STATE OF VERMONT
AGENCY OF TRANSPORTATION

Scoping Report

FOR

Chelsea BHF 0169(10)

VT Route 110, Bridge 11
Over the South Washington Brook

May 6, 2014

I. Contents

I. Preface **3**

II. Site Information **3**

Need 3

Traffic 4

Design Criteria 4

Inspection Report Summary 5

Hydraulics 5

Utilities 6

Right Of Way 6

Resources 6

Archaeological: 6

Historic: 6

Natural Resources: 6

Hazardous Materials: 6

Stormwater: 6

III. Maintenance of Traffic **7**

Option 1: Temporary Bridge 7

Option 2: Phased Construction 8

Option 3: Off-Site Detour 8

IV. Alternatives Discussion **10**

No Action 10

Alternative 1: Deck Replacement 10

Alternative 2: Superstructure Replacement 11

Alternative 3: Complete Replacement 11

Pedestrian Safety Issues 12

V. Alternatives Summary **12**

VI. Cost Matrix **13**

VII. Conclusion **14**

VIII. Appendices **16**

I. Preface

A scoping report was completed for this Bridge in January of 2013. A Regional Concerns Meeting was held in Chelsea on March 18, 2013 where the information from that original scoping report was presented. The original proposal was to replace the existing superstructure with prefabricated bridge units utilizing phased construction with a short term closure. The typical section for that proposal included 10 foot lanes and the addition of 3 foot shoulders to accommodate bicycles and pedestrians on both sides of the road. The concern expressed by those present at the meeting was that a sidewalk was needed at this location to accommodate pedestrians traversing the bridge. Based on this feedback, it was decided to modify the scoping report to address this concern. This report is the result of that effort.

II. Site Information

Bridge 11 is located on VT Route 110 approximately 0.3 miles north of the junction with VT 113 and approximately 600 ft. upstream of the confluence of South Washington Brook with the First Branch of the White River. The bridge is located at the northern end of the Chelsea Historic district and adjacent to Brookhaven Recreation Fields. While the bridge is at the northern end of the Village designation, residential housing continues along VT 110 and along Corinth Rd to the north of the bridge. The existing conditions were gathered from a combination of a Site Visit, the Inspection Report, the Route Log and the existing Survey. See correspondence in the Appendix for more detailed information.

Roadway Classification	Rural Major Collector
Bridge Type	Rolled Beam
Bridge Span	86 feet long
Year Built	1939
Ownership	State of Vermont

Need

The following are needs of VT 110 at the northern end of the Chelsea Historic District.

1. Bridge 11 is structurally deficient with local deck failures patched with steel deck plates.

2. The hydraulic opening provided by Bridge 11 is substandard and does not pass a 50 year storm event.

3. The shoulder width on the bridge is not sufficient to safely accommodate bicycles.

4. The superelevation on the curve to the south of the bridge does not meet standards.

5. The bridge railing and transition sections are substandard.

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	2015	2035
AADT	1700	1800
DHV	210	220
ADTT	130	200
%T	7.9	11.9
%D	52	52

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 between 1500 and 2000 and a design speed of 30 mph.

Design Criteria	Source	Existing Condition	Minimum Standard	Comment
Approach Lane and Shoulder Widths	VSS Table 5.3	11'/3' (28')	10'/4' (28')[1]	
Bridge Lane and Shoulder Widths	VSS Table 5.3	11'/1' w/ 5' sidewalk (24')	10'/4' (28')[1]	Substandard
Clear Zone Distance	VSS Table 5.5	none known	14' fill / 12' cut	
Banking	VSS Section 5.13	Normal Crown	8% (max)	Substandard
Speed		30 mph (Posted)	30 mph (Design)	
Horizontal Alignment	AASHTO Green Book Table 3-10b	500' Radius south of bridge	R_{min}=214' @ 8%	
Vertical Grade	VSS Table 5.6	~2.8%	9% (max) for rolling terrain	
K Values for Vertical Curves	VSS Table 5.1	40 crest	30 crest / 40 sag	
Vertical Clearance Issues	VSS Section 5.8	none known	14'-3" (min)	
Stopping Sight Distance	VSS Table 5.1	325'	200'	
Bicycle/Pedestrian Criteria	VSS Table 5.8	3' Shoulder on Approach 1' on Bridge	3' Shoulder	Substandard on Bridge
Bridge Railing (and Approach Railing)	Structures Design Manual Section 13.2	Concrete Bridge Rail w/ w-beam approach	TL-2	Substandard configuration
Hydraulics	VTrans Hydraulic Section	Pass Q_{10} storm event with 1.0' of freeboard	Pass Q_{50} storm event with 1.0' of freeboard	Substandard
Structural Capacity	S.M., Ch. 3.4.1	Structurally Deficient	Design Live Load: HL-93	Substandard

[1] Per HSDEI 11-004 (http://vtransengineering.vermont.gov/sites/aot_program_development/files/documents/structures/HSDEI_11-004_-_Minimum_Roadway_Width_of_Pavement.pdf) the minimum width of the lane and shoulder shall be 28'.

Inspection Report Summary

Deck Rating	4 Poor
Superstructure Rating	6 Satisfactory
Substructure Rating	6 Satisfactory
Channel Rating	7 Good

7/17/13 The structure is in need of a full deck replacement and beams need extensive cleaning and painting. JWW/JDM

04/12/2011 The deck is in need of full replacement. Local deck failure may occur anytime anywhere. The concrete spindles on both sides are in need of full replacement. The steel is in need of full paint recoat. PLB

Hydraulics
From preliminary hydraulics report:

The Q50 design event flow does not pass through the existing structure with large events going around the Left (South) abutment with overtopping of the roadway and upstream overtopping of the roadway on the Right (North) Bank. However, the Q10 flow event passes through the structure based with approximately 1.0-foot of freeboard based on our analysis of the Existing Conditions.

When reviewing possible options, it is apparent that a replacement bridge meeting the hydraulic standard cannot be achieved for this location without significant modifications to the area surrounding the bridge (i.e. remove buildings, modify roadways, relocate utilities, etc.).

Recommendations

Based on our analysis using a new structure, the recommendation will be to use a bridge having a 52-foot clear span normal to the stream channel (between the abutment faces) with a low beam elevation at or above 829.3 feet with stone fill protection in front of the abutments. The actual clear span of the bridge along the roadway will be approximately 81 feet based on the 50° skew of the bridge. To match the existing roadway alignment along the 50° skew, the bridge should also have the abutments parallel to the stream. The proposed wider structure will not constrict the stream channel width and be within the recommended VANR Bank Full Width criterion (i.e. no greater than 1.2 x Bank Full Width estimated at 44 feet by the equation).

It is noted that this option passes the Q10 flow event with about 1.0 foot of freeboard which is basically the same as the Existing Conditions.

Utilities

The utility information is shown in the Appendix.

There are overhead utilities (telephone and electric) on the east side of the roadway and bridge. They do not cross the road at the bridge location. There is a buried 12" water on the west side of the bridge and an unknown water line on the east side of the bridge. A utility plan obtained from the Town indicates that these lines are not carried across the river on the bridge. There is a sanitary sewer on the east side of the bridge, size unknown, but it does not appear on the bridge. There are two small diameter (+/-2" dia.) conduits cast into the east fascia crossing the bridge and visible only where the concrete is deteriorated away. They are believed to be abandoned and may be related to the light posts on the bridge. Also, two 5" OD conduits are on the west fascia beam and it is not known if they are in use.

Utility relocation will be required for any construction alternative.

Right Of Way

The existing Right-of-Way is shown on the Layout sheet. It appears that the existing structure is completely within the Right of Way. Depending on the option chosen, it may be necessary to acquire additional temporary rights.

Resources

The resources present at this project are shown on the layout sheets.

Archaeological:
There are no archaeological resources present within the current project area.

Historic:
Bridge 11 is a historic concrete bridge and is located within a historic district. These are Section 106 and Section 4(f) properties.

Natural Resources:
The only regulated resource in this immediate area is the South Washington Brook. Wetlands, species/habitat(s) and agricultural soils are all absent. The Brook is also not classified as Essential Fish Habitat.

Hazardous Materials:
There are several Hazardous Waste Sites delineated to the north of the bridge from previous underground storage tanks. There are several active underground storage tanks to the south in the Chelsea Historic District. All of the sites, except the one on the Brookhaven Recreational Fields to the northwest of the bridge, are well outside the limits to the project. Efforts will be made to avoid impacts to the hazardous site on the Brookhaven property.

These sites are shown in the Appendix.

Stormwater:
No known issues.

III. Maintenance of Traffic

The Vermont Agency of Transportation has developed an Accelerated Bridge Program, which focuses on faster delivery of construction plans, permitting, and Right of Way, as well as faster construction of projects in the field. One practice that will help in this endeavor is closing bridges for portions of the construction period, rather than providing temporary bridges. In addition to saving money, the intention is to minimize the closure period with faster construction techniques and incentives to contractors to complete projects early. The Agency will consider the closure option on most projects where rapid reconstruction or rehabilitation is feasible. The use of precast elements in new bridges will also expedite construction schedules. This can apply to decks, superstructures, and substructures. Accelerated Construction should provide enhanced safety for the workers and the travelling public while maintaining project quality. The following options have been considered:

Option 1: Temporary Bridge

A temporary bridge is feasible in this location on both the upstream and downstream side of the bridge. It is not possible to install a temporary bridge on either side of Bridge 11 without acquiring additional temporary Right of Way. No archeological or environment resources would be affected by the installation of a temporary bridge at this site. However, there are historic properties and 4(f) resources which would be affected. Placing a temporary bridge on the downstream side of the existing bridge should avoid impacts to the historic properties and overhead utilities but will impact the 4(f) resource and could impact the underground water line.

Placing a temporary bridge on the upstream side of the existing bridge would impact the historic properties, underground sewer line and the overhead utilities. Both sides have some pros and cons with either side being feasible. The decision about the location can be made later in the design process, but the upstream layout and limits are shown in the Appendix.

The amount of traffic at this site indicates that a single lane bridge with traffic signals and alternating traffic would be appropriate. While it would be feasible to place a two lane temporary bridge here, the extra impacts and cost associated with a wider approach and bridge are not justified in this location.

The advantage of using a temporary bridge to maintain traffic during construction is that it would allow vehicular traffic to be maintained along the corridor during construction.

In general, the disadvantages of temporary bridges are numerous and this situation is no exception. It would require the acquisition of temporary rights which extends the project development time and increases project development costs. The construction costs are increased to build two bridges at this location rather than just one. The duration of the construction activities would be extended to a second year. The impact to trees and adjacent properties is increased by installing a temporary roadway and bridge. While traffic would be maintained along the VT 110 corridor, there will be delays and disruptions to traffic for multiple years to accommodate the construction activities. The safety of the traveling public and construction workers is compromised by traffic traveling within and close to the construction site.

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 one to maintain traffic along the corridor during construction while mitigating the extra expense and impacts required by a temporary bridge.

While the time required to develop a phased construction project would remain the same, the time required to complete a phased construction project would increase over that for one without phasing because some of the construction tasks have to be performed multiple times. 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.

As mentioned previously, the traffic volumes are low enough to accommodate alternating one-way traffic with traffic signals during construction. While it is preferable to have a wider travel way to accommodate phased construction, the combination of the existing width and possibility of widening the new superstructure to meet current standards would make phasing construction a feasible method of maintaining traffic in this location.

The advantages of phasing construction to maintain traffic are that traffic is maintained along the VT 110 corridor during construction while staying within the existing Right of Way and reducing the impacts of a temporary bridge. The duration of the project engineering and construction along with their associated costs should be reduced over the temporary bridge option.

The disadvantages of phasing construction to maintain traffic include increased construction costs and increased construction durations because most construction tasks have to be done multiple times. While traffic would be maintained along the VT 110 corridor, there will be delays and disruptions to traffic to accommodate the construction activities. The safety of the traveling public and construction workers is further compromised because the traffic is traveling through an active construction site and the vehicles and workers are even closer than they would be with a temporary bridge.

Option 3: Off-Site Detour

This option would close the bridge to traffic during construction and reroute traffic on roads which are appropriate for and chosen based on the volume and type of traffic which will be diverted during construction and the currently existing traffic volumes and composition on those roads. One option would be to detour traffic from the intersection of VT 110 and VT 113 east to VT 244 east to US 5 to I 91 north to VT 25 to US 302 west and back to VT 110 north of the bridge. Another option would detour traffic from the intersection of VT 110 and VT 14 north to VT 107 west to I-89 north to VT 63 east to VT 14 north to US 302 and back to VT 110.

Neither of routes is particularly appealing. The end-to-end distances are 66 and 65 miles respectively and both would take about one and a half hours to navigate. Any route with an

interstate would not accommodate pedestrian and bicycle traffic and alternate accommodations would need to be made for traffic that is restricted from the Interstate system.

There are several local bypass routes in this area that avoid the construction site if VT 110 is closed to through traffic. Local bypass routes are not signed, or official, detour routes and are not necessarily appropriate for all traffic that needs to detour around a site. Because local bypass routes are comprised of public roads that circumvent the road closure in a shorter distance than the official detour, they may see an increase in traffic from passenger cars as locals use them during the closure. These bypass routes could also be utilized by pedestrians and bicyclists during any closure period.

One of the local bypasses in this location entails taking Beacon Hill Rd south of the bridge to Brook Rd to Pent Rd to Bobbinshop Rd and back to VT 110. The end-to-end distance is 7.2 miles and takes approximately 17 minutes to travel.

A map of potential detour and bypass routes can be found in the Appendix.

The advantages of closing a section of road during construction and utilizing an off-site detour can be numerous in the right location. It would eliminate the need to use a temporary bridge or phase construction to maintain traffic. This would decrease the cost and amount of time required to design and construct the project. The impacts to adjacent properties and historic resources and amount of temporary rights required to construct this project 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 main disadvantage to closing the road during construction and maintaining an off-site detour is that traffic would not be maintained through the project corridor during construction, so while there are many advantages to a detour for this project, the roads that are adequate to handle the extra traffic from closing VT 110 create a long and time-consuming detour. Even with the relatively low traffic volumes, one would want to keep the closure periods reasonably short to make this a viable option.

It is traditionally assumed that the road will be closed for construction and when the closure is complete the new bridge will be opened to two lanes of traffic. In order to keep the closure period as short as possible, a slightly modified hybrid maintenance of traffic option will be considered for the superstructure replacement alternative. In this option, the road will be completely closed for one or two short duration periods, i.e. four days over long weekends. If there is only one short duration closure, the eastern half of the existing superstructure will be removed, the bridge seats modified, and the corresponding new half of the superstructure will be replaced during this period. The western half of the superstructure will then be removed and replaced while two way alternating traffic is traveling on the eastern side of the bridge. With two closure periods, rather than phasing traffic, the two halves can be replaced during closure periods while the railing, substructure work and other set up and clean up can be done outside the closure periods. This hybrid option is only appropriate for deck and superstructure replacement options.

An off-site detour of this length would not be appropriate for the length of time necessary to remove and reconstruct an entire bridge and will not be considered for any complete replacement alternatives.

Safety is a major consideration during the development and construction of a project. Not only the safety of the travelling public and construction workers affected by the construction activities, but also the ability of fire and rescue personnel to reach all areas of a town during construction. Thus, any bypass routes are evaluated to determine if they may be used by service vehicles and first responders to respond to emergencies during a road closure.

