLE CRITERIA

Underclearances Vertical and Horizontal N NOT APPLICABLE

Waterway Adequacy: 7 SLIGHT CHANCE OF OVERTOPPING BRIDGE & ROADWAY

Approach Roadway Alignment: 8 EQUAL TO DESIRABLE CRITERIA

Scour Critical Bridges: 8 STABLE FOR SCOUR

DESIGN VEHICLE, RATING, and POSTING

Load Rating Method (Inv): 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: 2 H 15

INSPECTION and CROSS REFERENCE

X-Ref. Route:

Insp. Date: 072013 **Insp. Freq. (months)** 24 **X-Ref. BrNum:**

INSPECTION SUMMARY and NEEDS

7/2/2013 Structure is in fair condition. The deck and superstructure continue to deteriorate and remain saturated in large areas with rust staining and efflorescence. There are large delamed areas throughout and large spalled out areas in beams 8 and 9 with exposed rebar. JWW/JDM

06/01/2011 Both abutment joint areas are in need of repairs. PLB

06/15/2009 The overall condition of this bridge is fair due to slow but progressive deterioration of the deck soffit area, and slow ,but continuous breakdown of several concrete T-beams. PLB

VT AGENCY OF TRANSPORTATION PROGRAM DEVELOPMENT DIVISION

HYDRAULICS UNIT

TO: Chris Williams, Structures Project Manager

FROM: David Willey, Hydraulics Project Supervisor

DATE: July 14, 2014

SUBJECT: Woodstock BF 020-2(43), US 4 BR 51 over Kedron Brook

---

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

Existing Conditions

The existing structure was rebuilt in 1935. It is a concrete t-beam bridge with a concrete deck. The bridge is skewed about 45 degrees to the road. It has a clear span length of about 31' along the roadway and a hydraulic clear span length of about 21', measured perpendicular to the abutments. Clear height is about 9', providing a waterway opening of about 200 sq. ft. Record plans indicate the original abutments may have been stone. They were faced with concrete and extended in 1935.

A cutoff wall/dam was constructed downstream of the bridge as part of the bridge project in 1935. It appears that wall was constructed as a grade control and scour countermeasure, although that is not stated on the record plans.

This is a highly developed downtown area. Site conditions affect hydraulics and will limit project options. There are buildings upstream and downstream at the edge of channel, and in line with the abutment, on the eastern end of the bridge. There is a long retaining wall downstream of the bridge on the western side that connects into that abutment. There is a building downstream on the east side that extends over a portion of the channel. That building also rests on the retaining wall on the west side of the channel.

The existing bridge does not meet the current hydraulic standards. Water overtops the bridge and roadway below the design Q50. A Q2.33 event will pass under the bridge. Water is up onto the beams at a Q10, based on a low bottom of beam elevation of 693.5' and a Q10 water surface elevation of about 695.0'. The Q50 water surface elevation is about 698.3'. So the bridge does not have the required 1' of freeboard at the design flow.

Proposed Project

There is a Flood Insurance Study for this river. That and all the buildings in the floodplain dictate there be no increase in water surface elevations. So there should be no decrease in the waterway area of the bridge.

Superstructure replacement

One option that may be considered is a new superstructure on the existing abutments. This may be acceptable provided the waterway area of the bridge is not reduced. Bottoms of beams should be kept at least as high as the existing. Any increase in the bottom of beam elevation, by using a shallower superstructure, would be beneficial hydraulically. The roadway grade should not be raised, as that would raise the overtopping relief elevation and could increase upstream water levels. No fill should be placed between the abutments that would reduce the waterway area of the bridge.

The top of footings are exposed. We cannot determine if there is any undermining. Contraction scour was calculated to be 1' up to Q500. Based on the low calculated scour depth and the cutoff wall downstream, scour may not be a concern even though the footings are exposed. However, we recommend more investigation to determine how much of the footings are exposed and if there is any undermining. The condition of the downstream cutoff wall should also be checked. That will help determine if scour countermeasures are warranted.

Complete Bridge Replacement

It may not be practical to build a bridge within the confines of the site that will meet hydraulic standards with Q50 at approximately 698.3'. The bottom of beams would need to be at least elevation 699.3' to have 1' of freeboard at the design Q50. If a new bridge is built the bottoms of beams should be kept at least as high as the existing. Any increase in the bottom of beam elevation, by using a shallower superstructure, would be beneficial hydraulically. The roadway grade should not be raised, and no fill should be placed between the abutments that would reduce the waterway area of the bridge. Significantly lengthening the bridge would not improve hydraulics unless the upstream and downstream buildings and/or retaining walls were moved to provide a channel width equal to that through the new bridge. New abutments should be moved back to lengthen the span as much as is practical and still match into the upstream and downstream walls and buildings. If the project scope includes replacing the downstream retaining wall and installing a longer bridge, we can check the hydraulics for longer bridges.

General Comments

If a new bridge is installed, the bottom of abutment footings should be at least six feet below the channel bottom, or to ledge, to prevent undermining. Abutments on piles should be designed to be free standing for a scour depth at least 6' below channel bottom.

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

DCW

cc: Hydraulics Project File via NJW
Hydraulics Chrono File

AGENCY OF TRANSPORTATION **OFFICE MEMORANDUM**

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

END CCB

From: Eric Denardo, Geotechnical Engineer, via Christopher C. Benda, P.E., Geotechnical Engineering Manager

Date: July 14th, 2014

Subject: Woodstock Village BF 020-2(43) Preliminary Geotechnical Information

1.0 INTRODUCTION

We have completed our preliminary geotechnical investigation for the replacement of Bridge 51 on US Route 4 in Woodstock Village, which crosses the Kedron Brook. The subject project consists of replacing the existing bridge superstructure. This review was conducted using record plans, the Agency of Natural Resources Well logs, the USDA Natural Resources Conservation soil survey records, our in-house bridge boring files, surficial geology and bedrock maps of the State.

2.0 SUBSURFACE INFORMATION

2.1 Previous Projects

The record plans found for the existing structure show that the bridge abutments are founded on spread footings. No specific soil information was available, therefore it is unclear whether these footings are on soil or bedrock. The Geotechnical Engineering Section maintains a GIS based historical record of subsurface investigations, which contains electronic records for the majority of borings completed in the past 10 years. An exploration of this database revealed no nearby borings in Woodstock. Additional surrounding projects were searched for in our in-house files and one project was found. Woodstock BHF 020-2(32) was within 0.5 miles of the subject project. Boring logs showed a mix of sand, silt, and gravel but the borings did not encounter bedrock.

2.2 Water Well Logs

Figure 1 contains the subject project as well as surrounding well locations found using the ANR Natural Resources Atlas. Published online, the logs can be used to determine general characteristics of soil strata in the area. The soil description given on the logs is done in the field, by unknown personnel, and as such, should only be used as an approximation. The specific wells used to gain information on the subsurface conditions are highlighted by a red box. Four water wells within an approximate 1700 foot radius were used to get an estimate of the depth to bedrock likely to be encountered for BR 51.

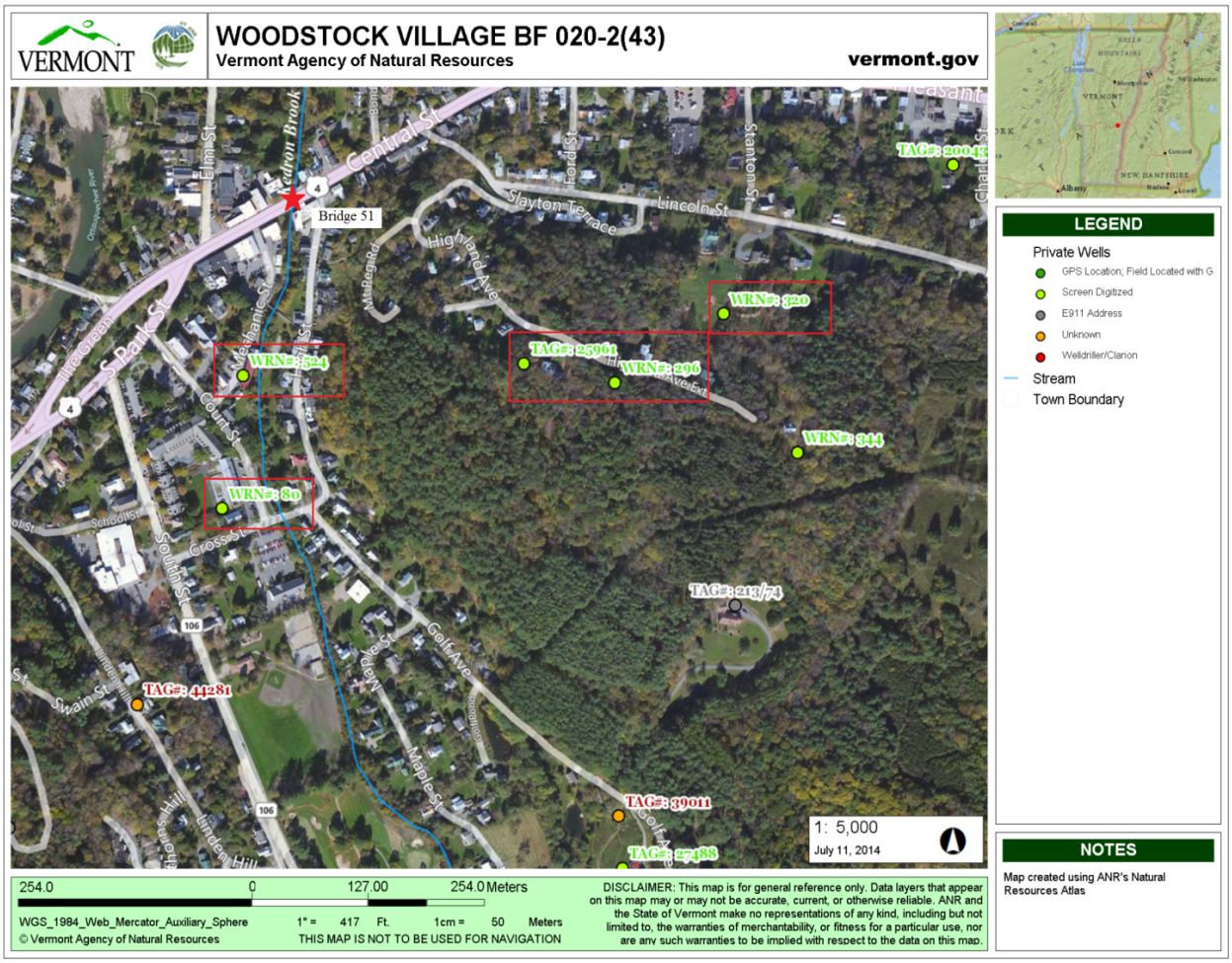


Figure 1. Highlighted Well Locations near Subject Project

Error! Not a valid bookmark self-reference. lists the well sites used in gathering the surrounding information. Wells are listed with the distance from the bridge project, depth to bedrock, and overlying soils encountered.