The primary fire coverage for the town comes from the Chelsea Fire Station, which is just south of Bridge 11. For coverage north of the bridge when closed, the closest fire departments are Washington or Corinth, approximately 9 to 9.5 miles away accessed from north of the bridge. The nearest ambulance service is either Barre or White River, which are some distance away from the project site. The nearest hospital would be in Randolph or Berlin. There is police coverage in Chelsea, but for calls north of the bridge when closed, police would need to utilize a bypass of the project to get north of the bridge. Coordination should occur so that coverage can be maintained if the bridge is closed.

IV. Alternatives Discussion

Bridge 11 is structurally deficient with local deck failures patched with steel deck plates. The bridge is hydraulically inadequate, the shoulder width on the bridge is too narrow to safely accommodate bicycles and pedestrians, the bridge railing and transition sections are substandard, and the superelevation is insufficient on the curve to the south of the bridge.

The additional constraint imposed on this project is that pedestrian traffic crossing the South Washington Brook be accommodated in a manner other than using a shared use shoulder.

No Action

This alternative would involve leaving the bridge in its current condition. A good rule of thumb for the "No Action" alternative is whether the bridge can stay in place without any work being performed on the bridge in the next 10 years. Considering that the deck has already been patched many times and is continually deteriorating, it is unlikely that the deck will last another 10 years without being patched or replaced. Thus, the No Action alternative will not be considered further in this report.

Alternative 1: Deck Replacement

This would entail removing the existing deck and replacing it with a new concrete deck. This would include repairs to any cracking and surface deficiencies on the abutments and cleaning and painting the existing beams.

The new typical section on the bridge would include 4 foot shoulders, 10 foot lanes, and a 5.5' sidewalk on the east side of the bridge. Because this is a wider typical section than the existing superstructure width, the tops of the wingwalls would be removed and reformed in an extended location to accommodate the extra width. An additional girder would also be required to support the sidewalk.

It is believed that this substructure widening could take place in the dry, utilizing the existing abutments as a foundation. The abutments are in satisfactory condition, the channel is in good condition and there is no indication of scour at this location.

The bridge span would remain unchanged, and the bridge and approach railing would be replaced. This alternative would resolve all of the known issues except the hydraulic inadequacy.

Alternative 2: Superstructure Replacement

Even though the superstructure is in satisfactory condition, the beams should be cleaned and painted as part of a deck replacement option. In addition, a new beam would need to be added to the superstructure to support the widened typical section. Not only is it usually quicker and easier to precast the deck sections on to beams and replace the superstructure as a unit rather than just replace the deck while cleaning and painting the existing beams, but an existing exterior beam would need to be modified to allow the connection of the new exterior beam. Because it is quicker and easier, it has been found that it is not much more expensive, if at all, to replace the entire superstructure rather than clean and paint the beams and replace the deck.

This alternative would have the same typical section as the Deck Replacement and maintain the existing bridge length. Substructure work would include repairing any abutment cracks and surface spalling as well as wingwall modifications and any bridge seat modifications necessary to accommodate the new superstructure. Since the bridge and approach railing would also be brought up to standard, this alternative would also resolve all of the known issues except the hydraulic inadequacy.

Alternative 3: Complete Replacement

This option would rectify the same deficiencies as the deck and superstructure replacement options but would extend the design life from 40 years to 80 years. Even though the hydraulic standards will not be met with this option, the hydraulic opening can be improved slightly with a new structure.

The new bridge length would extend approximately 110’ with a 30 degree skew to the roadway. This length is outside the range of the shallow precast, prestressed superstructure elements, thus it is assumed that a concrete deck on steel beams would be utilized. This could be accomplished with cast in place construction or precast, prefabricated bridge units (PBUs). By extending the bridge length slightly and keeping the skew to 30 degrees, the abutments can be constructed integrally with the superstructure and the pile cap can be constructed in the dry.

This type of structure can be constructed rapidly and in the dry without the use of cofferdams. It is reasonable to assume that the entire existing structure could be removed and a new bridge constructed in its place within 4 weeks. While this length of time is significantly shorter than construction projects of this size have traditionally taken, it has been assumed that the user costs are too great to detour traffic around the construction site in this location for the 4 weeks necessary to construct the project. Thus, the only methods for the maintenance of traffic considered for this alternative will be phasing and use of a temporary bridge.

Pedestrian Safety Issues

It does not appear that there are existing sidewalks in Chelsea to the north of the bridge and the sidewalk stops approximately 200' to the south of the bridge on the other side of the drive access to the Health Center. There is a dilemma with this project in that it has not been VTrans' past practice to install long expanses of sidewalk with a bridge rehabilitation or replacement project in locations where sidewalks did not previously exist while it is also not good practice to end sidewalks in a location where there are no other pedestrian facilities to accommodate the foot traffic off the proposed sidewalk.

It is unclear how far the sidewalk should extend to the north of the historic district. However, if the sidewalk were extended more than about 100' to the north, additional utilities would need to be relocated and additional Right of Way procured. Extending the sidewalk the 200' to the south would also entail the acquisition of additional Right of Way and the clearing of a large project with more impacts to natural and historic resources. Doing this would violate many of VTrans' priorities with the Road to Affordability of preserving existing infrastructure, minimizing additional Right of Way, minimizing the impacts to environmental and historic resources[2], and providing efficient and cost effective projects. Because the Town requested raised sidewalks in this location, the best option would be for the Town to develop and construct a project to extend the existing sidewalks to the bridge before the bridge project is built. In the absence of sidewalks extending to the bridge before this project is constructed, it is recommended that short sidewalk extensions be constructed just off the end of the bridge to allow the foot traffic to continue in the shared use shoulders as is currently the situation at this bridge. In addition, a painted crosswalk can be provided at the north end of the bridge to provide a known concentrated pedestrian crossing for athletes traveling to the Brookhaven Recreation Fields.

V. Alternatives Summary

Based on the existing site conditions, bridge condition, and other recommendations, the alternatives being considered are:

Alternative 1a: Deck Replacement with Traffic Maintained on a Temporary Bridge
Alternative 1b: Deck Replacement with Traffic Maintained by Phasing
Alternative 1c: Deck Replacement with Traffic Maintained on an Offsite Detour
Alternative 2a: Superstructure Replacement with Traffic Maintained on a Temporary Bridge
Alternative 2b: Superstructure Replacement with Traffic Maintained by Phasing
Alternative 2c: Superstructure Replacement with Traffic Maintained on an Offsite Detour
Alternative 3a: Complete Replacement with Traffic Maintained on a Temporary Bridge
Alternative 3b: Complete Replacement with Traffic Maintained by Phasing

[2] http://vtrans.vermont.gov/sites/aot/files/documents/policies/60131-Enhancements-to-Transportation-Projects.pdf

VI. Cost Matrix

Chelsea BHF 0169(10)		Do Nothing	Alt 1a	Alt 1b	Alt 1c	Alt 2a	Alt 2b	Alt 2c	Alt 3a	Alt 3b
			Deck Replacement			Superstructure Replacement			Complete Replacement	
			Temp Bridge	Phased Const.	Offsite Detour	Temp Bridge	Phased Const.	Offsite Detour	Temp Bridge	Phased Const.
COST[1]	Bridge Cost	$0	$601,000	$651,000	$601,000	$606,000	$657,000	$606,000	$1,002,000	$1,102,000
	Removal of Structure	$0	$78,000	$85,000	$78,000	$83,000	$91,000	$83,000	$111,000	$122,000
	Roadway	$0	$252,000	$246,000	$237,000	$254,000	$247,000	$238,000	$379,000	$380,000
	Maintenance of Traffic	$0	$175,000	$50,000	$20,000	$175,000	$50,000	$20,000	$175,000	$75,000
	Construction Costs	$0	$1,106,000	$1,032,000	$936,000	$1,118,000	$1,045,000	$947,000	$1,667,000	$1,679,000
	Construction Engineering + Contingencies	$0	$331,800	$278,700	$234,000	$335,400	$282,200	$236,800	$500,100	$503,700
	Total Construction Costs w CEC	$0	$1,437,800	$1,310,700	$1,170,000	$1,453,400	$1,327,200	$1,183,800	$2,167,100	$2,182,700
	Preliminary Engineering[2]	$0	$298,700	$278,700	$252,800	$301,900	$282,200	$255,700	$450,100	$453,400
	Right of Way	$0	$88,500	$0	$0	$88,500	$0	$0	$88,500	$0
	Total Project Costs	$0	$1,825,000	$1,589,400	$1,422,800	$1,843,800	$1,609,400	$1,439,500	$2,705,700	$2,636,100
SCHEDULING	Project Development Duration[3]	N/A	4 years	2 years	2 years	4 years	2 years	2 years	4 years	2 years
	Construction Duration	N/A	18 months	6 months	6 months	18 months	6 months	6 months	18 months	18 months
	Closure Duration (If Applicable)	N/A	N/A	N/A	4 or 8 days	N/A	N/A	4 or 8 days	N/A	N/A
ENGINEERING	Typical Section - Roadway (feet)	3-11-11-3	4-10-10-4	4-10-10-4	4-10-10-4	4-10-10-4	4-10-10-4	4-10-10-4	4-10-10-4	4-10-10-4
	Typical Section - Bridge (feet)	1-11-11-1-5	4-10-10-4-5.5	4-10-10-4-5.5	4-10-10-4-5.5	4-10-10-4-5.5	4-10-10-4-5.5	4-10-10-4-5.5	4-10-10-4-5.5	4-10-10-4-5.5
	Geometric Design Criteria	No Change	Meets Criteria	Meets Criteria	Meets Criteria	Meets Criteria	Meets Criteria	Meets Criteria	Meets Criteria	Meets Criteria
	Traffic Safety	No Change	Improved	Improved	Improved	Improved	Improved	Improved	Improved	Improved
	Alignment Change	No	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
	Bicycle Access	No Change	Improved	Improved	Improved	Improved	Improved	Improved	Improved	Improved
	Hydraulic Performance	No Change	No Change	No Change	No Change	No Change	No Change	No Change	Improved	Improved
	Pedestrian Access	No Change	Improved	Improved	Improved	Improved	Improved	Improved	Improved	Improved
	Utility	No Change	Relocation	Relocation	Relocation	Relocation	Relocation	Relocation	Relocation	Relocation
OTHER	ROW Acquisition	No	Yes	No	No	Yes	No	No	Yes	No
	Road Closure	No	No	No	Yes	No	No	Yes	No	No
	Design Life	<10 years	40 years	40 years	40 years	40 years	40 years	40 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.

VII. Conclusion

The Agency recommends Alternative 2c: Superstructure Replacement with Traffic Maintained on an Offsite Detour.

Structure:
The deck on the existing bridge is in poor condition with holes in it while the substructure is in satisfactory condition. Because of the condition of the deck, it makes sense to try to do something quickly. Because of the condition of the substructure, it does not make sense to replace the entire structure. With the combination of these factors, either the deck replacement or superstructure replacement should be considered.

Based on the scoping estimates shown above, the costs for both the deck replacement and superstructure replacement are equal. The cleaning, surface preparation and field painting of steel beams are much more difficult and expensive in the field than in the shop. Removing the deck from the existing beams without damaging the beams is difficult and the contractor is not able to reduce the cost of the demolition by salvaging the existing beams; this causes the demolition costs to be closer together as well. The length of time that the contractor is out in the field working on the superstructure is reduced also.

Thus, getting an entire superstructure for the cost of just a deck and installed just as rapidly as a deck replacement makes the superstructure replacement an easy choice.

The substructure is in satisfactory condition; the channel is in good condition; and the bridge has been deemed stable for scour. Thus, it is anticipated that the scope of this project will include no work in the channel or potential scour mitigation.

Traffic Control:
Keeping in mind that one wants to move this project along as quickly as possible, it makes sense to avoid a temporary bridge at this location, if at all possible, to streamline the design process. By utilizing a detour instead of a temporary bridge, it is also possible to minimize the impacts to the adjacent landowners and historic properties while producing a safer, faster and cheaper project to construct.

The traffic through this corridor is a modest 1700 vehicles per day. The proposed closure is a combined 8 days, which could be split into two 4 day closures. If this length of time is too cumbersome, the closure period can be reduced to one 4 day closure while the remainder of the work can be done with traffic traveling through the construction site. While the official detour is long and time consuming to circumvent the construction in this location, there are several bypass routes that local traffic can use during this short closure period.

The general procedure used when roads are closed in a community is to provide the affected towns the opportunity to determine the best time for the closure. The traditional window for closures within which the towns are able to choose is between June 1 and September 1. This provides a high probability for success because of the long days, favorable weather, low water and fewer restrictions for in-stream work. Within that allowable period, the community can balance the impacts to schools and businesses and any other community events. This process has worked well at providing a high rate of success to allow the construction to be completed within the closure period as well as providing the best outcomes for the towns based on their schedule and needs. It is anticipated that this same process will be utilized for this project.

Pedestrian Issues:

A sidewalk on the bridge with short sidewalks off the end of the bridge will be provided to allow pedestrians to cross the South Washington Brook separate from vehicular traffic. A painted crosswalk will be provided at the end of the sidewalk to the north of the bridge to cross VT 110 to reach the Brookhaven Recreation Field. The sidewalk to the south of the bridge will convey the pedestrian traffic into the shoulder of VT 110.

Miscellaneous Issues:

The ornamental lighting will be included as an option in the contract. A special finance and maintenance agreement will be required to construct the sidewalk and ornamental lighting on this project. In general, these agreements stipulate that the local municipality pay the costs of constructing and maintaining the lighting and guaranteeing that the pedestrian bridge is maintained free of snow and other obstructions. The exact requirements for this agreement will be developed later in the project process.

It is assumed that the project as scoped can move through the development process within 2 years from the time that the project is defined, with the hope that the deck can be replaced before any other work is required on the bridge or public safety is compromised in any way.

VIII. Appendices

- Site Pictures
- Town Map
- Bridge Inspection Report
- Hydraulics Memo
- Preliminary Geotechnical Information
- Natural Resources Memo
- Hazardous Waste Sites
- Archaeology Memo
- Historic Memo
- Stormwater Memo
- Utility Information
- Amenities Policy
- Crash Data
- Detour Routes
- Plans
    - Existing Conditions
    - Proposal
        - Typical Sections
        - Layout – Alt 1 & 2
        - Profile – Alt 1 & 2
        - Layout – Alt 3
        - Profile – Alt 3
    - Phasing
    - Temporary Bridge Layout

Support from Previous Repair Work, Deteriorated Deck, and Steel Beam Corrosion

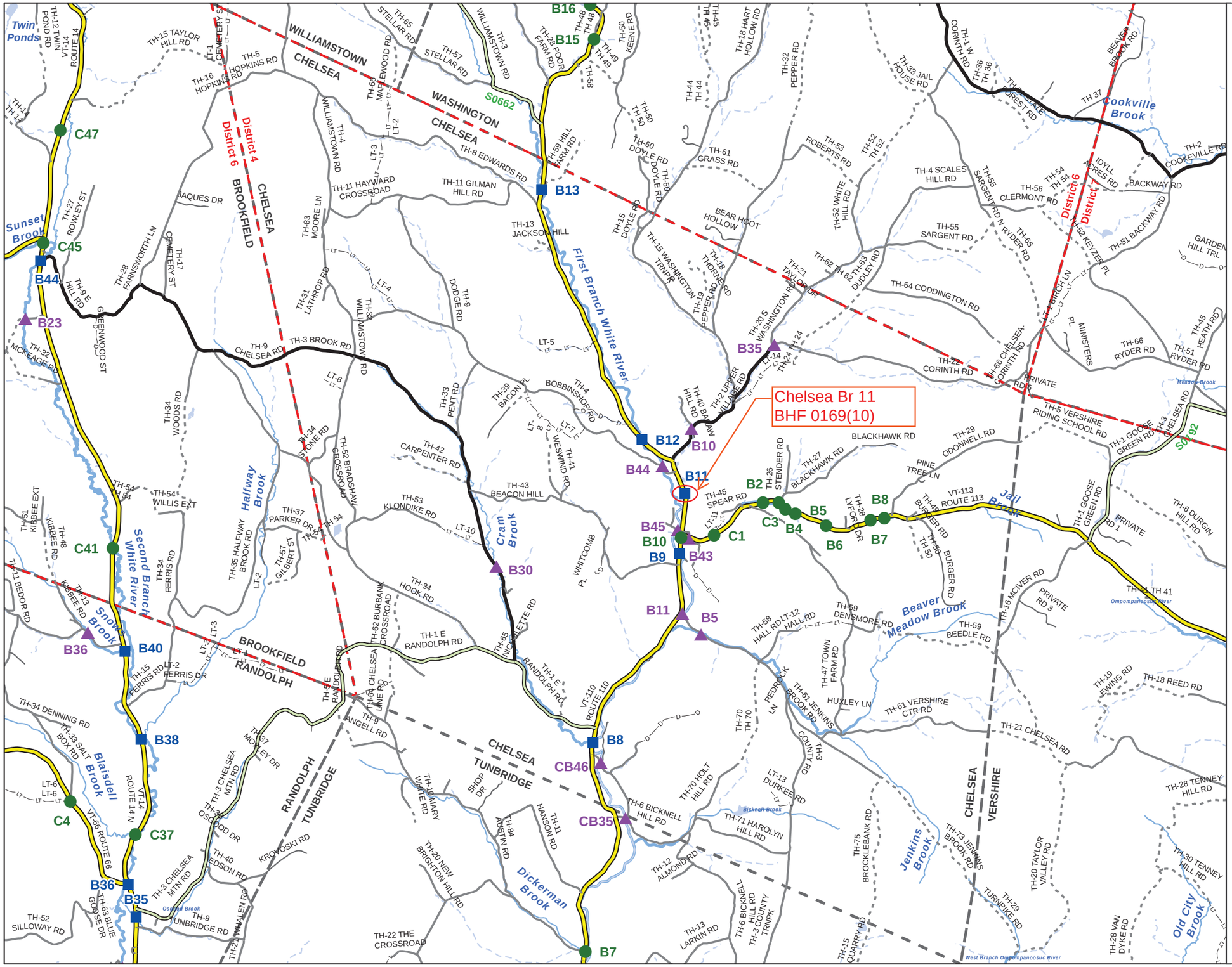
Deteriorated fascia deck and steel beam

Looking south over the bridge

Looking north over the bridge

Looking upstream from the bridge

Looking downstream from the bridge


Chelsea Br 11
BHF 0169(10)
WILLIAMSTOWN
CHELSEA
WASHINGTON
CHELSEA
BROOKFIELD
CHELSEA
RANDOLPH
BROOKFIELD
CHELSEA
TUNBRIDGE
RANDOLPH
TUNBRIDGE
CHELSEA
VERSHIRE
District 4
District 6
District 7
First Branch White River
Second Branch White River
Sunset Brook
Twin Ponds
Halfway Brook
Cram Brook
Cookville Brook
Jail Brook
Beaver Meadow Brook
Jenkins Brook
Dickerman Brook
Old City Brook
Blaisdell Brook
Snow Brook
S0662
S0192
B16
B15
B13
B44
B23
B35
B12
B10
B11
B2
B45
B9
B43
B5
B8
B7
B40
B38
B36
CB46
CB35
C47
C45
C41
C4
C37
C1
C3
C5
C6
C7
C8
Scale 1:58,382
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
CHELSEA
ORANGE COUNTY
DISTRICT # 4

STRUCTURE INSPECTION, INVENTORY and APPRAISAL SHEET

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

Inspection Report for CHELSEA **bridge no.:** 00011 **District:** 4

Located on: VT 00110 ML **ove** BROOK **approximately** 0.3 MI N JCT. VT.113 **Owner:** 01 STATE-OWNED

CONDITION

Deck Rating: 4 POOR

Superstructure Rating: 6 SATISFACTORY

Substructure Rating: 6 SATISFACTORY

Channel Rating: 7 GOOD

Culvert Rating: N NOT APPLICABLE

Federal Str. Number: 200169001109042

Federal Sufficiency Rating: 065.5

Deficiency Status of Structure: SD

AGE and SERVICE

Year Built: 1939 **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): 35

ADT: 002500 **% Truck ADT:** 06

Year of ADT: 1998

GEOMETRIC DATA

Length of Maximum Span (ft): 0082

Structure Length (ft): 000086

Lt Curb/Sidewalk Width (ft): 0.5

Rt Curb/Sidewalk Width (ft): 5

Bridge Rdwy Width Curb-to-Curb (ft): 24

Deck Width Out-to-Out (ft): 32

Appr. Roadway Width (ft): 028

Skew: 50

Bridge Median: 0 NO MEDIAN

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

Feature Under: FEATURE NOT A HIGHWAY OR RAILROAD

Min Vertical Underclr (ft): 00 FT 00 IN

STRUCTURE TYPE and MATERIALS

Bridge Type: ROLLED BEAM

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

Kind of Material and/or Design: 3 STEEL

Deck Structure Type: 1 CONCRETE CIP

Type of Wearing Surface: 6 BITUMINOUS

Type of Membrane 0 NONE

Deck Protection: 0 NONE

APPRAISAL *AS COMPARED TO FEDERAL STANDARDS

Bridge Railings: 0 DOES NOT MEET CURRENT STANDARD

Transitions: 1 MEETS CURRENT STANDARD

Approach Guardrail 1 MEETS CURRENT STANDARD

Approach Guardrail Ends: 1 MEETS CURRENT STANDARD

Structural Evaluation: 6 EQUAL TO MINIMUM CRITERIA

Deck Geometry: 2 INTOLERABLE, REPLACEMENT NEEDED

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)** 12 **X-Ref. BrNum:**

INSPECTION SUMMARY and NEEDS

7/17/13 The structure is in need of a full deck replacement and beams need extensive cleaning and painting. JWW/JDM

04/12/2011 The deck is in need of full replacement. Local deck failure may occur anytime anywhere. The concrete spindles on both sides are in need of full replacement. The steel is in need of full paint recoat. PLB

11/09/2009 - Confirm deck repair with full depth patch made by district forces. 04/09/2009 - The bridge deck needs replacement. Steel superstructure and the concrete abutments are still quite good and can easily be rehabilitated. C.M. sent regarding possible full depth hole formation in bay #3. - MJ/DS

11/05/2007 - The bridge is in fairly good condition with the exception of the concrete deck which is relatively poor. Leakage and deterioration along the soffit indicates possible full depth failure may form in beam bay #2 or #3 adjacent to beam #3. Bridge needs major reconstruction with full deck replacement and extensive cleaning and painting of the structural steel. In the meantime the sidewalk could use concrete patch repair work and the deck drains should be eliminated to deter further deterioration to the steel superstructure. The original Westinghouse light poles could also be salvaged to retain for the new deck/rail system. - MLL

VT AGENCY OF TRANSPORTATION PROGRAM DEVELOPMENT DIVISION

HYDRAULICS UNIT

TO: Chris Williams, Structures Project Manager

FROM: Brian Bennett, Hydraulics Project Engineer (McFarland Johnson)
via Nick Wark, VTrans Hydraulic Engineer

DATE: September 25, 2012

SUBJECT: CHELSEA – BHF-0169(10) – VT 110 Bridge 11 over South Washington Brook

---

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 1939 based on available information. The bridge is owned by the State. The bridge is a 2-lane single-span constructed of rolled beams having a concrete deck with an asphalt surface. There is also a sidewalk on the East side of the bridge. The total width of bridge is approximately 32 feet normal to the roadway. The normal clear span to the river between the abutment faces is approximately 50 feet, but the bridge is significantly askew to the river at approximately 50° which has a clear span of approximately 77 feet along the roadway. The effective width of the bridge along the river when accounting for the skew is approximately 42 feet. The total existing superstructure depth is approximately 4 feet based on record information and verified with field measurements. The existing abutments are cast-in-place concrete. These abutments are basically parallel with the stream channel at this location. The approximate maximum height to the bottom of the superstructure to the streambed varies between approximately 5.5 - 7 feet. The structure is located on an incised channel just downstream of a small bend in the river having a wide floodplain area downstream of the bridge located approximately 600 feet upstream of its confluence with the 1st Branch of the White River.

The Q_{50} design event flow does not pass through the existing structure with large events going around the Left (South) abutment with overtopping of the roadway and upstream overtopping of the roadway on the Right (North) Bank. However, the Q_{10} flow event passes through the structure based with approximately 1.0-foot of freeboard based on our analysis of the Existing Conditions. There are a significant amount of site constraints for this bridge location which include existing utilities, streets, a multiple building access road and houses located adjacent to the bridge location. We did not evaluate the scour for the existing conditions or any proposed bridge configurations as part of the preliminary design. Scour calculations will be performed during final hydraulics.

Recommendations

When reviewing possible options, it is apparent that a replacement bridge meeting the hydraulic standard cannot be achieved for this location without significant modifications to the area surrounding the bridge (i.e. remove buildings, modify roadways, relocate utilities, etc.). The bridge location has an extreme number of site constraints by being located in a village setting with a major multiple building access road, utilities and houses which limit the bridge span and vertical roadway geometry. To further restrict the site conditions, the existing bridge is located just upstream of a very flat natural floodplain area at the confluence of the South Washington Brook and the 1st Branch of the White River. Therefore, the bridge option selection criteria should be to provide a bridge opening that does not restrict the bank full width, nor provide an unrealistic widening, of the existing

channel, as well as not create any worse backwater flooding conditions than the existing conditions.

It has been assumed a replacement structure will be located in the existing roadway alignment based on the site constraints. It is also anticipated the proposed deck elevations will be similar to the Existing Conditions. For a replacement structure, we have anticipated that the proposed abutments will be vertical face concrete abutments with sloped stone fill scour protection placed in front of the abutments.

Based on our analysis using a new structure, the recommendation will be to use a bridge having a 52-foot clear span normal to the stream channel (between the abutment faces) with a low beam elevation at or above 829.3 feet with stone fill protection in front of the abutments. The actual clear span of the bridge along the roadway will be approximately 81 feet based on the 50° skew of the bridge. To match the existing roadway alignment along the 50° skew, the bridge should also have the abutments parallel to the stream. The proposed wider structure will not constrict the stream channel width and be within the recommended VANR Bank Full Width criterion (i.e. no greater than 1.2 x Bank Full Width estimated at 44 feet by the equation). The access road near the Left (South) abutment will continue to allow large flood events to overtop the roadway and act as a relief channel for flooding events or in the event of a blockage of the bridge opening. The roadway will also continue to overtop VT 110 approach on the Right (North) bank during large flood events. It is noted that this option passes the Q_{10} flow event with about 1.0 foot of freeboard which is basically the same as the Existing Conditions. The recommended option also has stage elevations which are approximately 0.5 feet lower than the Existing Conditions for Q_{50} flow event, but still approximately 2.2 feet above the low beam elevation. The stage reduction from the Existing Conditions is due to the minor widening of the span and the proposed minor modifications of steepening the stone slope fill on the Left (South) abutment.

As noted above, scour was not reviewed during the preliminary design. However based on the velocities from the analyses and evidence from the site, it is anticipated that Type 3 Stone Fill will be necessary for armoring the abutments and channel banks near the replacement structure.

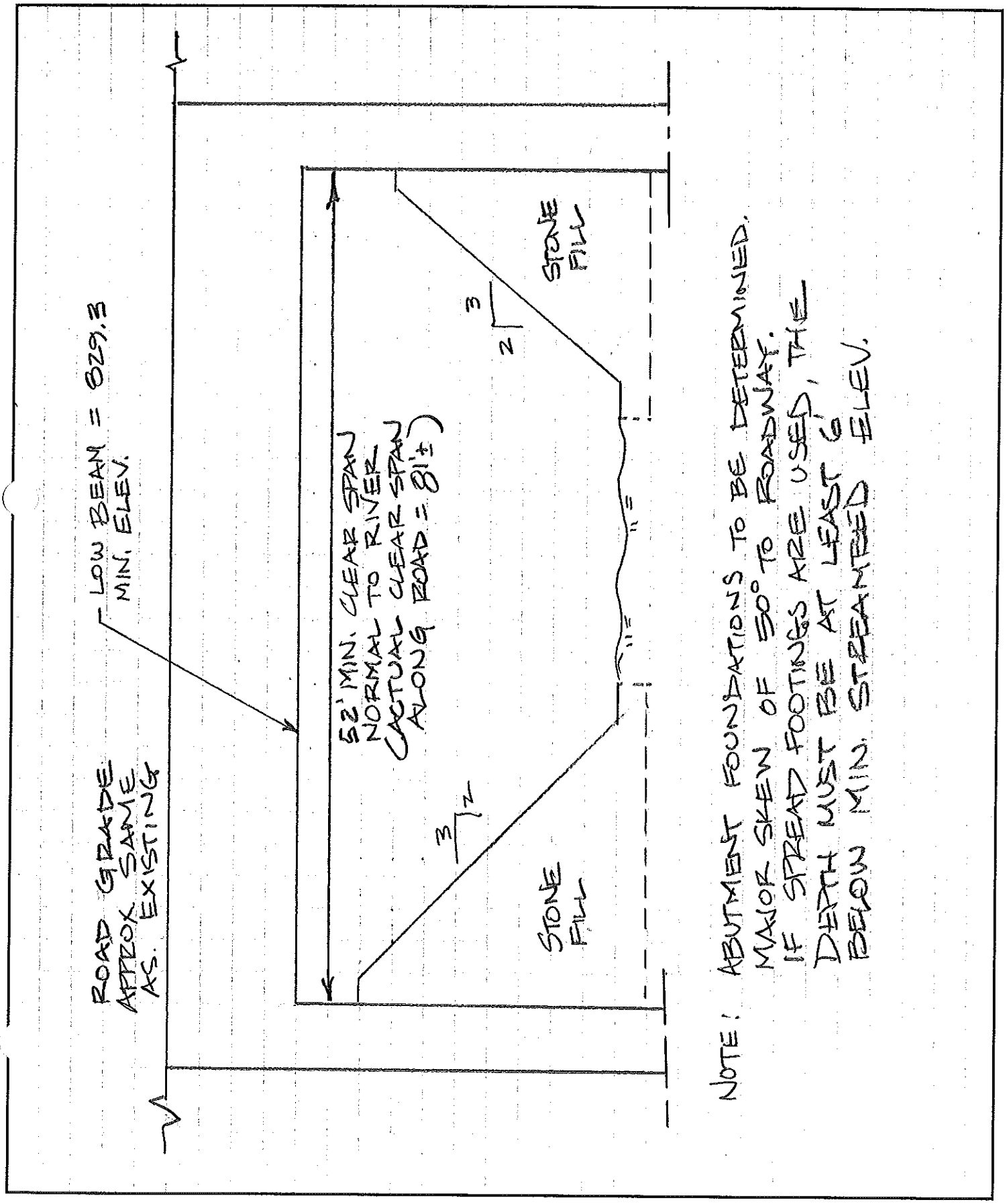
<u>Temporary Bridge</u>
It is unclear whether a temporary bridge will be used during the construction of the new bridge, but this issue will need to be resolved prior to final hydraulics.