Table 1. Well Information Including Depths to Bedrock

Well Number	Approximate Distance From Project (feet)	Approximate Depth To Bedrock (feet)	Overlying Strata
524	650	20	Topsoil
25961	1000	14	Not Specified
80	1100	80	Clay
296	1400	3	Topsoil
320	1700	16	Sand

2.3 USDA Soil Survey

The United States Department of Agriculture Natural Resources Conservation Service maintains a surficial geology map of the United States, which is available online. According to the Web Soil Survey, the strata directly underlying the project site consists of Ninigret fine sandy loam 0-8% slopes. These soils are classified as moderately well

drained with depth to bedrock of more than 80 inches and a depth to ground water of 18 to 30 inches.

2.4 Geologic Maps of Vermont

Mapping conducted in 1970 for the Surficial Geologic map of Vermont shows that the project area is underlain by glacial till.

According to the 2011 Bedrock Map of Vermont, the project site is underlain with Mafic gneiss.

3.0 FIELD OBSERVATIONS

A preliminary site visit was conducted on February 27, 2014 to determine possible obstructions inhibiting boring operations and to make any other pertinent observations about the project. Utilities are buried in the Village of Woodstock and run beneath the bridge at the center along US Route 4.

Figure 2: Electrical Conduit Running under Bridge 51

In addition to the Utilities, there are also buildings in close proximity to the bridge. Several of the buildings are supported on the bridge abutments and wingwalls. Figure 3 and Figure 4 show two buildings that are located near the bridge location.

Figure 3: Building Next to Southeast Corner of the Bridge

Figure 4: Building Supported on Channel Wall North of the Bridge

4.0 RECOMMENDATIONS

We recommend, if the substructure is to be replaced, a minimum of two borings be taken opposite corners of the bridge in the roadway. We also recommend, if feasible, additional borings be taken along the wing/channel walls on the west end of the bridge in order to more fully assess the subsurface conditions across the entire site, including, but not limited to, the soil properties, groundwater conditions, and depth to bedrock (if applicable).

5.0 CONCLUSION

If you have any questions or would like to discuss this report, please contact us by phone at (802) 828-2561.

cc: DJH/Read File
CCB/Project File
END

AGENCY OF TRANSPORTATION **OFFICE MEMORANDUM**

TO: Lee Goldstein, Environmental Specialist

FROM: John Lepore, Transportation Biologist

DATE: February 4, 2014

SUBJECT: Woodstock Village B_F 020-2 (43)
US 4, Bridge 51 over Kedron Brook

The purpose of this memorandum is to confirm that the only regulated resource in the area is Kedron Brook itself. The limits of Ordinary High Water (OHW) should be depicted on the plans, and only fills below the OHW line will be regulated.

Wetlands

Wetlands are not located in the project area. The surrounding area is heavily developed.

Impact below OHW / Fisheries / AOP

Kedron Brook is the only regulated natural resource in the immediate project area, and only impacts below OHW are regulated. Kedron Brook is a coldwater trout stream and tributary of the Ottauquechee River. The current structure passes fish and other aquatic organisms. Kedron Brook is not classified as Essential Fish Habitat or a Navigable Waterway. In-stream construction would therefore be limited between July 15 and October 1, unless a Cat 2 GP is obtained under Section 404.

Species / Habitats of Special Concern

Species or habitats of special concern will not be impacted by the project since there aren't any species of special concern near the project.

Agricultural Soils / Floodplains

There are no agricultural or Floodplain Soils within the area of the project.

cc: Chris Williams, Project Manager
Environmental Files via Lee Goldstein
BioFiles via Lepore

VERMONT

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

Agency of Transportation

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

To: Lee Goldstein, VTrans Environmental Specialist

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

Date: 5/16/2014

Subject: Woodstock Village BF 020-2(43) – Archaeological Resource ID

Lee,

A field visit was completed on 5/14/2014 in order to assess archaeological resources around Bridge 51 over Kedron Brook in Woodstock Village, Windsor County, Vermont. The APE is situated in a highly developed historic downtown. There are no apparent archaeological resources given the tight development pattern. However, the structures all date to the 19th century and should be considered archaeological sites if they are slated for demolition for construction.

Please feel free to contact me with questions or concerns. There are currently no arch sensitive areas to map and no concerns for archaeology.

Sincerely,

Brennan

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

VTrans Working to Get You There
Vermont Agency of Transportation

Stone, Laura

From: O'Shea, Kaitlin
Sent: Monday, February 10, 2014 2:46 PM
To: Goldstein, Lee
Cc: Newman, Scott; Williams, Chris
Subject: WOODSTOCK VILLAGE BF 020-2(43) Historic Resource ID

Hi Lee,

The historic resource ID for this project is complete. Chris, we have another potentially complex project on our hands!

Bridge 51 which carries US Route 4 (Central St) over the Kendron Brook in Woodstock, VT is a historic 1935 concrete T beam structure with an ornamental concrete parapet railing. Bridge 51 is a good example of standard 1930s bridge railings, evident by the hexagonal concrete balusters.

The bridge is located within the Woodstock Village Historic District. Three of the four quadrants have contributing historic structures. The building on the NE corner has lost its historic integrity, however impacts to this are still of concern for the effect to the entire district. On the SW corner of the bridge, there is a small park, a Section 4(f) property. I've mapped these on Arcmap.

I'm glad to talk more about this bridge and adjacent properties when there's more information available. In the meantime, let me know if you have questions.

Thanks,
Kaitlin

Kaitlin O'Shea
Historic Preservation Specialist
Vermont Agency of Transportation

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

Hazardous Sites:

Local & Regional Input Questionnaire

Project Name: Woodstock Village Bridge US4 BR51 over Kedron Brook
Project Number: BF 020-2(43)

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.

   Yes there are many in the summer – listing based on 2014's schedule but it will be similar during construction year.
   May 17–19 Woodstock Sidewalk Sale Days
   May 25, 10:30am Memorial Day Parade
   June 2, 8:15am Covered Bridges Half-Marathon
   June 15, 2pm Woodstock Alumni Day Parade
   July 26–28 Bookstock Weekend
   Woodstock Summerfest (early August) – closes Elm St.
   August 17 & 18 Naked Table Project
   September 7–8 4th Annual Woodstock's Art and Wine Festival on the Green
   Fall foliage season!!!

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

   Yes, before June 1st or after Labor Day before foliage season (week ending of Sept).

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

   Please see attached facilities map.

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

   Please see attached facilities map. Both the Woodstock Elementary School and the Woodstock Union High School finishes 3rd week of June.

5. In the vicinity of the bridge, is there a land use pattern, existing generators of pedestrian and/or bicycle traffic, or zoning that will support development that is likely to lead to significant levels of walking and bicycling? Please explain.

   Yes, the bridge is right in the heart of the village along with the key businesses in town. It's next to the post office.

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

   Yes, many local businesses.

7. Are there any important public buildings (town hall or community center) or community facilities (recreational fields or library) in close proximity to the proposed project?

   Yes, the post office is next to the bridge.

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

   For local traffic, the detour would be Pleasant St to Elm St and back onto Route 4. See highlighted route on map.

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

   The short term bridge closure is preferable as it will have less impact on emergency response/fire/police and the traveling public. There are no planned municipal construction projects around the bridge.

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.

    Vermont Standard – Jim Kelly jkelly@thevermontstandard.com
    Valley News
    Front Porch Forum
    Woodstock Listserv

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

    Yes, Woodstock Chamber of Commerce – 457-3555. Beth Finlayson, Executive Director bfinlayson@woodstockvt.com

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?

No alignment issues. It matches with Route 4.

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

   Existing width is ok but would prefer something slightly wider.

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

   Active daily bike ped traffic.

4. If a sidewalk or wide shoulder is present on the existing bridge, should the new structure have one? Are there existing bicycle and/or pedestrian facilities on the approaches to the bridge?

   Yes there currently exists a sidewalk and the new design should include sidewalks to match up with the rest of the sidewalk network. There is no bike lanes through the village and don't anticipate new lanes with the construction.

5. Does the Town have plans to construct either bicycle or pedestrian facilities leading up to the bridge? Please provide a copy of the planning document that demonstrates this (e.g. scoping study, master plan, corridor study) Please explain and provide documentation.

   No.

6. Does the bridge provide an important link in the town or statewide bicycle or pedestrian network such that you feel that bicycle and pedestrian traffic should be accommodated during construction?

   Yes however there is no room during construction. Pedestrians should take the Pleasant St-Elm St detour around.

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

   Yes. The guardrail design should be considered as it's in a historical village.

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

   No. There are ADT

9. Does the location have a history of flooding? If yes, please explain. No issues of flooding.

10. Are you aware of any nearby Hazardous Material Sites? No.

11. Are you aware of any historic, archeological and/or other environmental resource issues? No.

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

    Making sure the project complies with ANR stream permits and to consult with the Army Corps of Engineers.

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

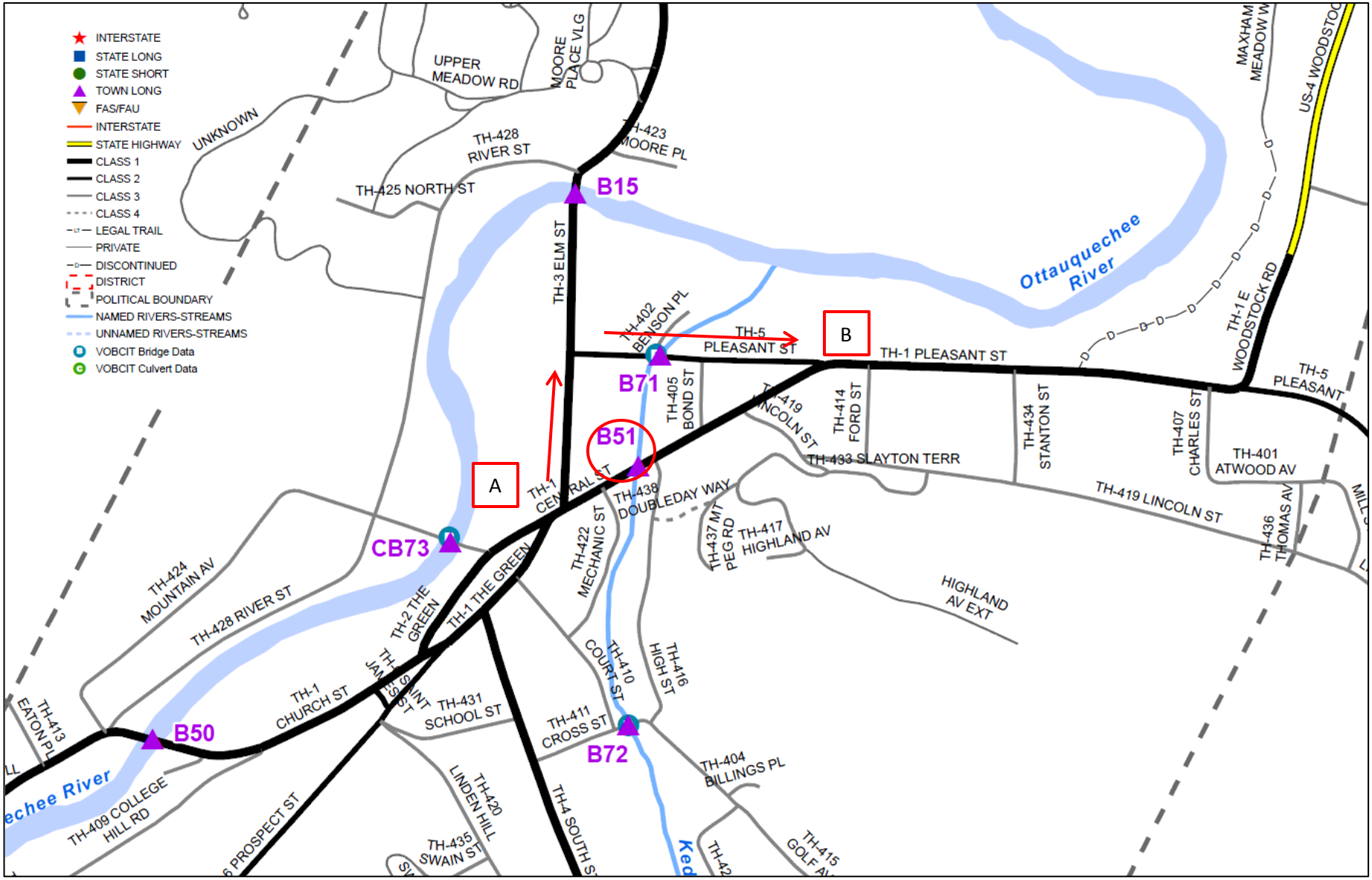
1. Does your municipal land use plan reference the bridge in question? If so please provide a copy of the applicable section or sections of the plan.
   No.

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

3. Are there any existing, pending or planned development proposal that would impact future transportation patterns near the bridge? If so please explain.
   No new development anticipated.

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

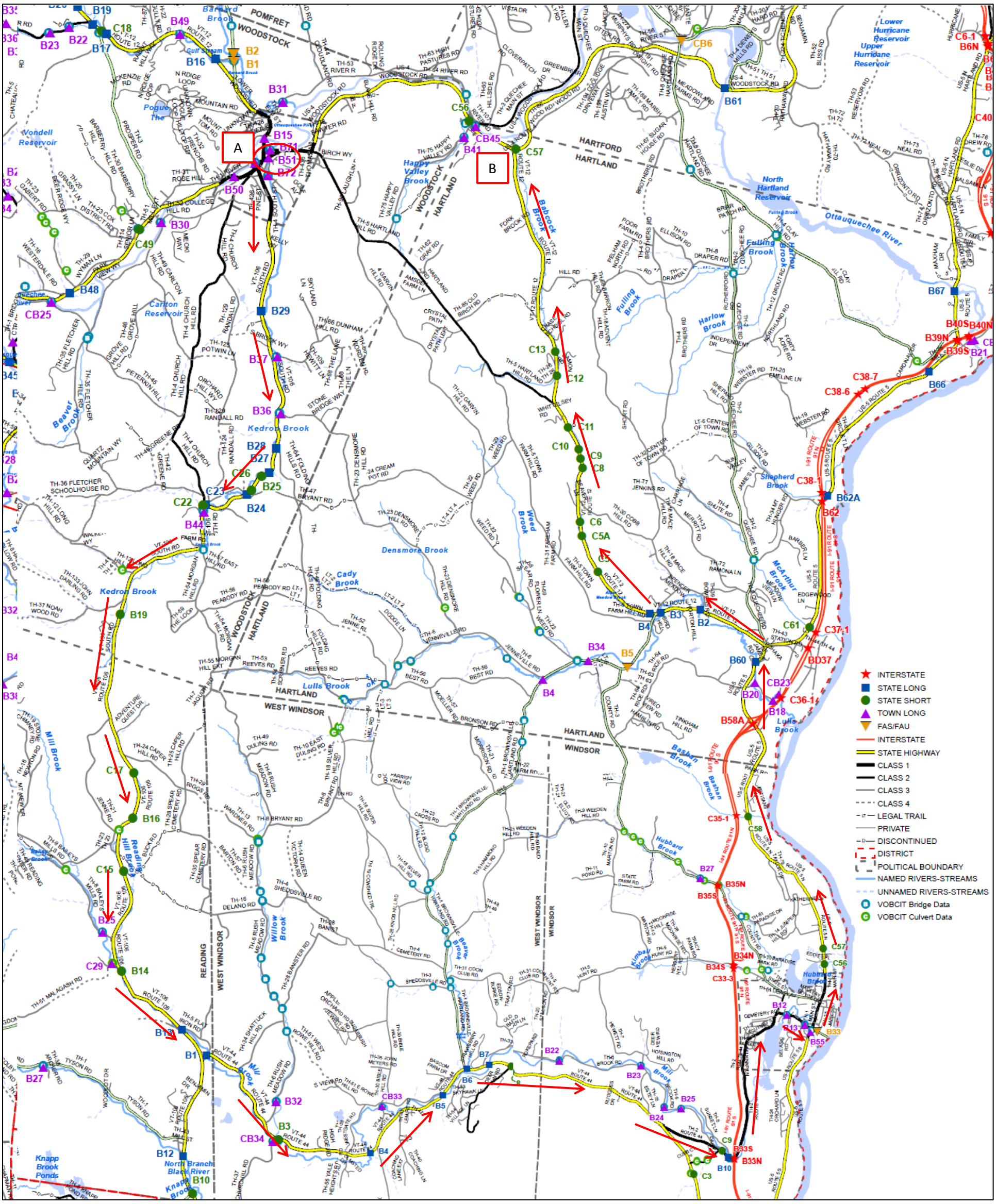
   Intercity bus route between Rutland and WRJ operated by Premier Coach (hasn't started yet but the route was awarded this year 2014).