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

BMB
cc: Hydraulics Project File via NJW
Hydraulics Chrono File

VTrans Working to Get You There
Vermont Agency of Transportation

JOB CHELSEA VT110 BR11
BHF-0169(10) 12C152
CALCULATED BY BMB DATE 9-13-12
CHECKED BY NJW DATE 9-25-12
SCALE N.T.S.



AGENCY OF TRANSPORTATION **OFFICE MEMORANDUM**

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

LAR CCB

From: Laura Ripley, Geotechnical Intern, via Christopher C. Benda P. E., Soils and Foundations Engineer

Date: June 18, 2012

Subject: Chelsea BHF 0169(10) Preliminary Geotechnical Information

1.0 INTRODUCTION

The Soils and Foundations Unit within the Materials and Research Section has performed a preliminary geotechnical investigation for Bridge No. 11, located on Route 110 in the town of Chelsea, VT. This structure is located about 0.3 miles north the intersection of VT 110 and VT 113 and crosses over the first branch of the White River. This report includes a site description, available data, and any field observations that were pertinent. The materials referenced in this investigation include: VTrans boring files and record plans, Agency of Natural Resources (ANR) water well logs, USDA Surficial Geologic maps, and VTrans Bridge Inspection Photos.

2.0 SUBSURFACE INVESTIGATION

2.1 Previous Projects

Record plans were recovered for Bridge No. 11, however no subsurface information was available. The plans provide details for the abutments on either side of the bridge, which contain steel reinforced bulkheads for bank protection. The associated records also indicated that a detour of 3.6 additional miles was available.

2.2 Water Well Logs

The Agency of Natural Resources (ANR) provides published water well logs, which were referenced with data from wells that were within a 2000 foot radius. The data provided estimated for the depth to bedrock and expected soils types encountered on the site. It should be noted that these boring logs were developed and provided by drilling companies whose employees may have had little to no formal training in identifying soil and rock. The corresponding well locations are highlighted in Figure 1.

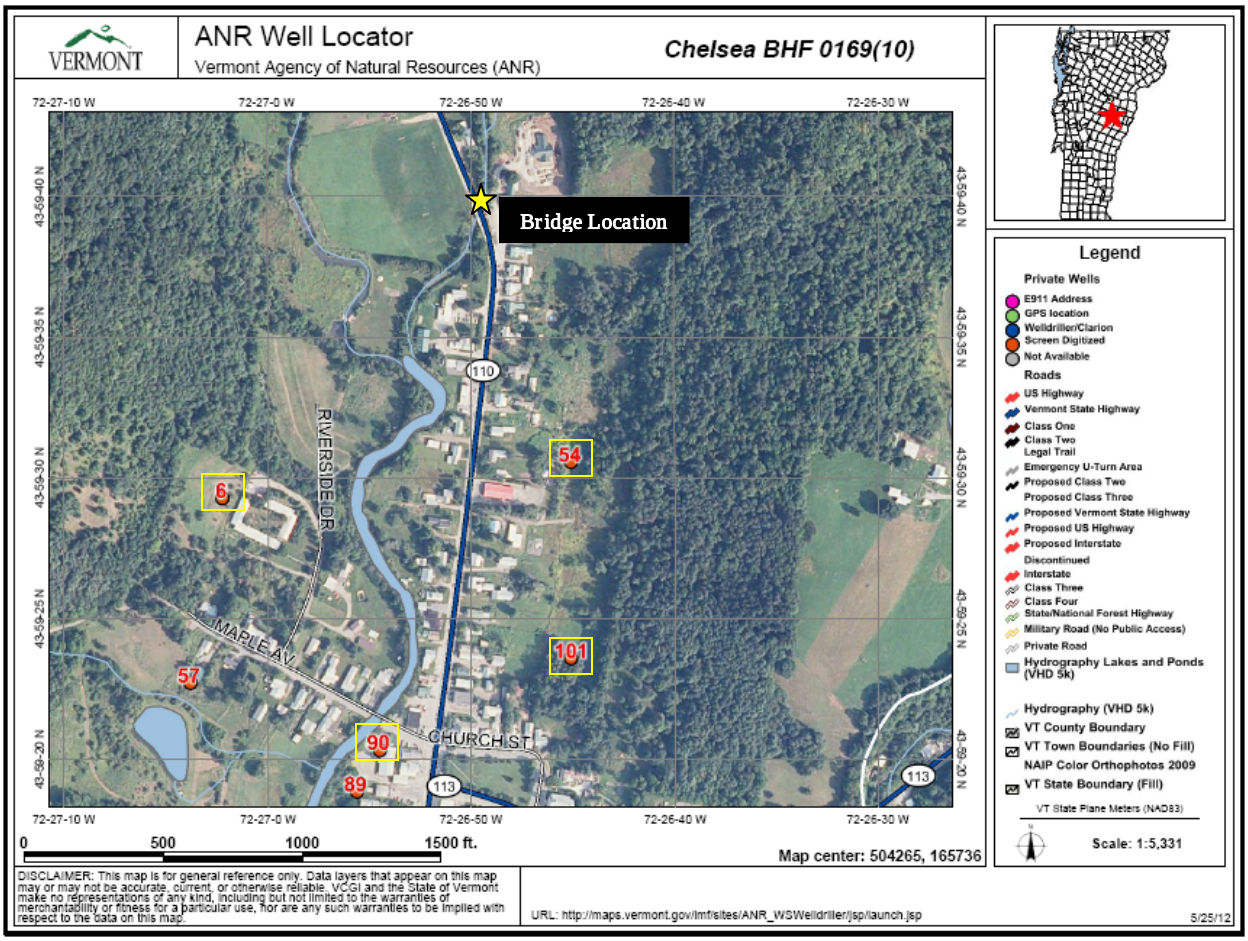


Figure 1. Site map with well locations.

Four wells were identified within the radius, and the information for each is listed in Table 1.

Table 1. Well log descriptions of surrounding sites.

Well Number	Distance From Project (feet)	Depth to Bedrock (feet)	Overburden Material
6	1400	15	Topsoil broken rock and much
54	950	26	Boney sandy gravel
101	1650	12	Dirty sandy gravel; wet sand
90	1800	15	Gravel; course sand

2.3 USDA Environmental Interest Locator

The U.S. Department of Agriculture (USDA) provides online maps with data locating potential environmental hazards. A hazardous waste site was identified approximately 150 feet from the bridge, as seen in Figure 2.

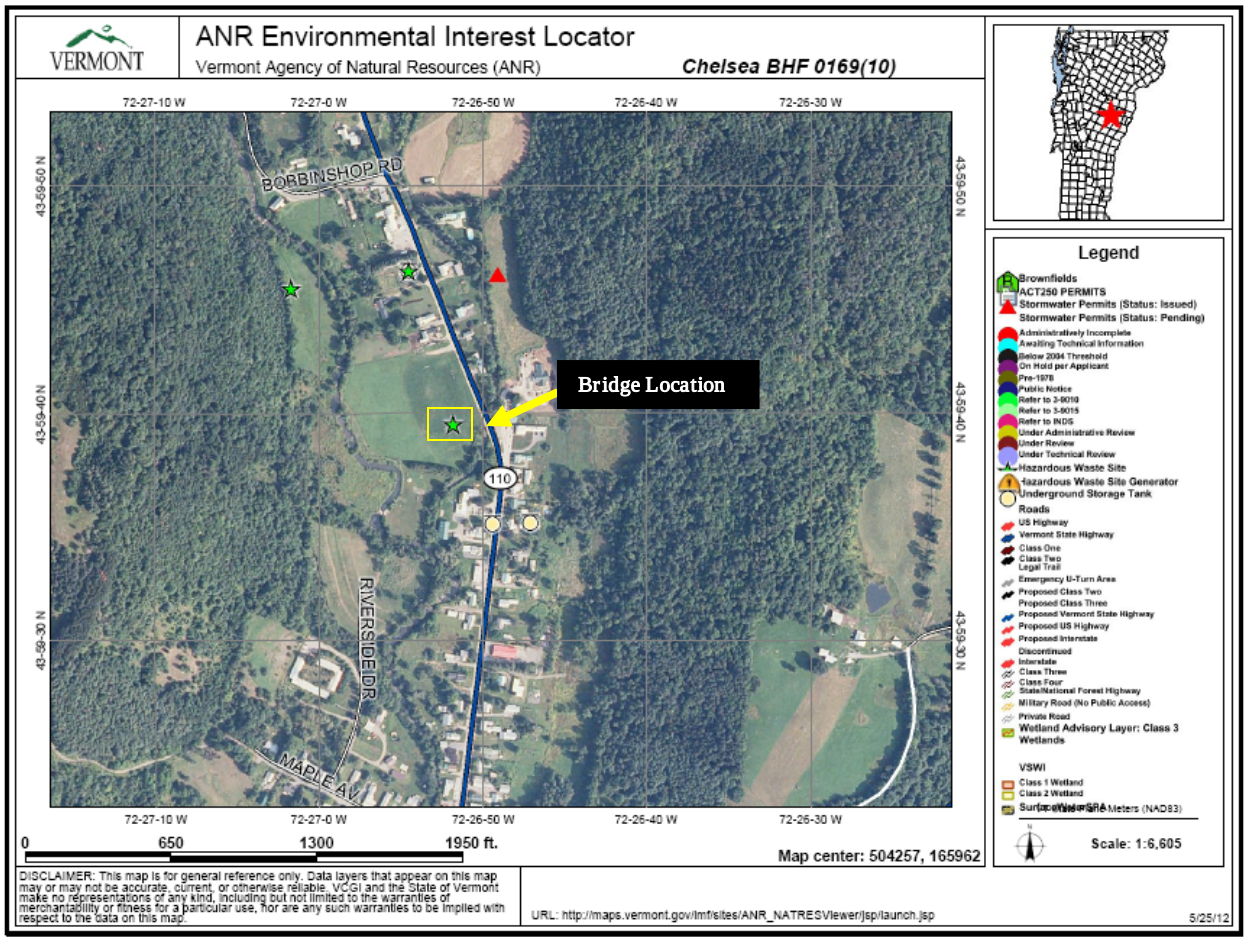


Figure 2. Hazardous waste site in proximity to Bridge No. 11.

This site (No. 951809) was contaminated with gasoline in 1995; but as of 2005 the groundwater monitoring showed no signs of contamination and it was assigned a "Site Management Activity Completed". Further details may need to be obtained from the Department of Environmental Control, should this area directly obstruct construction and boring retrieval.

2.4 USDA Soil Survey

The U.S. Department of Agriculture provides online geology maps with published soil data. These indicated that the existing soils at the project site consist of Hadley very fine sandy loam. These soils are typically very deep to bedrock and well draining, with a water table around 4.0 – 6.0 feet.

2.5 USGS Bedrock Maps

The United States Geologic Survey (USGS) publishes online bedrock maps with subsurface information. The data corresponding to this site location indicates that the bedrock conditions consist of phyllite and metalimestone, and are described as "*dark-gray to silvery-gray, lustrous, carbonaceous muscovite-biotite-quartz (+/-garnet) phyllite containing abundant beds of punky-brown-weathering, dark-bluish-gray micaceous quartz-rich limestone in beds ranging from 10 cm to 10 m thick.*"

3.0 FIELD OBSERVATIONS

A site visit was conducted on June 7, 2012. Pertinent information was gathered in order to determine any potential issues with boring observations or design considerations.

Figure 3. View of existing bridge, facing north.

Overhead utilities were noted on the east side of the road, as well as a water main near the northeast corner of the site on the surrounding private property. A 2-inch electrical conduit cast in concrete was noted along the east side of the structure, as well as two 5-inch conduits along the west side. A posted sign marking an underground telephone in the northwest corner to the site, offset about 10 feet from pavement. The streambed consisted of many medium sized cobbles, with little to no boulders. There was medium to large sized rip-rap placed along the banks, however bedrock was not noted anywhere along the stream.

This bridge is located in an urban area of Chelsea and there exists several nearby houses, which could also pose a potential issue during construction and drilling; this proximity is displayed in Figure 4.

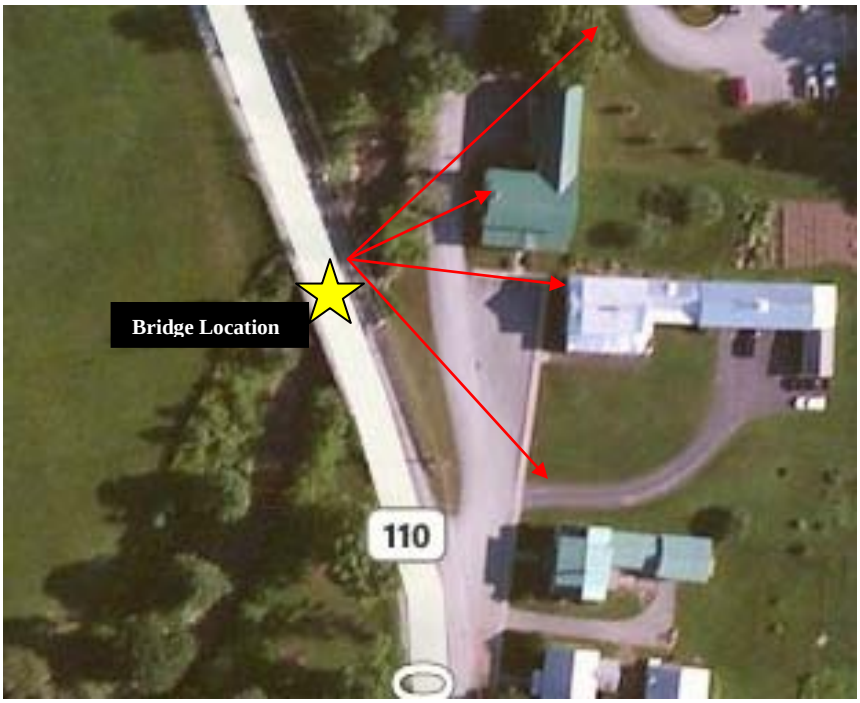


Figure 4. Bridge proximity to residential neighborhoods.

4.0 RECOMMENDATIONS

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

- Cantilevered stemwall on spread footings
- Pile caps on a single row of H-piles
- Stub abutment on MSE walls

It is recommended that a minimum of two borings drilled to bedrock be taken at opposite ends of the bridge be taken in order to assess the subsurface conditions. The suggested location of these samples is in the roadway, with the relative area pending on the location of the underground utility lines marked by Dig-Safe. An additional two hand steel soundings can be taken at opposite corresponding ends in order to obtain more accurate bedrock information if bedrock is encountered at shallow depths. If any variable conditions are noted, the recommendations should be reevaluated.

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: Project File/CCB
LAR

AGENCY OF TRANSPORTATION **OFFICE MEMORANDUM**

TO: Lee Goldstein, Environmental Specialist

FROM: John Lepore, Transportation Biologist

DATE: April 2, 2012

SUBJECT: Chelsea BHF 0169 (9) & (10)
VT 110 Br. 9 & 11 over First Branch White River

The purpose of this memorandum is to let you know that only regulated resource in this immediate area is the First Branch itself. Wetlands, species/habitat(s) and agricultural soils are all absent.

There First Branch is also not classified as Essential Fish Habitat.

There is no preference as to the where a temporary structure would be placed, but I do ask that the entire channel (beyond OHW) be spanned for ease of permitting…

If you have any questions about this, call me at 828-3963.

Hazardous Waste Sites

Vermont Agency of Natural Resources

vermont.gov

LEGEND

Landfills
- OPERATING
- CLOSED

Hazardous Waste Site

Hazardous Waste Generators

Brownfields

Underground Storage Tank (w

Town Boundary

NOTES

Map created using ANR's Natural Resources Atlas

396.0 0 198.00 396.0 Meters

WGS_1984_Web_Mercator_Auxiliary_Sphere 1" = 650 Ft. 1cm = 78 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: Lee Goldstein, VTrans Environmental Specialist

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

Date: 6/1/2012

Subject: Chelsea BHF 0169(10) – Archaeological Resource ID

Lee,

A field visit for Chelsea BHF 0169(10) was conducted on 5/25/2012 with a finding of no archaeological resources within the general project area. The overall site rates low on the environmental predictive model for precontact archaeology. Therefore, there are *no archaeological resources* present within the current project area.

Please feel free to contact me with any questions or concerns,

Brennan

Brennan Gauthier
VTrans Assistant Archaeologist
tel. 802-828-3965
Brennan.Gauthier@state.vt.us

VTrans Working to Get You There
Vermont Agency of Transportation

Goldstein, Lee

From: O'Shea, Kaitlin
Sent: Tuesday, June 26, 2012 3:13 PM
To: Goldstein, Lee
Subject: Chelsea BHF 0169(10) Historic Resource ID

Lee,

I have completed the historic resource ID for Chelsea BHF 0169(10): Bridge 11 is a historic concrete bridge and is located within a historic district. These are Section 106 and Section 4(f) properties. There is a town owned park/playing fields at the northwest corner of the bridge. This is a Section 4(f) resource. All of these resources have been digitally mapped in Arcmap in the historic preservation database.

Thanks,
Kaitlin

Kaitlin O'Shea
Historic Preservation Specialist
Vermont Agency of Transportation

802-279-0869
Kaitlin.O'Shea@state.vt.us

Goldstein, Lee

From: Armstrong, Jon
Sent: Thursday, May 17, 2012 3:42 PM
To: Goldstein, Lee
Subject: RE: Environmental Request NOTIFICATION: CHELSEA BHF 0169(10)

Hi Lee,
I have no stormwater related concerns of note for this project.

Jonathan B. Armstrong, PE
VTrans Stormwater Management Engineer
(802) 828-1332

"*We forget that the water cycle and the life cycle are one*."
- Jacques Cousteau

```
><((((º>`·.¸¸.·´¯`·.¸.·´¯`·...><((((º>¸.
·.¸.,..´`·.. ><((((º>`·.¸¸.·´`·.¸.·´¯`·...><((((º>
```

From: Goldstein, Lee
Sent: Tuesday, March 27, 2012 4:43 PM
To: Gingras, Glenn; Armstrong, Jon; O'Shea, Kaitlin; Gauthier, Brennan
Subject: FW: Environmental Request NOTIFICATION: CHELSEA BHF 0169(10)

Hi Pilot team—resource ID requested!
Thanks…
Lee

Lee D.R. Goldstein, MLA
Environmental Specialist, SE Region
VTrans PDD, Environmental Section
Vermont Agency of Transportation
1 National Life Drive--Drawer 33
Montpelier, VT 05633
e-mail: lee.goldstein@state.vt.us
Tel.: 802-828-3985 Fax: 802-828-2334

From: EnterpriseSQL@state.vt.us [mailto:EnterpriseSQL@state.vt.us]
Sent: Tuesday, March 27, 2012 12:06 PM
To: Goldstein, Lee; Narowski, John; Ramsey, Jeff; Slesar, Chris
Cc: Magnan, Steph; Spencer, Lisa
Subject: Environmental Request NOTIFICATION: CHELSEA BHF 0169(10)

Please do not reply to this email.

NOTIFICATION EMAIL

The following Environmental\Hydraulic Request has been successfully submitted:

Date Requested: Mar 27 2012 12:06PM
Project Request Type: Capital Program

Pin: 12C152

Project Name and Number: CHELSEA BHF 0169(10)

Request Activity: Arch\Hist\Bio Resource Identification

Other Request Activity Description: N/A

Proposed Due Date: May 2 2012 12:00AM

File(s): Z:\Projects-Engineering\ChelseaBHF0169(10)12c152\Structures\Memos\2012\CHELSEA_Town_Map_BR11.pdf

Comments: The resource ID will be conducted by a pilot group under PDWP GIS/GPS work plan. This group is part of the GIS Experimental work plan and is researching innovative ways to streamline the ID process.

Contact Information:

Name: WILLIAMS, CHRISTOPHER (Structures)

Phone Number: (802) 828-0051

Email: chris.williams@state.vt.us;

Additional Contact(s): gary.sweeny@state.vt.us;

Fillbach, Tim

From: Driscoll, Kristin
Sent: Thursday, June 14, 2012 2:15 PM
To: Williams, Chris
Subject: FW: Chelsea BHF 0169(10) VT 110, B-11 - Request For Information
Attachments: chelsea bhf 0169[10] mun ult.pdf

Chris,
Attached please find a plan I retained form the town showing the water and sewer in the vicinity of the bridge. Please note that not all of the information is currently shown on the survey. There are aerial utilities (Tel and Elec) that run along the east side of the bridge. On the west side there is currently on old active (?) toll line underground delineated by the concrete post and seems to be in the conduit on the bridge (can't seem to find any plans on this). FairPoint believes it is not in use any longer, and is looking into abandoning it, when it needs to be relocated.
Let me know if you have any further questions. As the plans develop, I will look into relocating the utilities.
Thanks

Kristin Driscoll
Vermont Agency of Transportation
Utilities and Permits, Project Supervisor
One National Life Dr.
Montpelier, VT 05633-5001
Tel. (802)828-0511
Fax(802)828-5742
Kristin.driscoll@state.vt.us

From: Keller, Craig
Sent: Tuesday, May 22, 2012 7:52 AM
To: Driscoll, Kristin
Cc: Gilman, Theresa
Subject: FW: Chelsea BHF 0169(10) VT 110, B-11 - Request For Information

---

From: Williams, Chris
Sent: Monday, May 21, 2012 8:37 AM
To: Wark, Nick; Keller, Craig; Petrovs, Harry; Ramsey, Jeff; Benda, Chris
Subject: Chelsea BHF 0169(10) VT 110, B-11 - Request For Information

Chelsea BHF 0169(10) VT 110, B-11

Request For Information (RFI) for the following tasks:

030.01.03 Hydraulics - Preliminary
030.01.04 Utilities - Existing
030.01.05 ROW - Existing
030.01.06 Archaeological Resource Identification
030.01.07 Historical Resource Identification
030.01.08 Biological Resource Identification
030.04.05 Geotechnical Assessment

Greetings,

We will soon be developing alternatives to address the needs at the subject project. We are at a very early stage of development but are requesting information from your sections to help us evaluate these alternatives. We feel that getting you involved in these projects at an early stage will be advantageous for all parties. If you are unclear on what information is being requested, please feel free to contact me immediately. We would also be willing to meet with you individually or as a group to discuss more details of this project.

Some of you receiving this request have previously received a list of all the projects being scoped in the PIIT to assist you in coordinating staff, assigning resources and maximizing efficiencies. In some cases, it is even possible that your task has already been performed or deemed to be unnecessary. Regardless of this, I am providing this information to everyone and in some cases it can simply be considered a project update.

Project Scope:
The existing structure is a single span, rolled beam with concrete deck structure approximately 86' long. The scope of the project is undetermined at this time. Maintenance of traffic may be accomplished using a temporary bridge.

Project Schedule:
These tasks are being monitored in the Artemis project schedule. Please refer to Artemis for the expected finish date for your task and let me know if this presents a problem.

Project Information:
PIN - 12C152

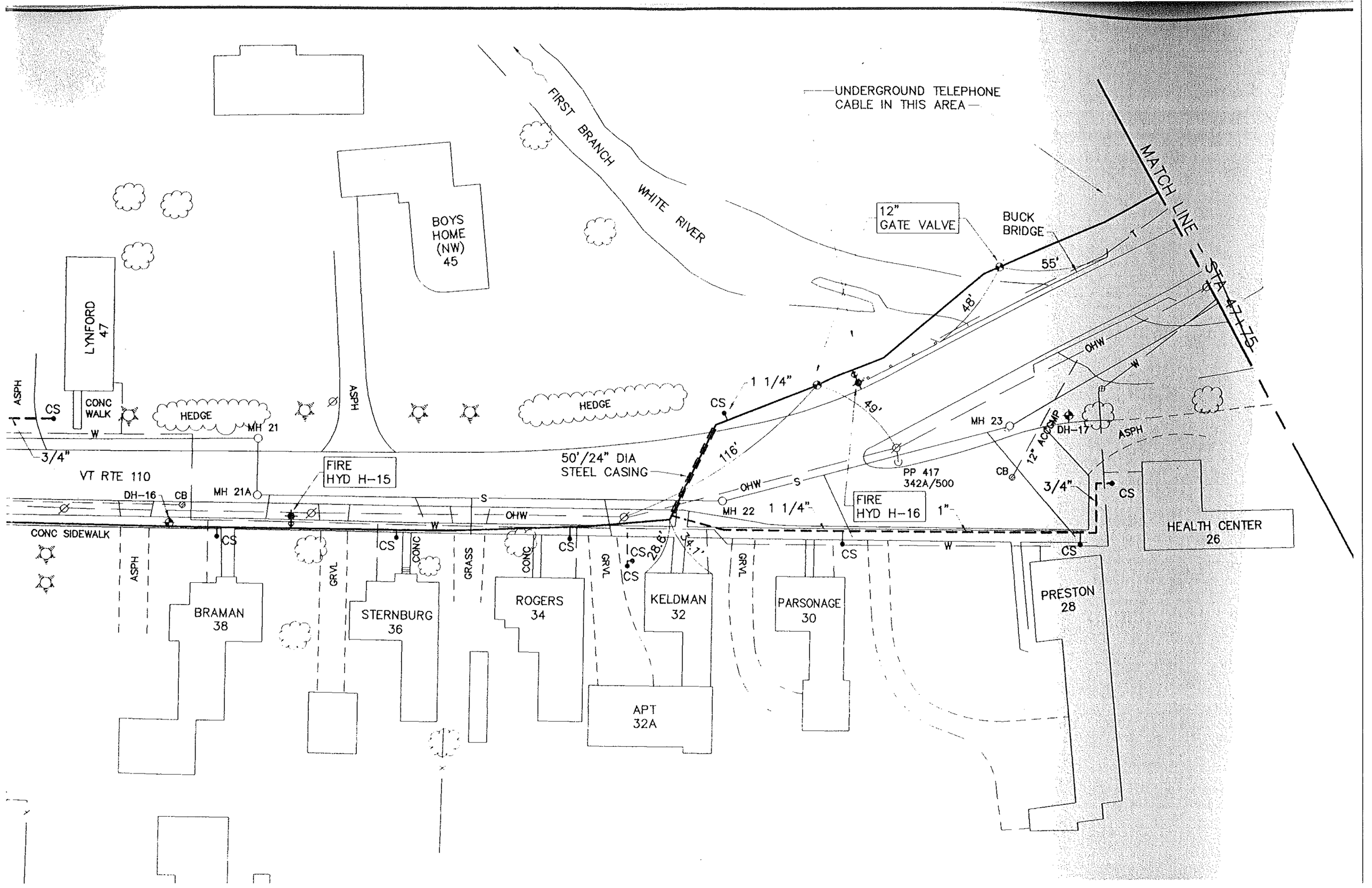
EA - 0169010-100

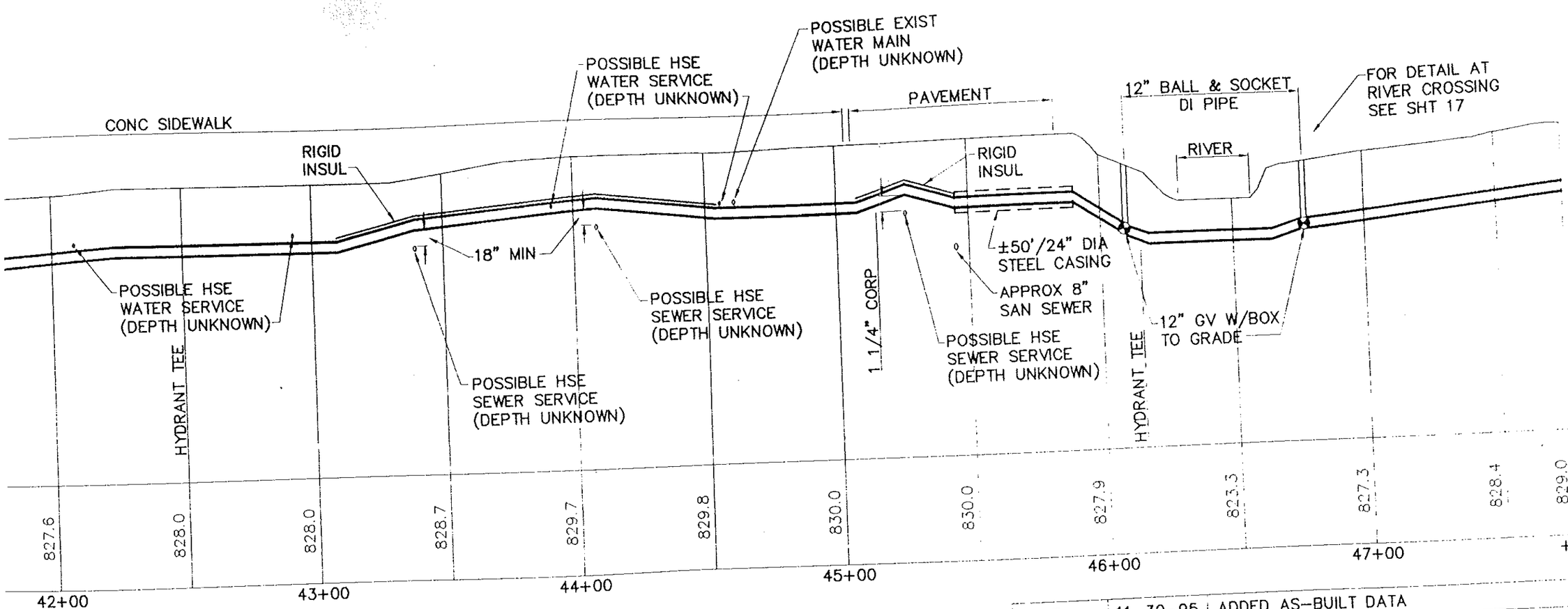
Town Map
Z:\Projects-Engineering\ChelseaBHF0169(10)12c152\Structures\Memos\2012\CHELSEA_Town_Map_BR11.pdf

Existing Conditions plan set
M:\Projects\12c152\Structures\PDF\Submittals\Existing Conditions-May 2012\s12c152-Existing Conditions-05182012.pdf

Much more information is also available on the Z drive under the Structures folder. I recommend that you review all existing information prior to beginning your work. It is possible that in some cases, performing a desk review to research available information may eliminate a field visit and/or any work by your section.