Passenger Car Detour Route

US Route 4, to Elm Street, Pleasant Street, back to US Route 4

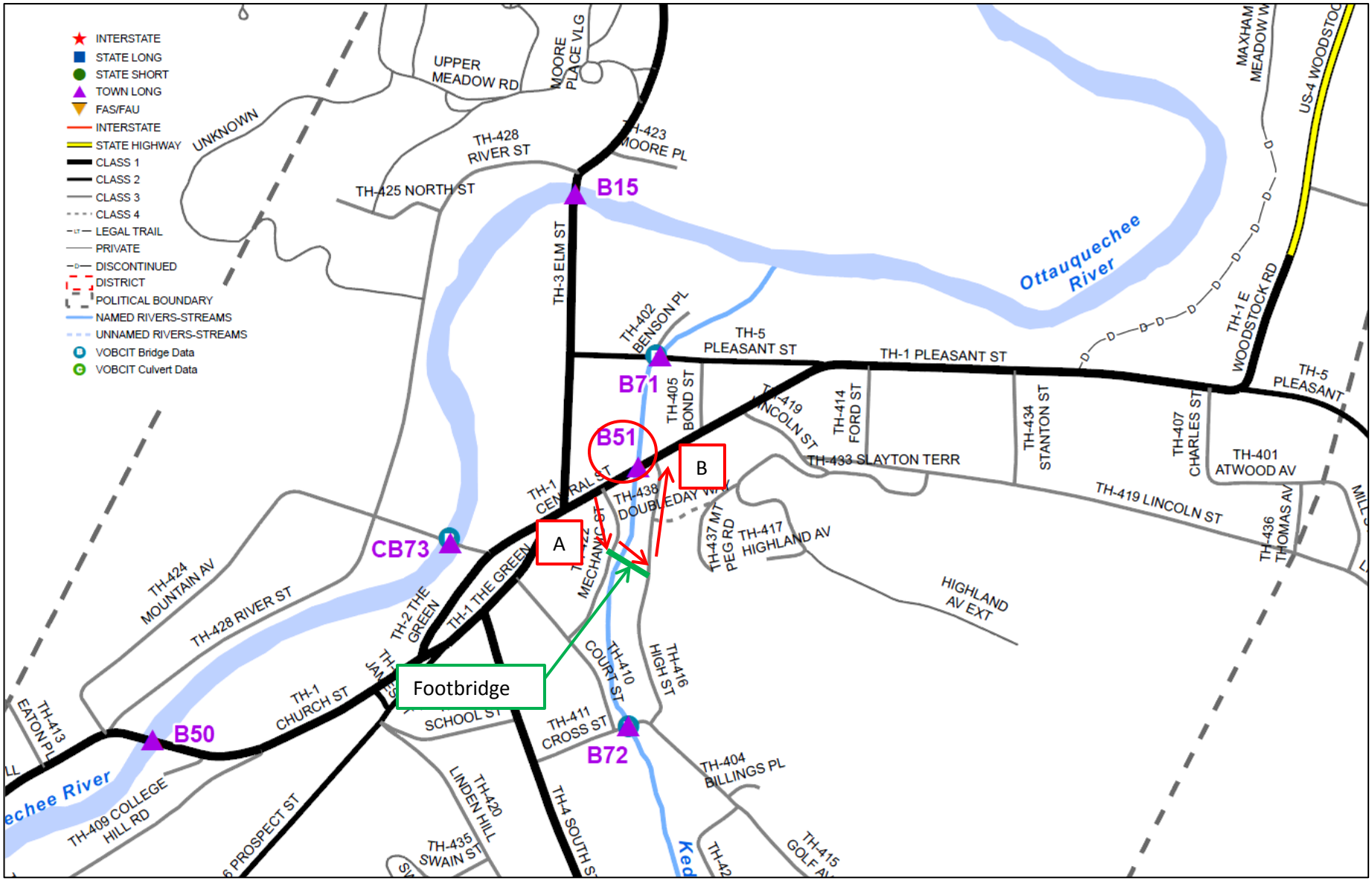
A – B Through Route: 0.25 Miles
A – B Detour Route: 0.31 Miles
Added Miles: 0.06 Miles
End-End Distance: 0.56 Miles



Truck Detour Route

US Route 4, to VT Route 106, VT Route 44, VT Route 12/US Route 5, VT Route 12, back to US Route 4

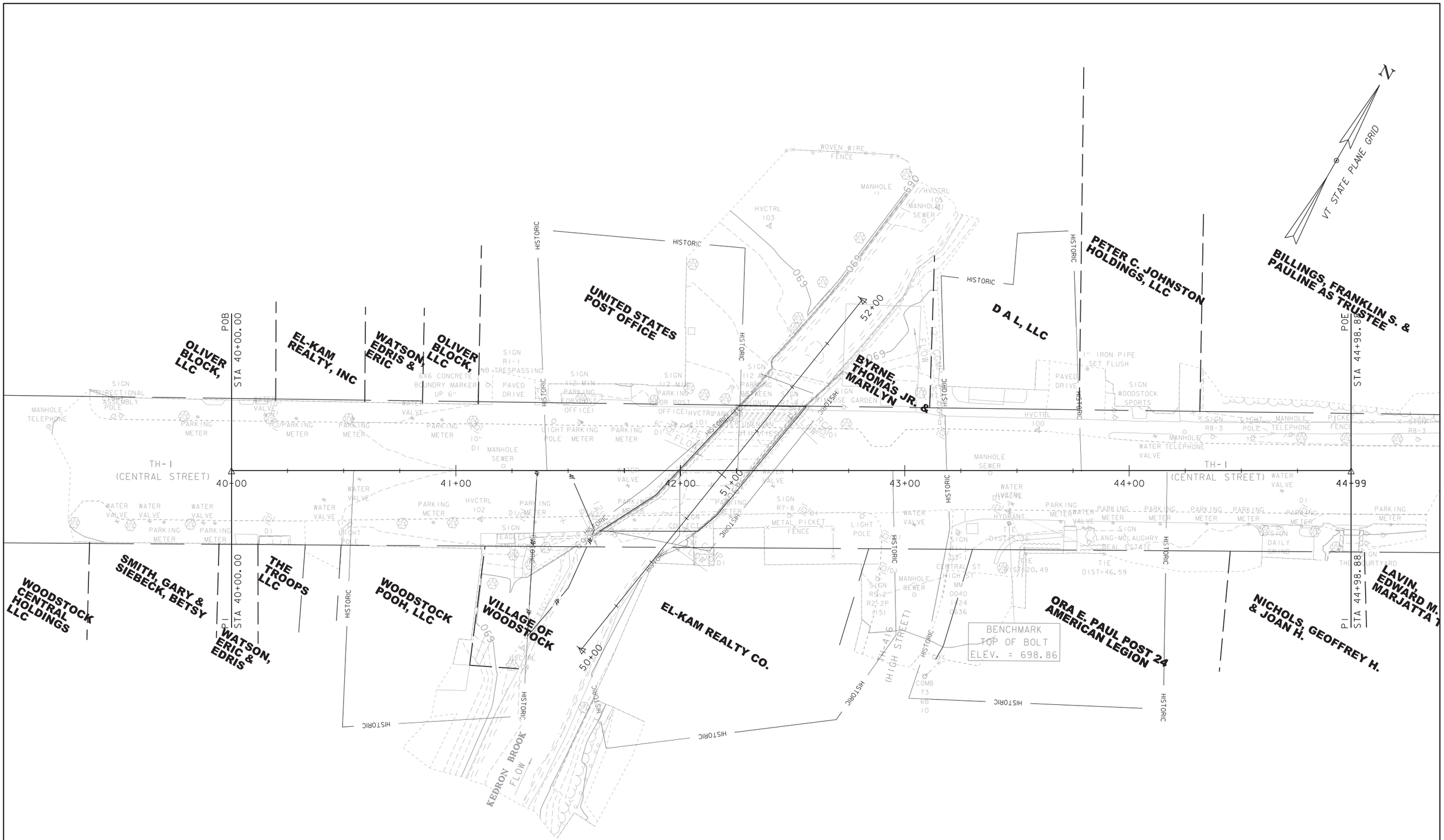
A – B Through Route: 4.0 Miles
A – B Detour Route: 35.7 Miles
Added Miles: 31.7 Miles
End-End Distance: 39.7 Miles



Pedestrian Detour Route

US Route 4, to Mechanic Street – over footbridge – High Street, back to US Route 4

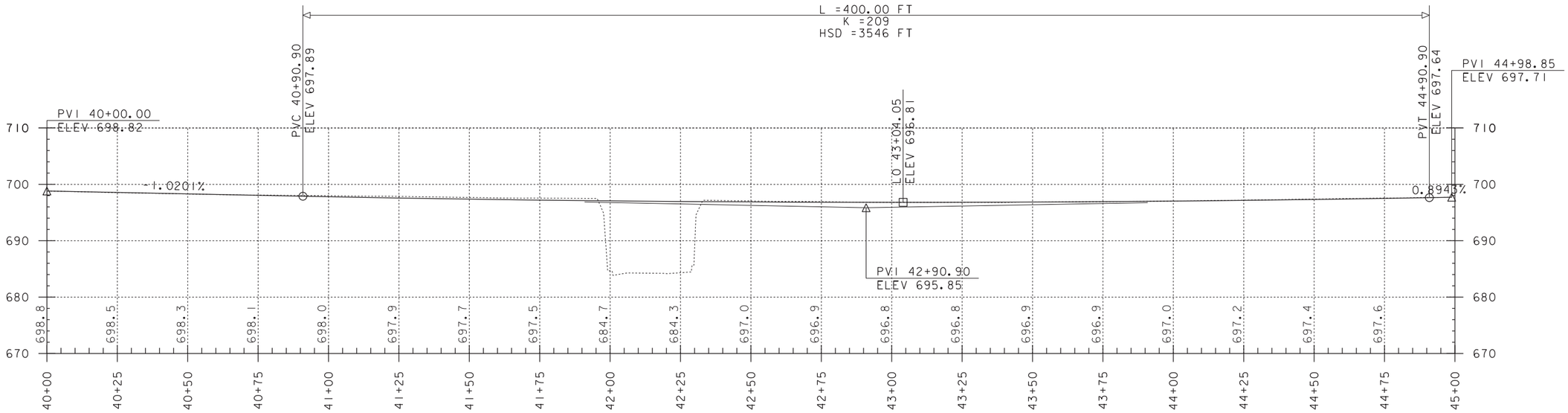
A – B Through Route: 0.06 Miles
A – B Detour Route: 0.18 Miles
Added Miles: 0.12 Miles
End-End Distance: 0.24 Mile



EXISTING CONDITIONS

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

PROJECT NAME:	WOODSTOCK VILLAGE
PROJECT NUMBER:	BF 020-2(43)
FILE NAME: 13j280/sl3j280boder.dgn	PLOT DATE: 09-OCT-2014
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
EXISTING CONDITIONS	SHEET 1 OF 12



TH 1 EXISTING PROFILE

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

NOTE:

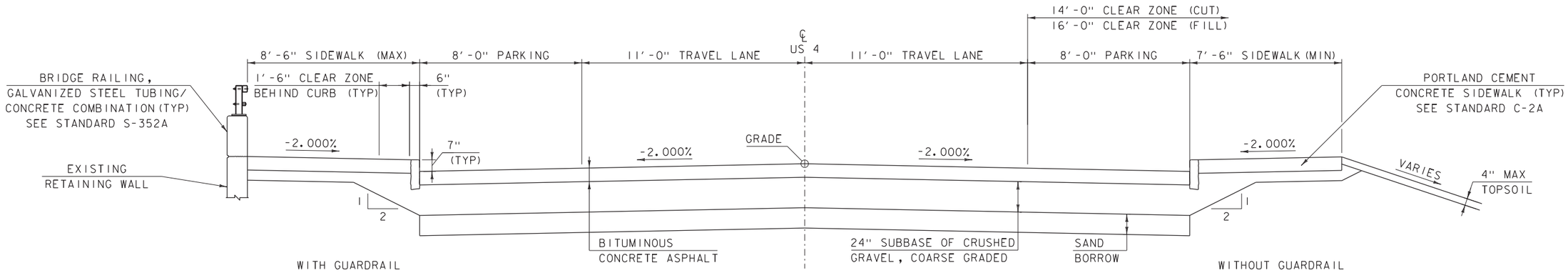
GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: WOODSTOCK VILLAGE
PROJECT NUMBER: BR 020-2(43)

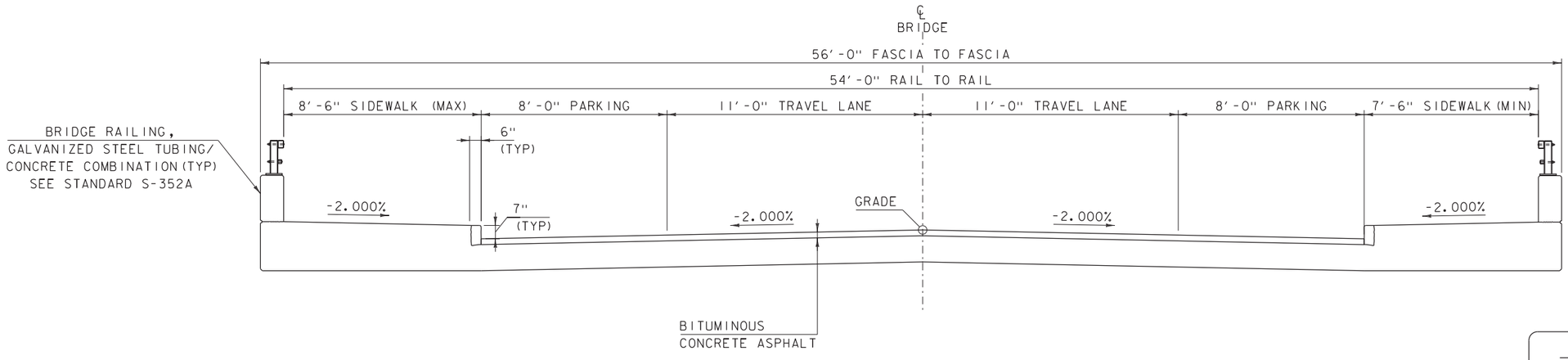
FILE NAME: 13j280/sl3j280profile.dgn
PROJECT LEADER: C.P.WILLIAMS
DESIGNED BY: ------
PROFILE SHEET

PLOT DATE: 09-OCT-2014
DRAWN BY: D.D.BEARD
CHECKED BY: ------
SHEET 2 OF 12



PROPOSED US 4 TYPICAL SECTION

SCALE 3/8" = 1'-0"



FLOW

PROPOSED BRIDGE TYPICAL SECTION

SCALE 3/8" = 1'-0"

MATERIAL TOLERANCES

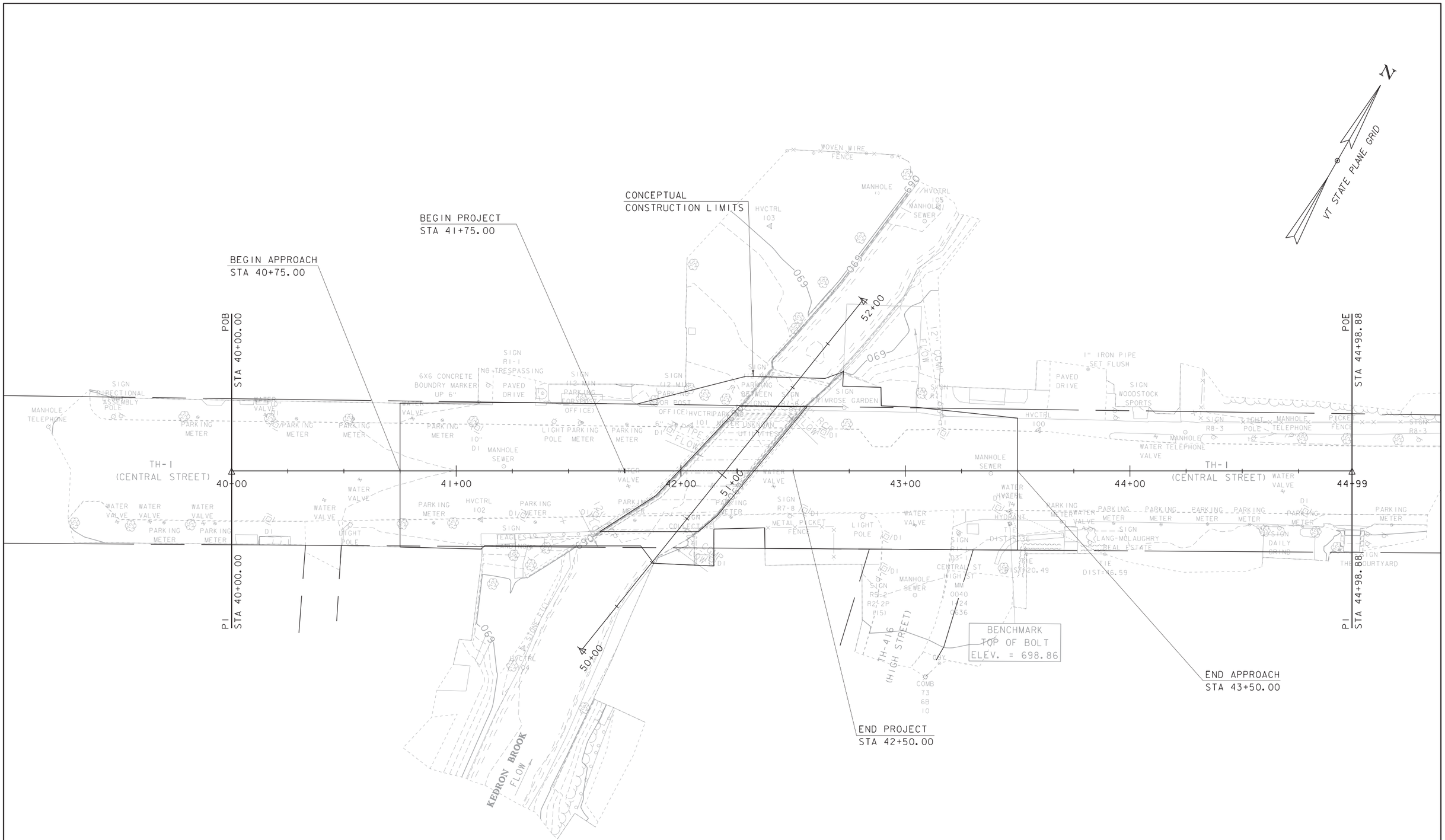
(IF USED ON PROJECT)

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

PROJECT NAME: WOODSTOCK VILLAGE
PROJECT NUMBER: BF 020-2(43)

FILE NAME: 13j280\sl3j280typical.dgn
PROJECT LEADER: C.P.WILLIAMS
DESIGNED BY: L.J.STONE
TYPICAL SECTIONS

PLOT DATE: 09-OCT-2014
DRAWN BY: D.D.BEARD
CHECKED BY: L.J.STONE
SHEET 3 OF 12

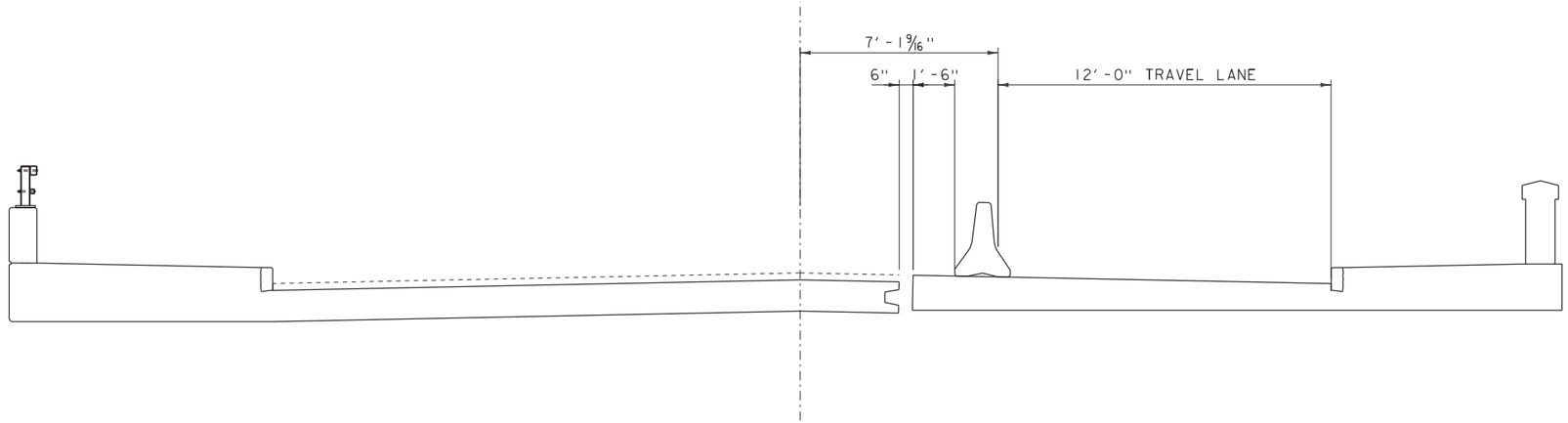


ALTERNATIVE 2 LAYOUT

SCALE 1" = 20'-0"