Let me know if you have questions.
thanks,
chris


UNDERGROUND TELEPHONE CABLE IN THIS AREA
FIRST BRANCH WHITE RIVER
MATCH LINE
STA 47+75
12" GATE VALVE
BUCK BRIDGE
55'
48'
49'
116'
1 1/4"
BOYS HOME (NW) 45
LYNFORD 47
CONC WALK
HEDGE
MH 21
ASPH
CS
W
3/4"
VT RTE 110
DH-16
CB
MH 21A
FIRE HYD H-15
50'/24" DIA STEEL CASING
S
OHW
MH 22
1 1/4"
FIRE HYD H-16
1"
PP 417
342A/500
MH 23
DH-17
12" ACCOMP
3/4"
HEALTH CENTER 26
CONC SIDEWALK
GRVL
CONC
GRASS
28.6'
54.1'
BRAMAN 38
STERNBURG 36
ROGERS 34
KELDMAN 32
APT 32A
PARSONAGE 30
PRESTON 28



)FILE

Revision No.	Date	Description	D
7	11-30-95	ADDED AS-BUILT DATA	D
6	1-17-95	ENGINEER AND ANR FINAL REVIEW COMMENTS	D
5	11-11-94	MISCELLANEOUS REVISIONS	D
4	6-22-94	REVISIONS PER ANR REVIEW COMMENTS	D
3	4-4-94	ENGINEERS REVIEW	

WATER SYSTEM IMPROVEMEN

FOR THE

TOWN OF CHELSEA, VERMONT

WATER MAIN PLAN AND PROFILE

THE ENGINEER'S SIGNATURE BELOW INDICATES THAT HE/SHE HAS REVIEWED THIS PLAN AND HAS AUTHORIZED SUBMITTAL TO THE REVIEWING AGENCIES. PLANS ARE NOT FOR CONSTRUCTION UNLESS SEALED BY THE ENGINEER.

STATE OF VERMONT
MARK P. YOUNGSTROM
No. 2077
REGISTERED PROFESSIONAL ENGINEER

RECORD DRAWING

SHOWN PICTORALLY
MAY NOT BE TO SCALE

VERMONT AGENCY OF TRANSPORTATION	ORIGINAL POLICY ADOPTED 11/02/2002	ORIGINAL POLICY IDENTIFIER 6013
POLICY MANUAL	EFFECTIVE DATE 12/06/2007	IDENTIFIER 6013.1
	RESPONSIBLE SECTION PDD	SUPERSEDES
SUBJECT: Enhancements to Transportation Projects	SCREEN/PAGE 1 OF 7	

STATUTORY REFERENCE/OTHER AUTHORITY: Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), as amended.

APPROVAL DATE: December 6, 2007

APPROVED BY: Neale F. Lunderville, Secretary of Transportation

PURPOSE/COMMENT: To establish Agency of Transportation policy on enhancements to transportation projects.

POLICY STATEMENT: This policy defines the use limits of VTrans-administered funds (including both state and federal non-earmark funds) to support enhancements or amenities to transportation projects. The policy applies to projects administered or developed by VTrans, as well as municipal projects administered under a cooperative agreement between VTrans and the municipality. This policy is part of VTrans' effort to conserve funding and resources for preservation of transportation facilities in keeping with "Road to Affordability" priorities.

1. Q. What are VTrans' priorities under the "Road to Affordability" as they pertain to enhancements and amenities?

A. Under the "Road to Affordability," VTrans will give priority to projects that:

- Preserve the functionality of existing transportation infrastructure;
- Minimize the need to acquire additional rights-of-way;
- Minimize the need for utility adjustments;
- Minimize impacts on environmental and historic resources;
- Incorporate designs which provide safe and efficient transportation;
- Promote economic opportunities for Vermonters;
- Foster the best use of the state's natural and economic resources consistent with the planning goals listed in 24 V.S.A. § 4302 as amended by Act No. 200 of the Acts of the 1987 Adj. Sess. (1988) and Act No. 115 of the Acts of the 2003 Adj. Sess. (2004); and
- Give appropriate consideration of local, regional and state agency plans.

2. Q. How will VTrans determine what elements are included in a project's scope?

A. To accomplish the goals of the "Road to Affordability" initiative, VTrans will financially support (with state and federal non-earmark transportation funds allocated to Vermont) only project elements that are functionally necessary to carry out the core purpose of a transportation project. Municipalities can add elements to a project as long as the municipality is willing to pay for their cost. See question 10 for details about adding elements to a project.

3. Q. What is meant by "functional necessity?"

A. **"**Functional necessity" means features, components, elements, or materials of a transportation project that are required by:

- State or federal law;
- Permit requirements;
- The "Vermont State Standards for the Design of Transportation Construction, Reconstruction and Rehabilitation on Freeways, Roads, and Streets;"
- Other adopted Vermont state design policies and manuals;
- Vermont Standard Construction Drawings; and
- Other applicable industry standard design manuals that are essential to safely construct, operate, and maintain the project.

These items are essential to the performance and integrity of the roadway or structure in question, and should result in the lowest life-cycle cost of the project.

4. Q. How is "functional necessity" analyzed when there is a specific goal or purpose associated with earmarked funds?

A. Work elements needed to accomplish the specific goals or purposes for which specific federal (usually termed "earmarks") or state funds have been granted are considered to be functionally necessary only if that work is required by one or more of the above-noted documents, or if the project elements are part of the core project.

5. Q. What is the "core project"?

A. The "core project" means those features or elements of a project that are:

- Functionally necessary;
- Preexist the current project and/or are subject to a preexisting finance and maintenance agreement between VTrans and a municipality; and
- Need to be disturbed as a result of the project.

Generally for roadways, the core dimensions are the "curb-to-curb" or "ditch–to-ditch" width of the existing roadway. For bridges, this width is generally the width of the deck and the existing width of the pavement and shoulders on the roadway approaches. The core of a project also extends vertically downward to the extent of any excavation required for construction of the pavement and drainage structure, or upward to accommodate traffic signals, signs, and clearance of overpasses.

Features required by state or federal permits and/or mitigation required by a federal environmental document also are considered to be part of the core project, even though they may be physically outside the boundaries of the “curb-to-curb” or “ditch-to-ditch” limits. Features or components added to the project to comply with state law, federal law, grant approvals (in the case of earmarked projects), or updates in design standards or procedures (for example, ADA compliance) are considered part of the core project.

6. Q. Are elements such as benches, under grounding of utilities, landscaping, ornamental lighting, ornamental fences, etc. considered functionally necessary?

A. These elements generally are not considered functionally necessary. However, these elements could be considered core to a project or functionally necessary if they are specified in the language of an earmark.

7. Q. Are pedestrian and bicycle facilities considered to be functionally necessary?

A. In keeping with the VTrans Policies on Pedestrians and Bicycles, appropriate accommodation of pedestrians and bicycles will be incorporated into all transportation projects. Appropriateness will be determined by the VTrans
Project Manager in consultation with his/her Program Manager and the VTrans Bicycle and Pedestrian and Safe Routes to Schools Managers.

8. Q. Who makes the determinations of functional necessity or core project?

A. Determinations as to functional necessity and core project are the responsibility of the VTrans project manager.

9. Q. Is there a process for reviewing such determinations?

A. A municipality can request that a project manager’s determination be reviewed by the VTrans program manager. A municipality can request further review by the Secretary of Transportation, whose determination is final.

10. Q. What if a municipality wishes to incorporate non-functional or non-core elements to a VTrans project?

A. If a municipality desires to have elements included in a project that are not determined to be functionally necessary, it can do so as non-participating costs if the municipality agrees by a Finance and Maintenance Agreement to fund 100 percent of the construction cost of those items as well as agree to maintain those items with 100 percent locally secured funds. However, for new projects or projects in the early design stage, VTrans must be notified of the municipality’s desire to include additional elements no later than the Conceptual Design phase of project development. Once

notified, the VTrans project manager will arrange for development of a Finance and Maintenance Agreement or an amendment to an existing Finance and Maintenance Agreement which will be sent to the municipality for review, approval and execution before VTrans moves forward with inclusion of the additional elements. The estimated costs of these elements will be included in the project's estimated costs for determining a project's benefit/cost ratio in the VTrans project prioritization system.

For projects currently in the design process or "pipeline" that have attained the level of accepted/approved "Preliminary Plans," the project manager will review the most current plan for consistency with this policy's definitions of Core Project and Functional Necessity. Those features determined by the project manager to be inconsistent with those definitions will be incorporated into a detailed listing. This listing will then be reviewed with VTrans' Program Management before being reviewed with appropriate municipal officials and before VTrans determines which features no longer will be eligible for VTrans' financial support.

After this review, VTrans may elect to continue its financial support for some items or elements that might otherwise be considered functionally unnecessary had the project not already been in the "pipeline." In these cases, the Agency's financial support will continue through construction only if the municipality agrees to pay for the amenity's future maintenance and/or replacement.

Those features which remain a part of the project either with VTrans financial support or at 100 percent municipal cost will be specifically listed in the Finance and Maintenance Agreement by amendment subsequent to the joint VTrans/municipal review as either financially supported by VTrans and maintained by the municipality or financially supported and maintained by the municipality.

The Finance and Maintenance Agreement will be modified subsequent to the joint VTrans/municipal review to include a provision that specifically indicates that non-functionally necessary or non-core project elements will be maintained for their useful life by the municipality at 100 percent municipal cost. Further project development will be suspended until the Finance and Maintenance Agreement is signed by the municipality.

11. Q. What does "financial support" mean?
A. "Financial support" means payment with non-earmarked funds. Earmarks are made by either the U.S. Congress or the Vermont State Legislature specifically for an amenity or enhancement. The Vermont Legislature simply including funding for a project in the annual Transportation Bill or Budget Adjustment Bill is not considered an earmark unless the legislation specifically specifies that the amenity or enhancement must be included in the overall project appropriation.

12. Q. Will inclusion of non-functional or non-core elements have an effect on a project's priority in the VTrans' prioritization systems?

A. The estimated costs of the non-functional or non-core elements that might remain in a project financially supported by VTrans will be included in the project's estimated costs for determining a project's benefit/cost ratio. Such inclusion could lower a project's priority.

The estimated costs of non-functional or non-core elements that will be borne entirely by the municipality will not be included in the project's estimated costs for determining a project's benefit/cost ratio in the VTrans project prioritization system. Excluding these costs will raise the project's benefit/cost ratio and could raise a project's priority.

13. Q. What is the effect of element inclusion in the Finance and Maintenance Agreement?

A. Upon inclusion in the Finance and Maintenance Agreement, only those elements specifically listed will be eligible for VTrans financial support. The assumed cost of these elements will also be included in the project's estimated cost for determining a project's benefit/cost ratio or cost in the VTrans Project Prioritization systems.

Additional non-functional or non-core elements that are subsequently desired by the municipality will only be included in a project if the municipality agrees to pay for the construction, maintenance and replacement of the elements.

14. Q. How does this policy relate to VTrans' Project Definition Team (PDT)?

A. Projects which have not advanced to the accepted/approved Preliminary Plans at the time of adoption of
this policy – including projects that have been processed through the PDT – will be reviewed by the VTrans project manager who will determine the functional necessity and core project elements for the project. The project manager will notify the municipality in which the project is located about his/her determination
and how that determination limits financial support. The project manager will inquire about the municipality's desire and ability to pay for and maintain work elements not determined to be functionally necessary. Finance and Maintenance Agreements will be appropriately modified to reflect the municipality's decision.

The project manager will also advise the municipality as to those projects that are to be scheduled for PDT review. The PDT process will be bound by this policy. Any amenities or enhancements that are deemed functionally unnecessary or not part of the core project are subject to the same financial constraints as any other VTrans project. The PDT has no authority to make its own financial decisions.

15. Q. How does this policy affect the freestanding Enhancement Program?

A. This policy does not affect the freestanding Transportation Enhancement Grant Program described in 19 V.S.A. § 38.

POLICY HISTORY
ORIGINAL POLICY ADOPTION DATE: 11/22/2002

REVISION NO: 1	**EFFECTIVE DATE: 12/06/2007**	**REASON: Affordability/Funding shortfall**
REVISION NO:	**EFFECTIVE DATE: __/__/____**	**REASON:**
REVISION NO:	**EFFECTIVE DATE: __/__/____**	**REASON:**

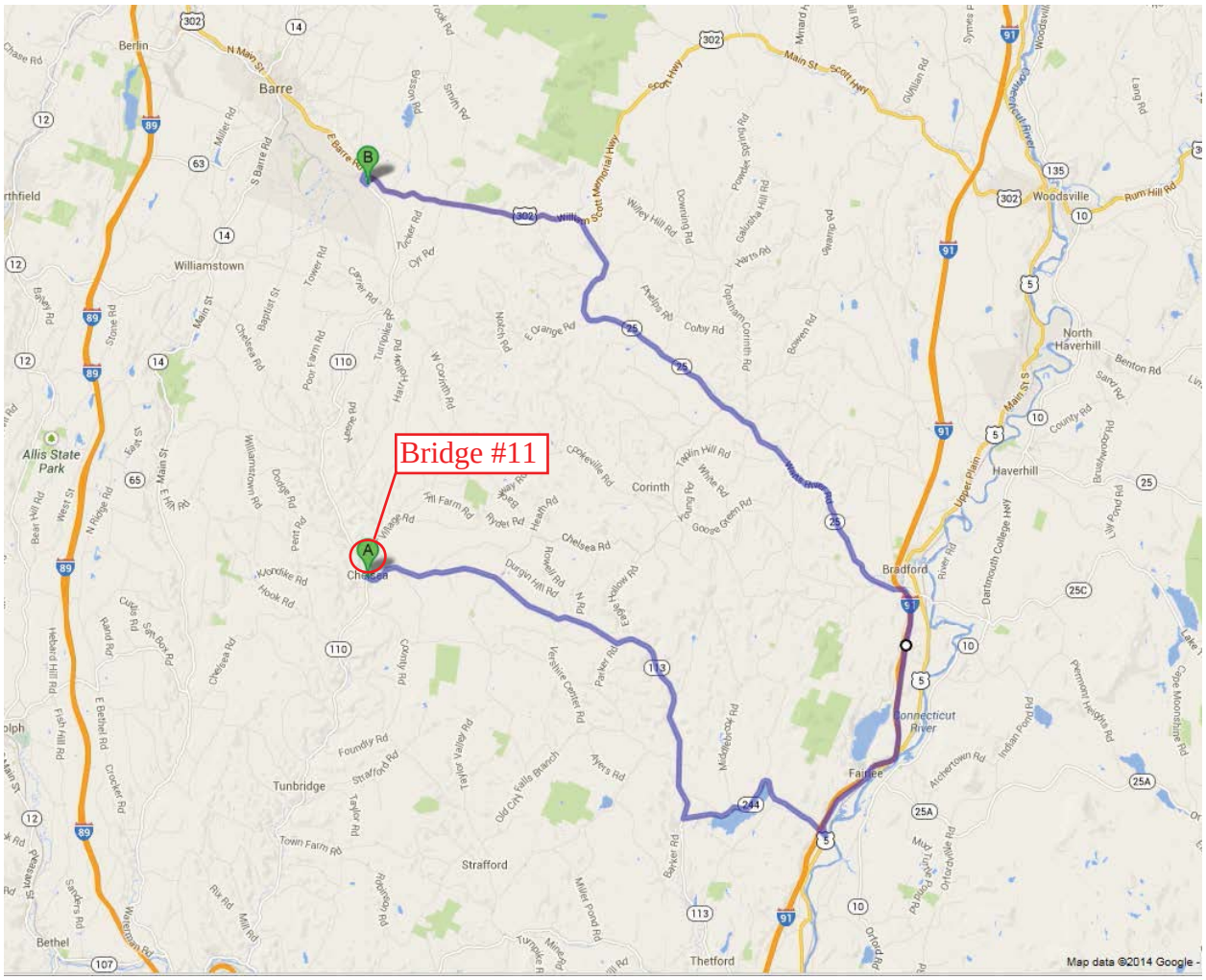
Vermont Agency of Transportation

General Yearly Summaries - Crash Listing: State Highways and All Federal Aid Highway Systems