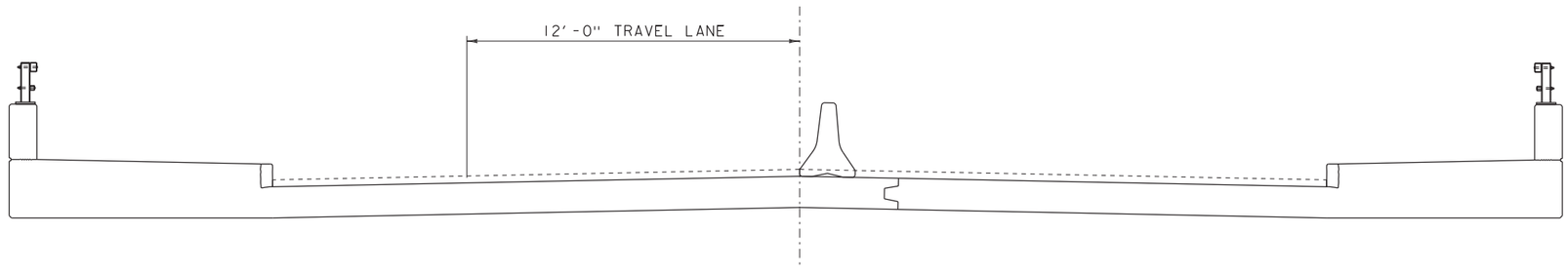
20 0 20

PROJECT NAME:	WOODSTOCK VILLAGE
PROJECT NUMBER:	BF 020-2(43)
FILE NAME: 13J280/s13J280boder.dgn	PLOT DATE: 09-OCT-2014
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: L.J.STONE	CHECKED BY: L.J.STONE
ALTERNATIVE 1LAYOUT	SHEET 4 OF 12



SINGLE LANE PHASE 1 TYPICAL SECTION

SCALE 3/8″ = 1′ - 0″



SINGLE LANE PHASE 2 TYPICAL SECTION

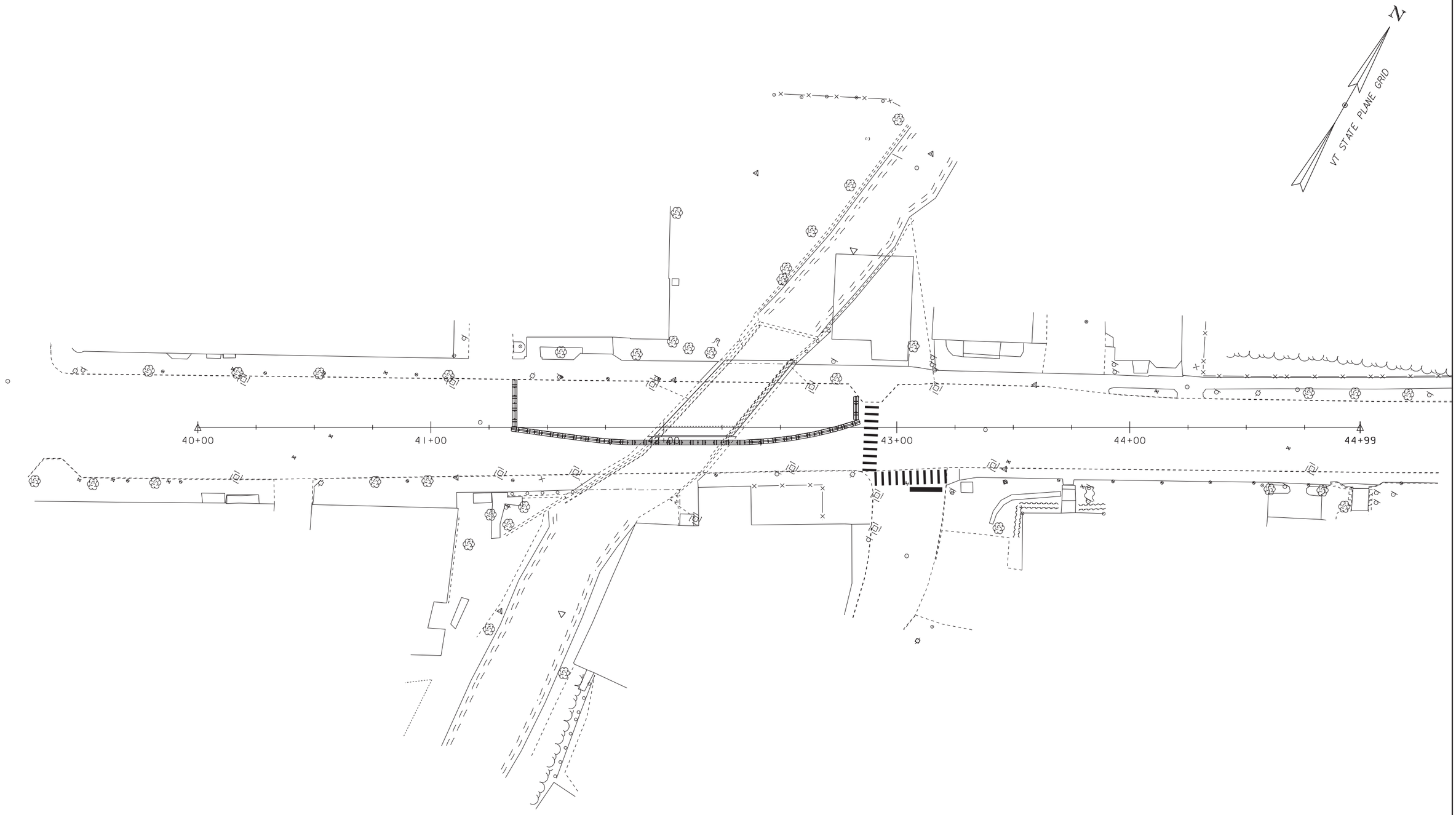
SCALE 3/8″ = 1′ - 0″

PROJECT NAME: WOODSTOCK VILLAGE

PROJECT NUMBER: BF 020-2(43)

FILE NAME: 13j280\sl3j280phasing.dgn
PROJECT LEADER: C.P.WILLIAMS
DESIGNED BY: L.J.STONE
ONE WAY PHASING TYPICAL SECTIONS

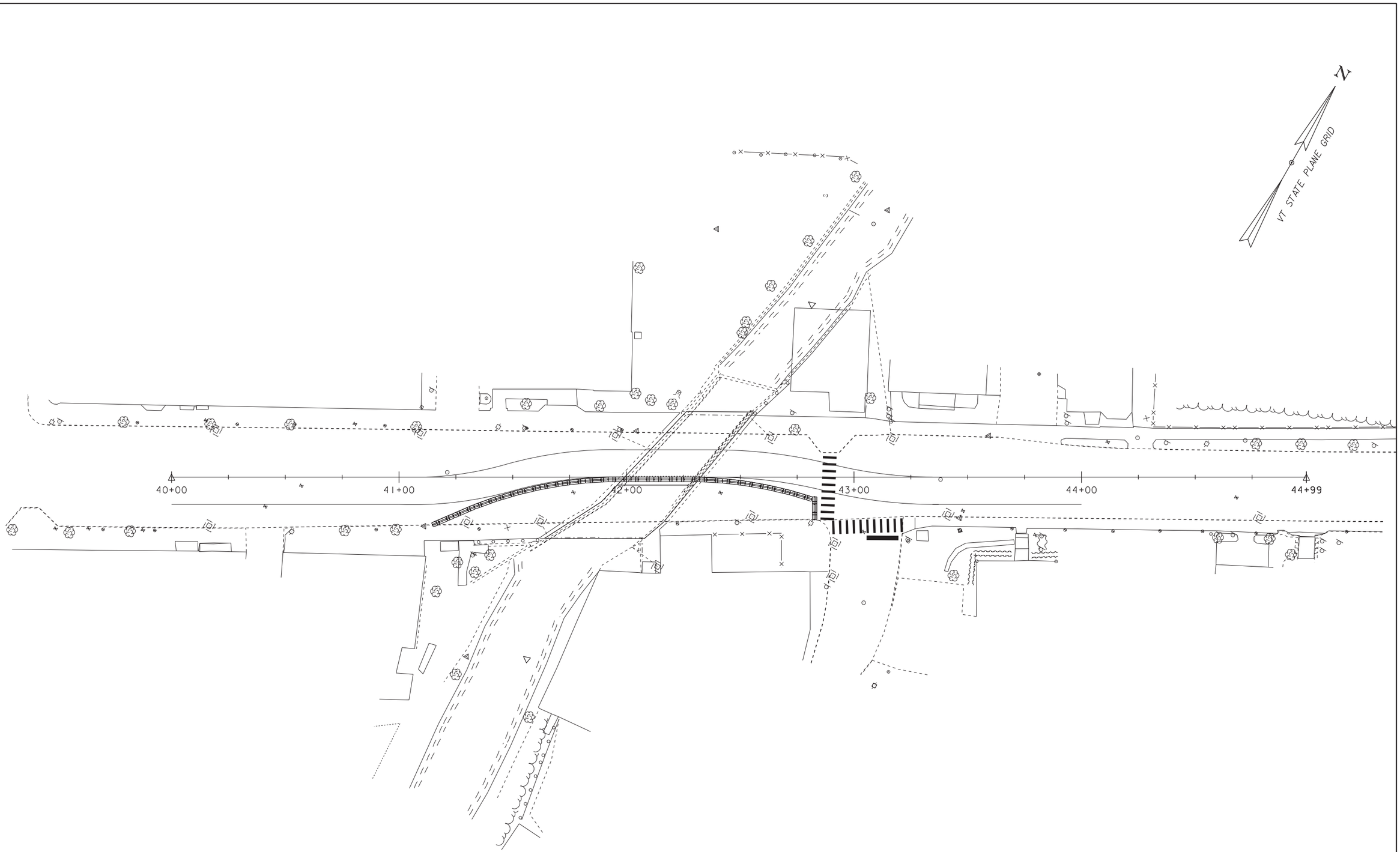
PLOT DATE: 09-OCT-2014
DRAWN BY: D.D.BEARD
CHECKED BY: L.J.STONE
SHEET 6 OF 12