From 01/01/08 To 12/31/12 General Yearly Summaries Information

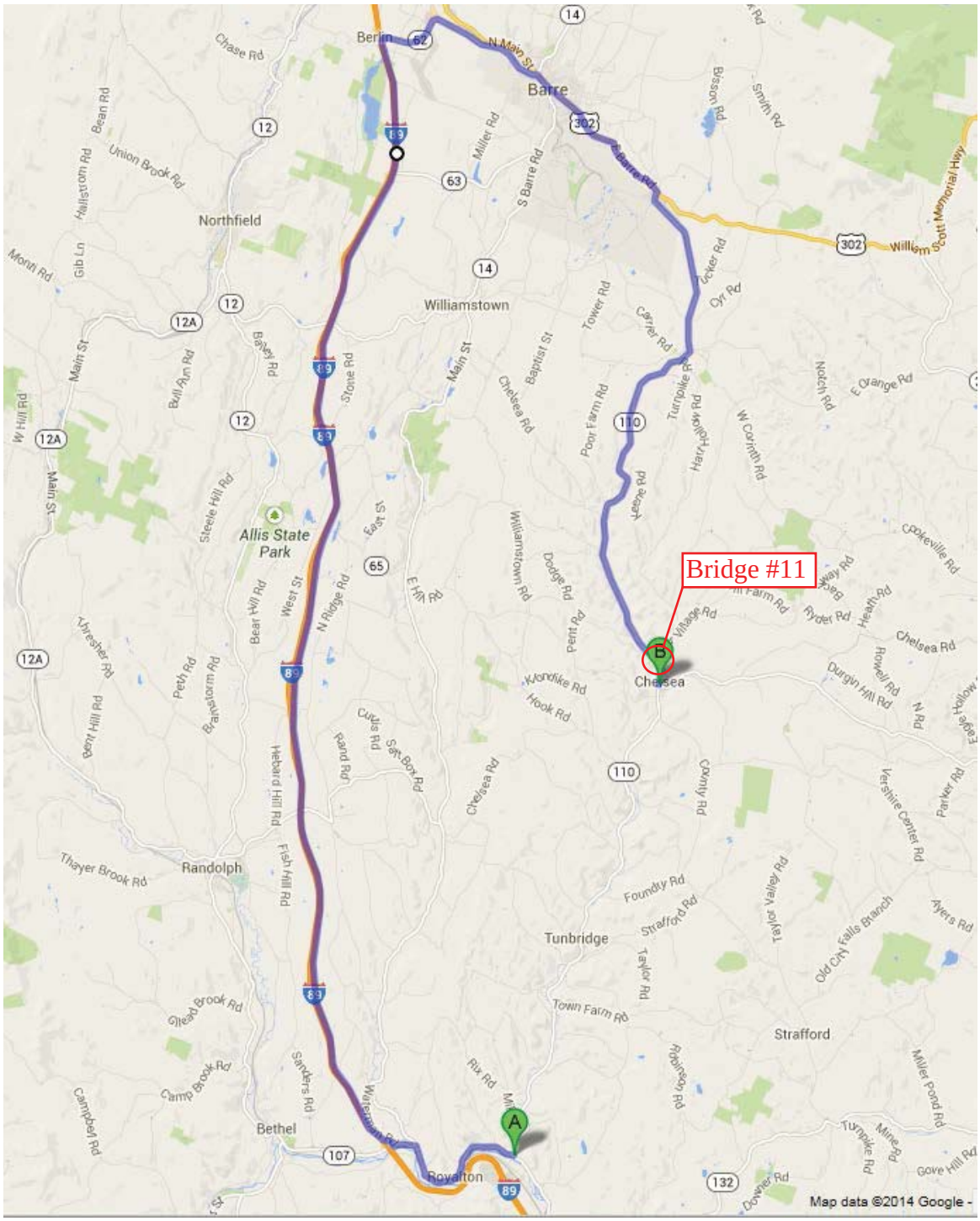
*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Number Of Untimely Deaths	Direction	Road Group
Route: VT-109 Continued ...													
	VTVSP0100/12A10 2094	Belvidere	0.8	06/09/2012	18:30	Clear	Driving too fast for conditions	Single Vehicle Crash	1	0	0	E	SH
	VTVSP0100/08A10 5396	Belvidere	2.25	12/01/2008	08:29	Cloudy	Driving too fast for conditions	Single Vehicle Crash	0	0	0	E	SH
	VTVSP0100/08A10 3857	Belvidere	4.21	08/24/2008	20:29	Clear	Failure to keep in proper lane	Single Vehicle Crash	0	0	0	N	SH
Route: VT-110													
	VTVSP1100/12D30 4130	Royalton	0.02	09/15/2012	17:01	Clear	Operating vehicle in erratic, reckless, careless, negligent, or aggressive manner, No improper driving	Same Direction Sideswipe	0	0	0	N	SH
	VTVSP1100/09D30 1439	Royalton	0.14	05/01/2009	14:59	Clear	Inattention, Followed too closely, No improper driving	Rear End	1	0	0	N	SH
	VTVSP1100/10D30 4005	Royalton	0.42	10/23/2010	16:17	Clear	No improper driving, Failed to yield right of way, Made an improper turn	Left Turn and Thru, Angle Broadside -->v--	1	1	0		SH
	VT0141100/12RY0 0920	Royalton	0.7	08/24/2012	19:03	Clear	Unknown	Single Vehicle Crash	1	0	0	E	SH
	VT0141100/11RY0 1083	Royalton	0.78	12/04/2011	08:30	Clear	Driving too fast for conditions	Single Vehicle Crash	0	0	0	N	SH
	VT0141100/10RY0 0010	Royalton	1.42	04/03/2010	19:30	Clear	Swerving or avoiding due to wind, slippery surface, vehicle, object, non-motorist in roadway etc	Single Vehicle Crash	1	0	0	N	SH
	VTVSP1100/10D30 4655	Royalton	1.59	12/12/2010	14:18	Snow	Failure to keep in proper lane	Single Vehicle Crash	0	0	0	N	SH
	VT0141100/08RY0 0026	Royalton	1.62	03/06/2008	11:45	Unknown	Unknown	Single Vehicle Crash	0	0	0	N	SH
	VTVSP1100/09D30 0287	Tunbridge	0.24	01/22/2009	19:07	Clear	Failure to keep in proper lane, Under the influence of medication/drugs/alcohol	Single Vehicle Crash	0	0	0	S	SH
	VTVSP1100/10D30 4629	Tunbridge	0.7	12/11/2010	01:13	Cloudy	Failure to keep in proper lane	Single Vehicle Crash	1	0	0	N	SH
	VTVSP1100/11D30 0129	Tunbridge	0.72	01/09/2011	09:00	Cloudy	Driving too fast for conditions	Single Vehicle Crash	0	0	0	N	SH
	VTVSP1100/08D30 2580	Tunbridge	1.12	06/25/2008	09:10	Clear	Failure to keep in proper lane	Head On	1	0	0	N	SH
	VTVSP1100/09D30 4050	Tunbridge	1.4	11/12/2009	10:34	Clear	Made an improper turn, No improper driving	Left Turn and Thru, Angle Broadside -->v--	0	0	0		SH
	VTVSP1100/08D30 3433	Tunbridge	1.45	08/21/2008	17:46	Clear		Head On	0	0	0	E	SH
	VT0090000/10OR C1654	Tunbridge	2.55	09/17/2010	17:10	Clear	Distracted, No improper driving	Rear End	0	0	0	S	SH
	VTVSP1100/08D30 0884	Tunbridge	3.89	02/21/2008	06:55	Clear	Driving too fast for conditions	Single Vehicle Crash	0	0	0	S	SH
	VTVSP1100/08D30 1886	Tunbridge	4.48	05/04/2008	21:53	Clear	Failure to keep in proper lane, Under the influence of medication/drugs/alcohol	Single Vehicle Crash	2	0	0		SH
	VTVSP1100/12D30 3959	Tunbridge	4.59	09/06/2012	08:16	Clear	Failure to keep in proper lane, Inattention	Single Vehicle Crash	0	0	0	N	SH
	VTVSP1100/12D30 4530	Tunbridge	4.72	10/09/2012	17:29	Cloudy	No improper driving, Operating defective equipment, Failure to keep in proper lane	Head On	3	0	0	N	SH
	VTVSP1100/09D30 2150	Tunbridge	6.33	06/25/2009	16:07	Clear	Failed to yield right of way, Inattention, No improper driving	Left Turn and Thru, Angle Broadside -->v--	1	1	0	N	SH
	VTVSP1100/09D30 0728	Tunbridge	7.58	02/26/2009	20:31	Clear	Driving too fast for conditions	Single Vehicle Crash	1	0	0	N	SH
	VTVSP1100/11D30 0596	Tunbridge	7.7	02/07/2011	15:18	Cloudy		Single Vehicle Crash	0	0	0	S	SH
	VTVSP1100/08D30 4107	Chelsea	0.78	10/13/2008	15:11	Clear	Failed to yield right of way, No improper driving	Other - Explain in Narrative	1	0	0	N	SH
	VTVSP1100/09D30 1173	Chelsea	3	04/07/2009	08:15	Rain	No improper driving, Made an improper turn	Left Turn and Thru, Broadside v<--	0	0	0	N	SH

**Crash occurred prior to the last Highway Improvement Project. This data should not be used in a crash analysis. UNK indicates the Mile Marker is Unknown.*



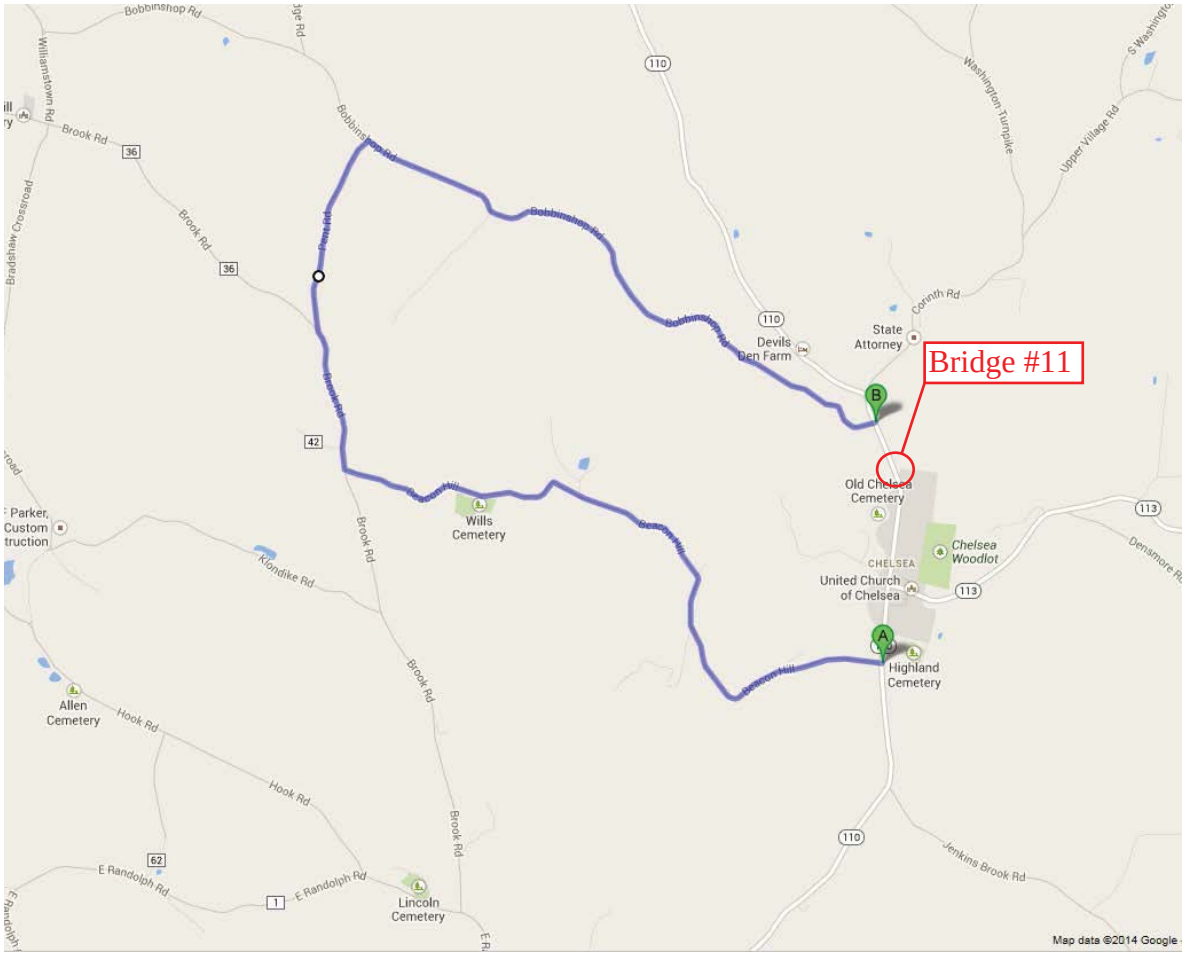
<u>Detour Route</u> – VT 110 to VT 113 to VT 244 to US 5 to I-91 to VT 25 to US 302 to VT 110

A to B on Through Route: 16.2 Miles (about 19 minutes)
A to B on Detour Route: 50.3 Miles (about 83 minutes)
Added Miles: 34.1 Miles (about 64 minutes)
End to End Distance: 66.5 Miles (about 102 minutes)