SINGLE LANE PHASE I

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

PROJECT NAME:	WOODSTOCK VILLAGE
PROJECT NUMBER:	BF 020-2(43)
FILE NAME: 13J280/s13J280phasing.dgn	PLOT DATE: 09-OCT-2014
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
SINGLE LANE PHASE I LAYOUT	SHEET 7 OF 12



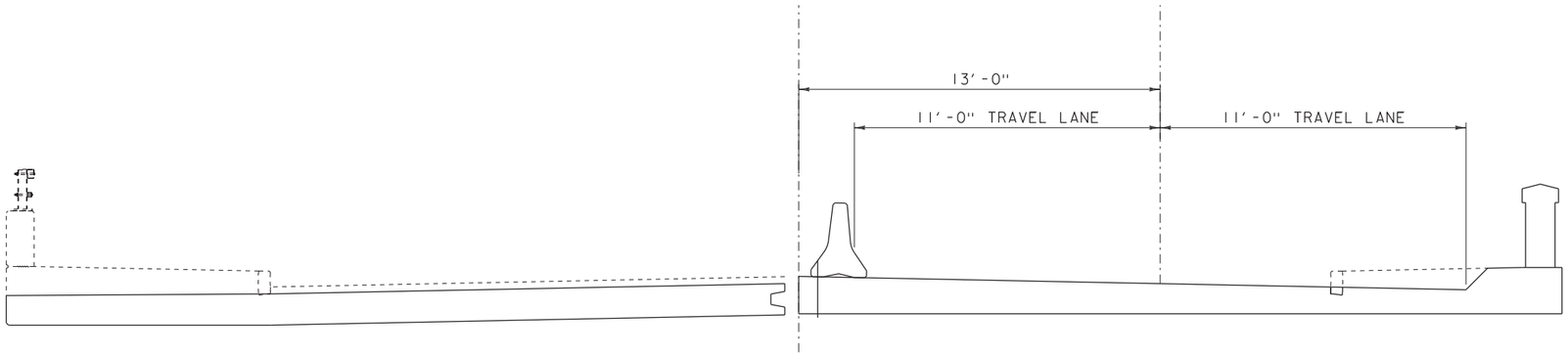
SINGLE LANE PHASE 2

SCALE 1" = 20'-0"

20 0 20

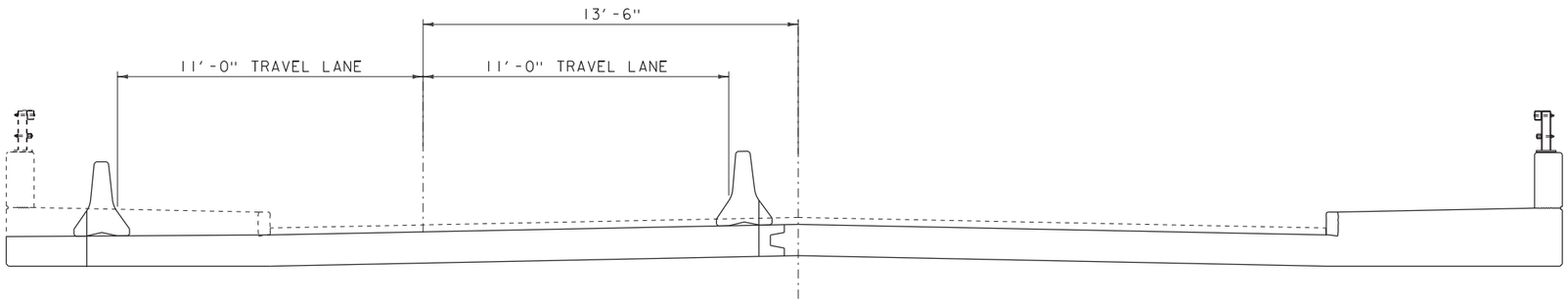
PROJECT NAME:	WOODSTOCK VILLAGE
PROJECT NUMBER:	BF 020-2(43)

FILE NAME: 13j280/sl3j280phasing.dgn	PLOT DATE: 09-OCT-2014
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
SINGLE LANE PHASE 2 LAYOUT	SHEET 8 OF 12



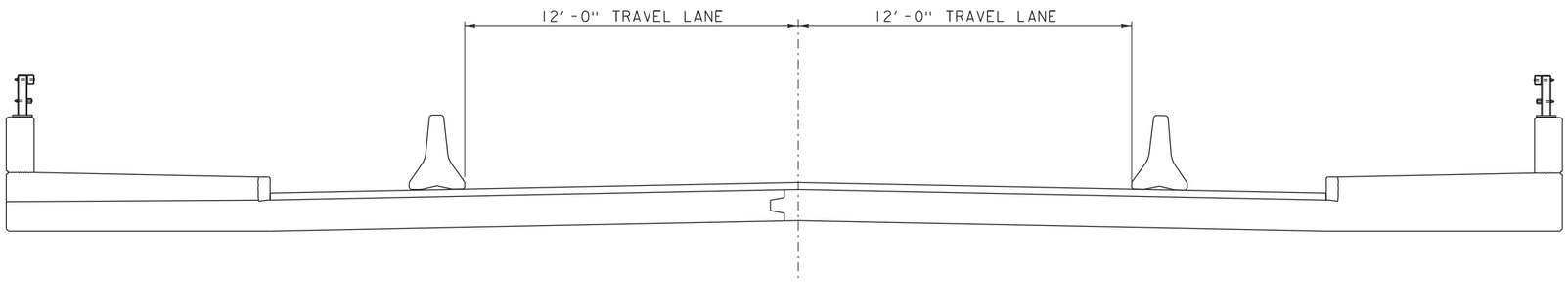
TWO LANE PHASE 1 TYPICAL SECTION

SCALE 3/8" = 1'-0"



TWO LANE PHASE 2 TYPICAL SECTION

SCALE 3/8" = 1'-0"

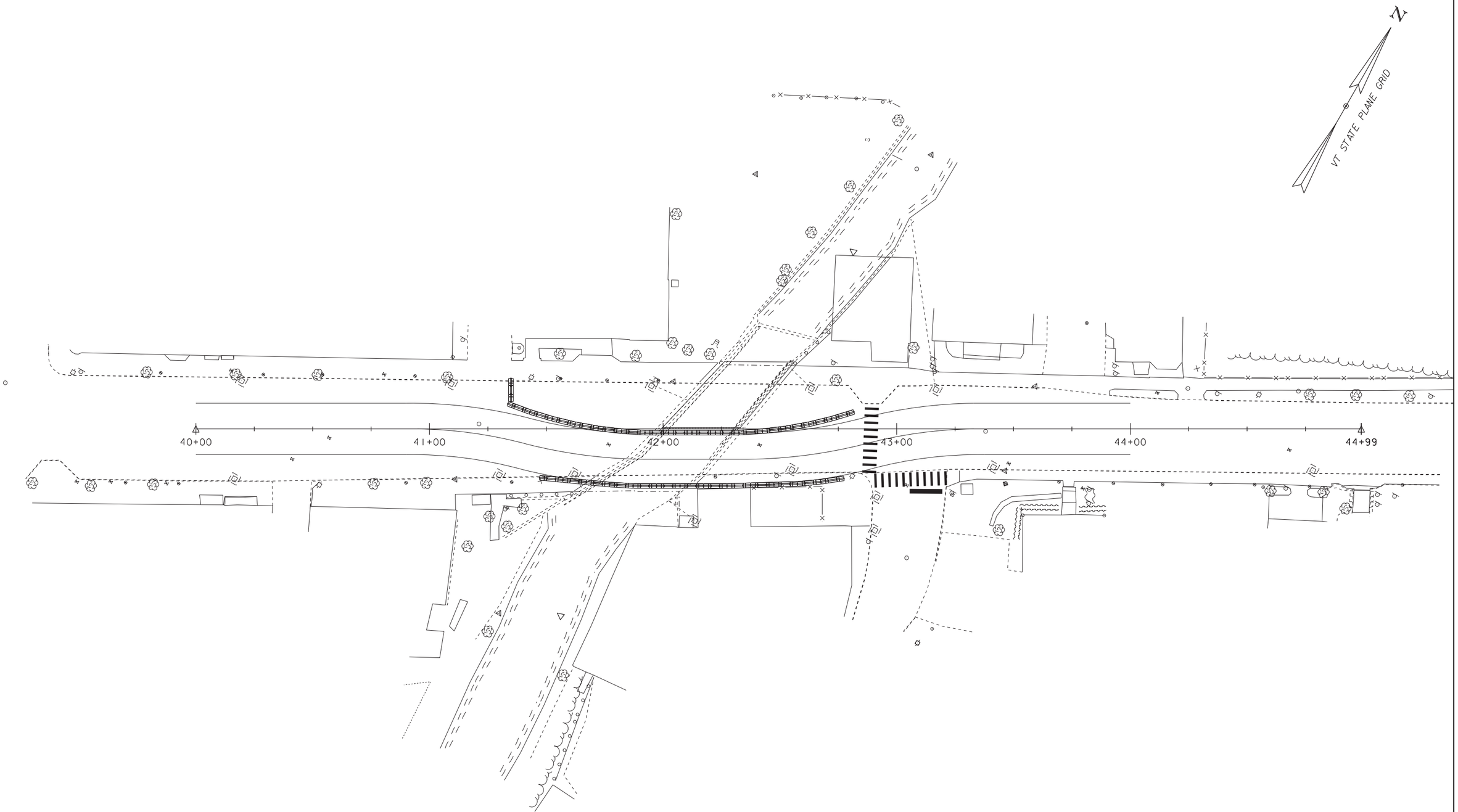


TWO LANE PHASE 3 TYPICAL SECTION

SCALE 3/8" = 1'-0"

PROJECT NAME:	WOODSTOCK VILLAGE
PROJECT NUMBER:	BF 020-2(43)

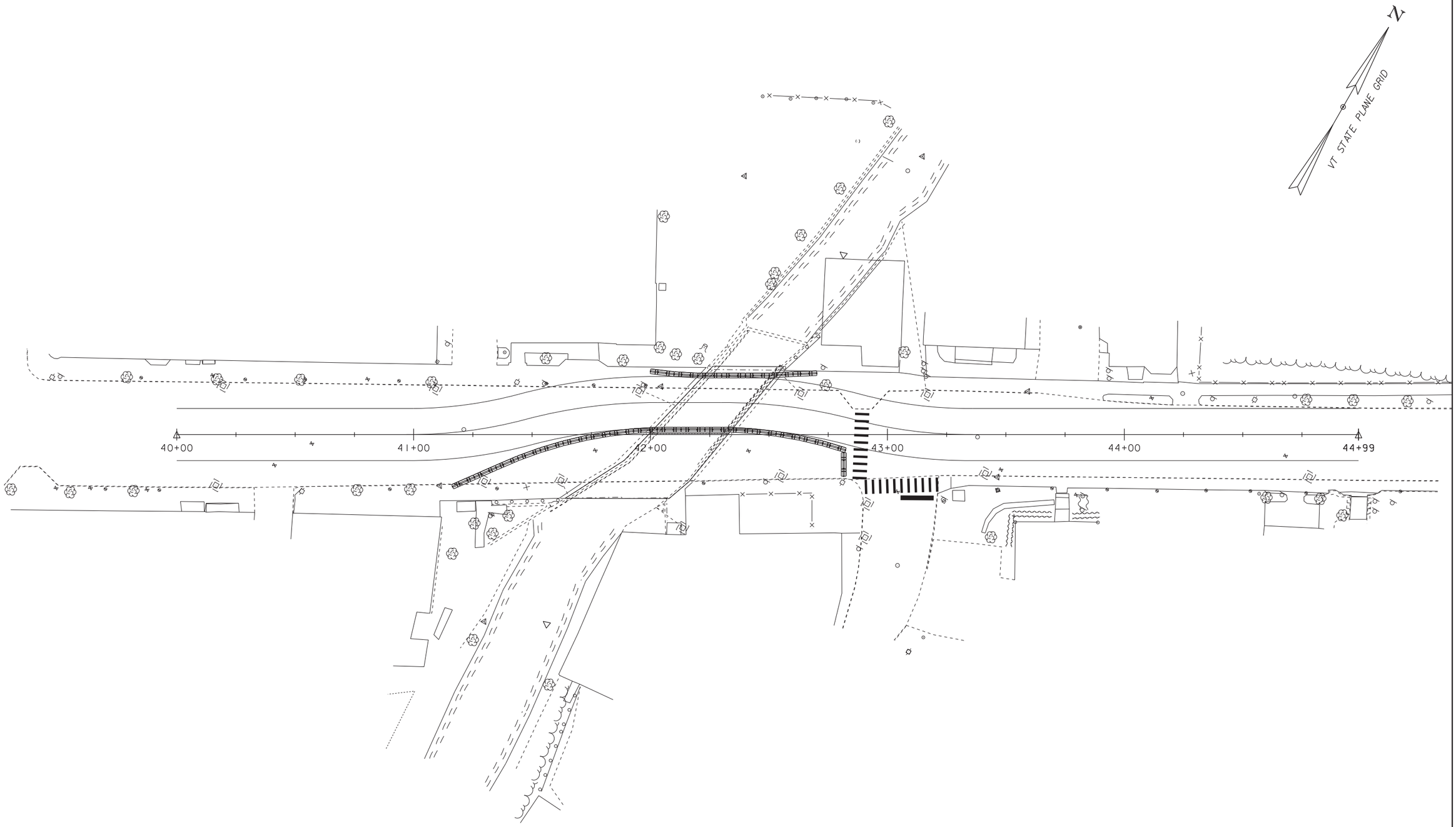
FILE NAME: 13j280\s13j280phasing.dgn	PLOT DATE: 09-OCT-2014
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: L.J.STONE	CHECKED BY: L.J.STONE
TWO WAY PHASING TYPICAL SECTIONS	SHEET 9 OF 12



TWO LANE PHASE I

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

PROJECT NAME:	WOODSTOCK VILLAGE
PROJECT NUMBER:	BF 020-2(43)
FILE NAME: I3j280/sI3j280phasing.dgn	PLOT DATE: 09-OCT-2014
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
TWO LANE PHASE I LAYOUT	SHEET 10 OF 12

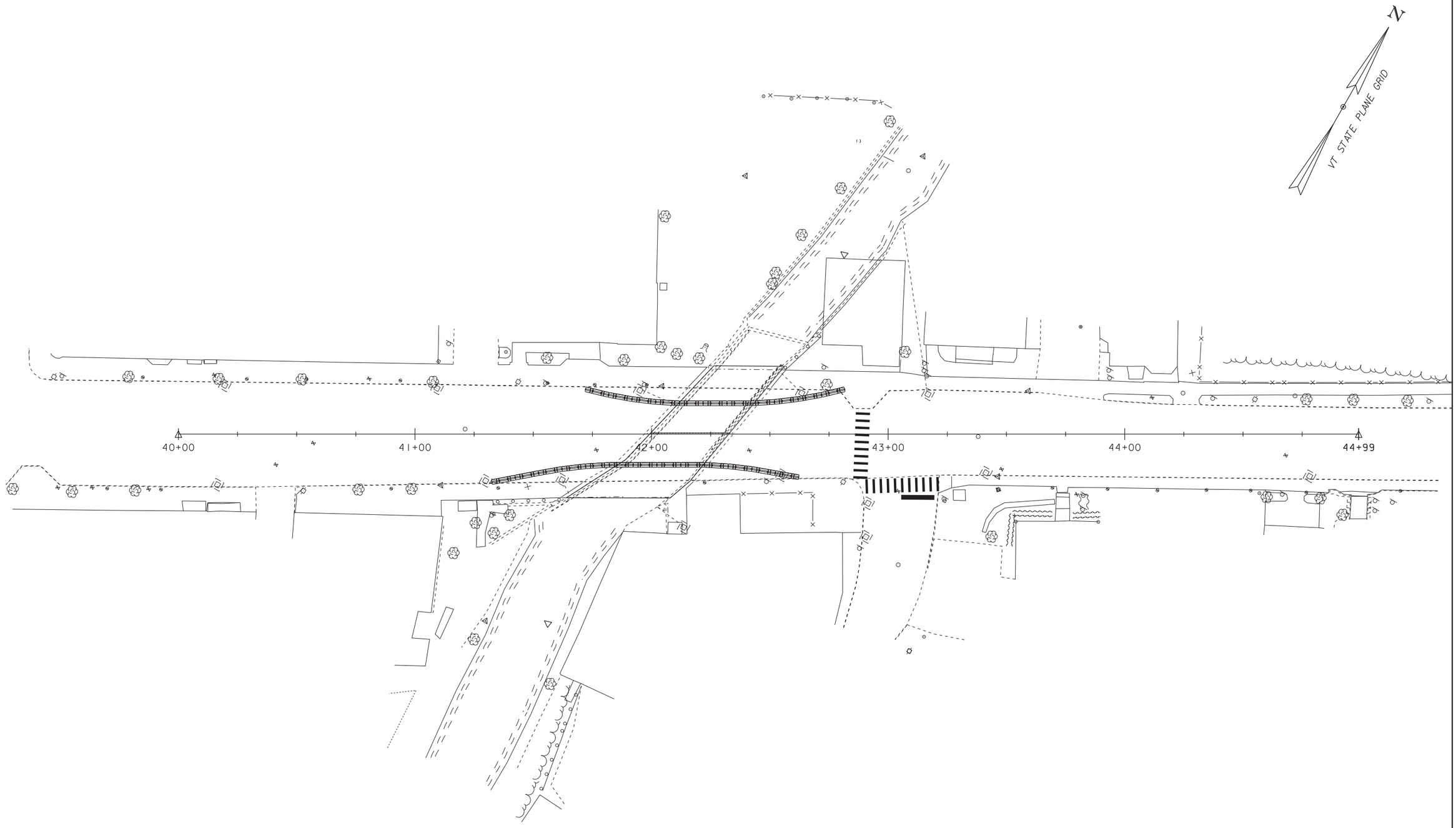


TWO LANE PHASE 2

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME:	WOODSTOCK VILLAGE
PROJECT NUMBER:	BF 020-2(43)
FILE NAME: 13j280/sl3j280phasing.dgn	PLOT DATE: 09-OCT-2014
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
TWO LANE PHASE 2 LAYOUT	SHEET 11 OF 12



TWO LANE PHASE 3

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

PROJECT NAME:	WOODSTOCK VILLAGE
PROJECT NUMBER:	BF 020-2(43)
FILE NAME: 13j280/s13j280phasing.dgn	PLOT DATE: 09-OCT-2014
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
TWO LANE PHASE 3 LAYOUT	SHEET 12 OF 12