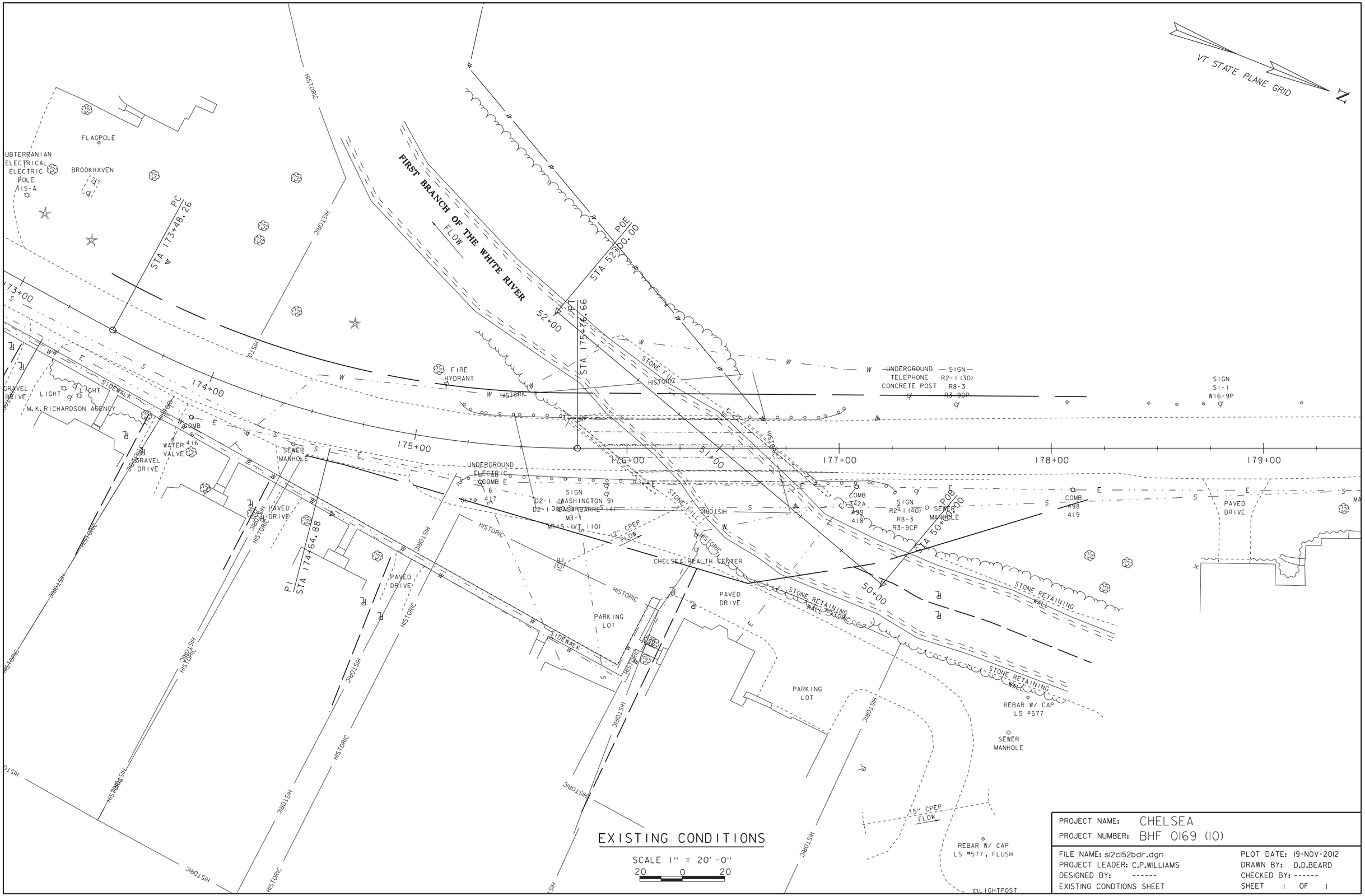
Detour Route – VT 110 to VT 14 to VT 107 to I 89 to VT 62 to US 302 to VT 110

A to B on Through Route: 13.2 Miles (about 18 minutes)
A to B on Detour Route: 54.9 Miles (about 65 minutes)
Added Miles: 41.7 Miles (about 47 minutes)
End to End Distance: 68.1 Miles (about 83 minutes)



<u>Local Bypass Route</u> – VT 110 to Beacon Hill to Brook Rd to Pent Rd to Bobbinshop Rd to VT 110

A to B on Through Route: 0.9 Miles (about 1 minute)
A to B on Bypass Route: 6.3 Miles (about 16 minutes)
Added Miles: 5.4 Miles (about 15 minutes)
End to End Distance: 7.2 Miles (about 17 minutes)

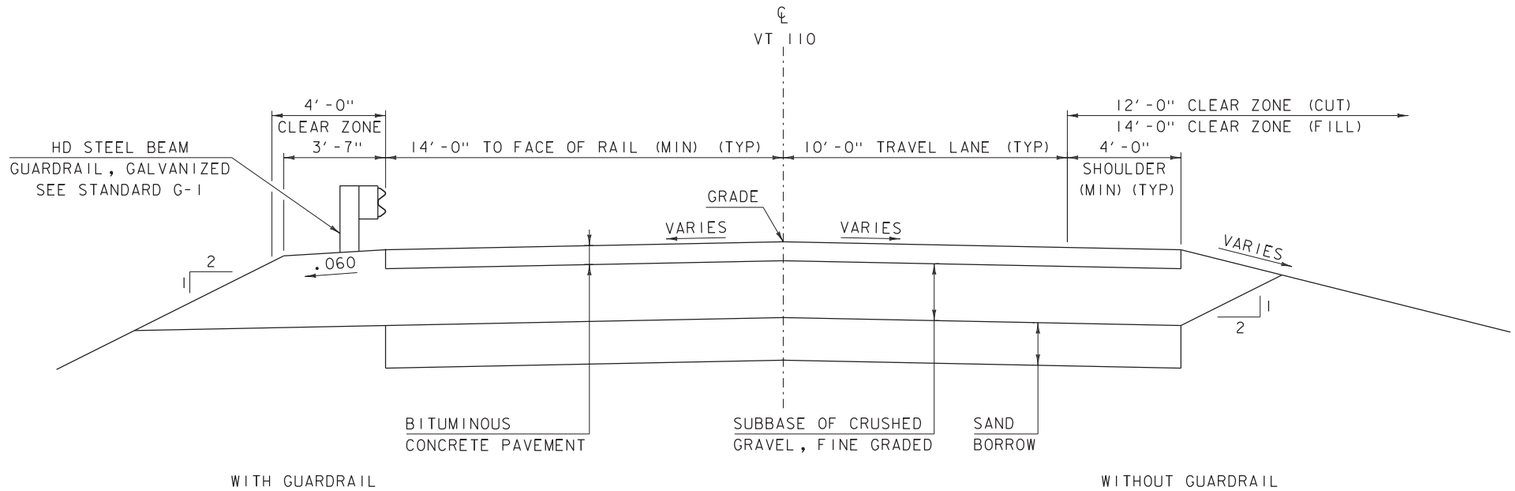


EXISTING CONDITIONS

SCALE 1" = 20'-0"

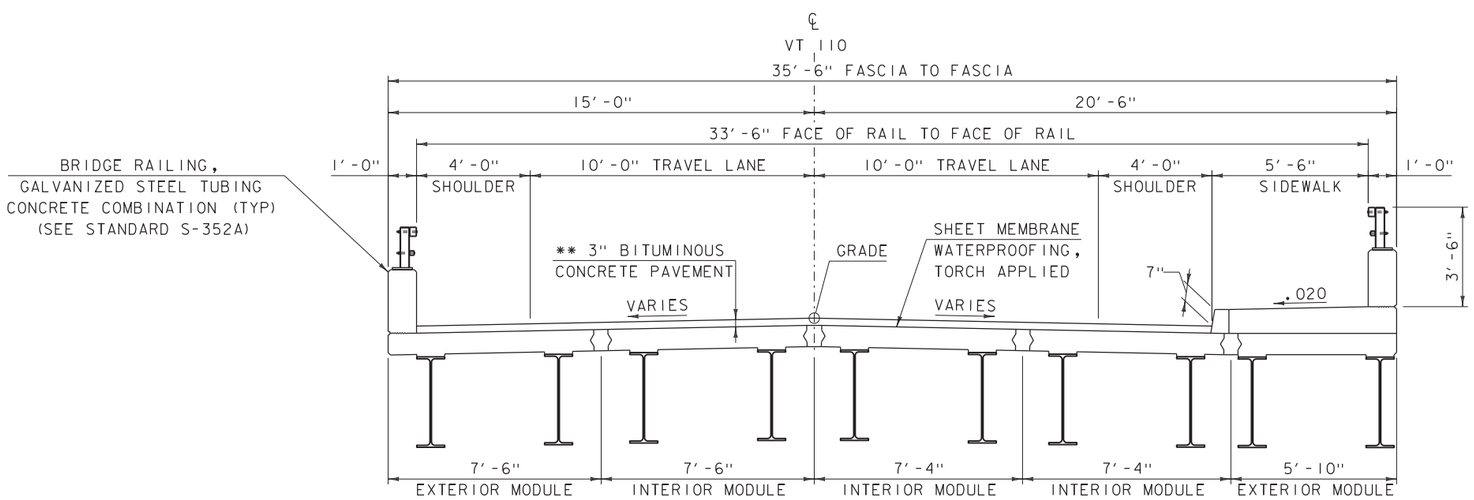
20 0 20

PROJECT NAME: CHELSEA	
PROJECT NUMBER: BHF 0169 (10)	
FILE NAME: s12c152bdr.dgn	PLOT DATE: 19-NOV-2012
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
EXISTING CONDTIONS SHEET	SHEET 1 OF 1



PROPOSED VT 110 TYPICAL SECTION

SCALE 3/8" = 1'-0"



FLOW

PROPOSED BRIDGE TYPICAL SECTION

SCALE 3/8" = 1'-0"

NOTE: L100 PRECAST BRIDGE UNITS SHOWN,
SUPERSTRUCTURE NOT YET DESIGNED.
SUPERSTRUCTURE MAY CHANGE.

MATERIAL TOLERANCES

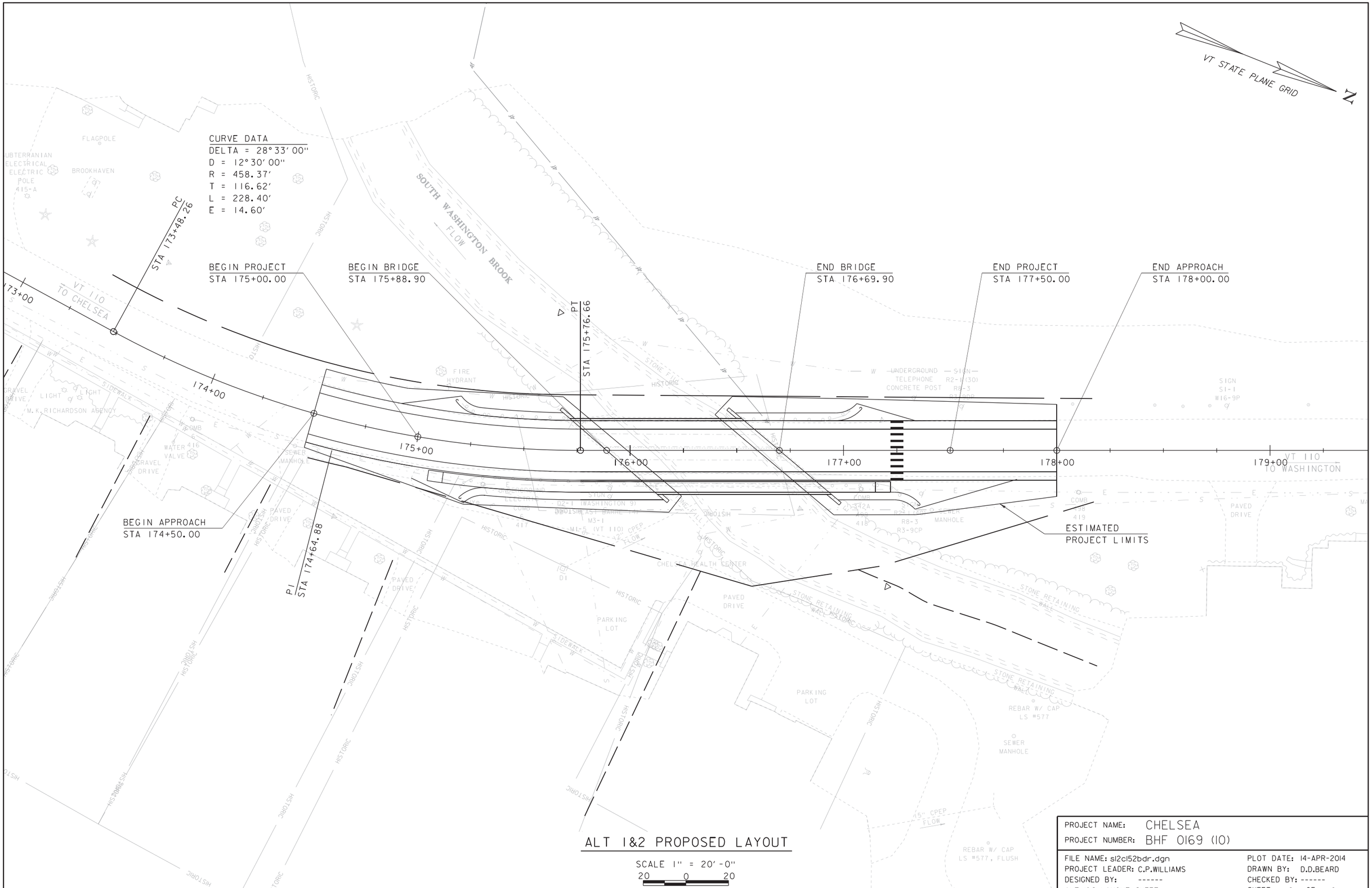
(IF USED ON PROJECT)

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

PROJECT NAME: CHELSEA
PROJECT NUMBER: BHF 0169(10)

FILE NAME: 12c150/s12c152typical.dgn
PROJECT LEADER: C.P.WILLIAMS
DESIGNED BY: G.SWEENY
TYPICAL SECTIONS

PLOT DATE: 14-APR-2014
DRAWN BY: D.D.BEARD
CHECKED BY: G.SWEENY
SHEET 1 OF 9

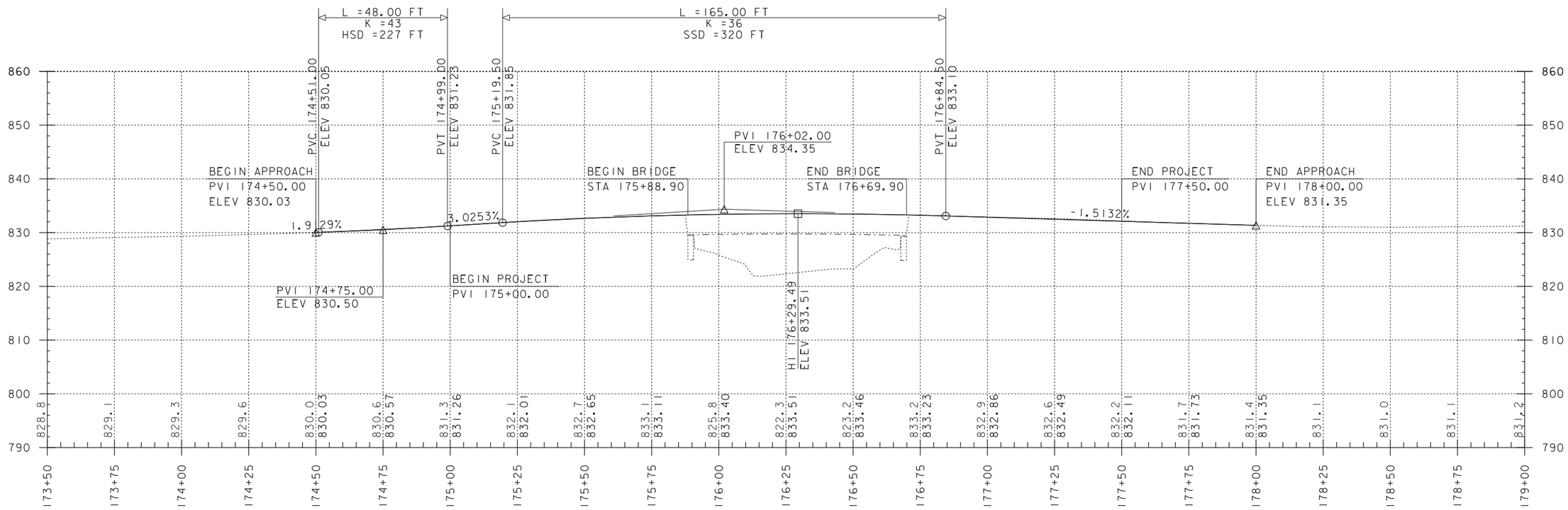


ALT 1&2 PROPOSED LAYOUT

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME: CHELSEA	
PROJECT NUMBER: BHF 0169 (10)	
FILE NAME: s12c152bdr.dgn	PLOT DATE: 14-APR-2014
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
ALT 1&2 LAYOUT SHEET	SHEET 2 OF 9



VT RT 110 ALTERNATIVES 1&2 PROFILE

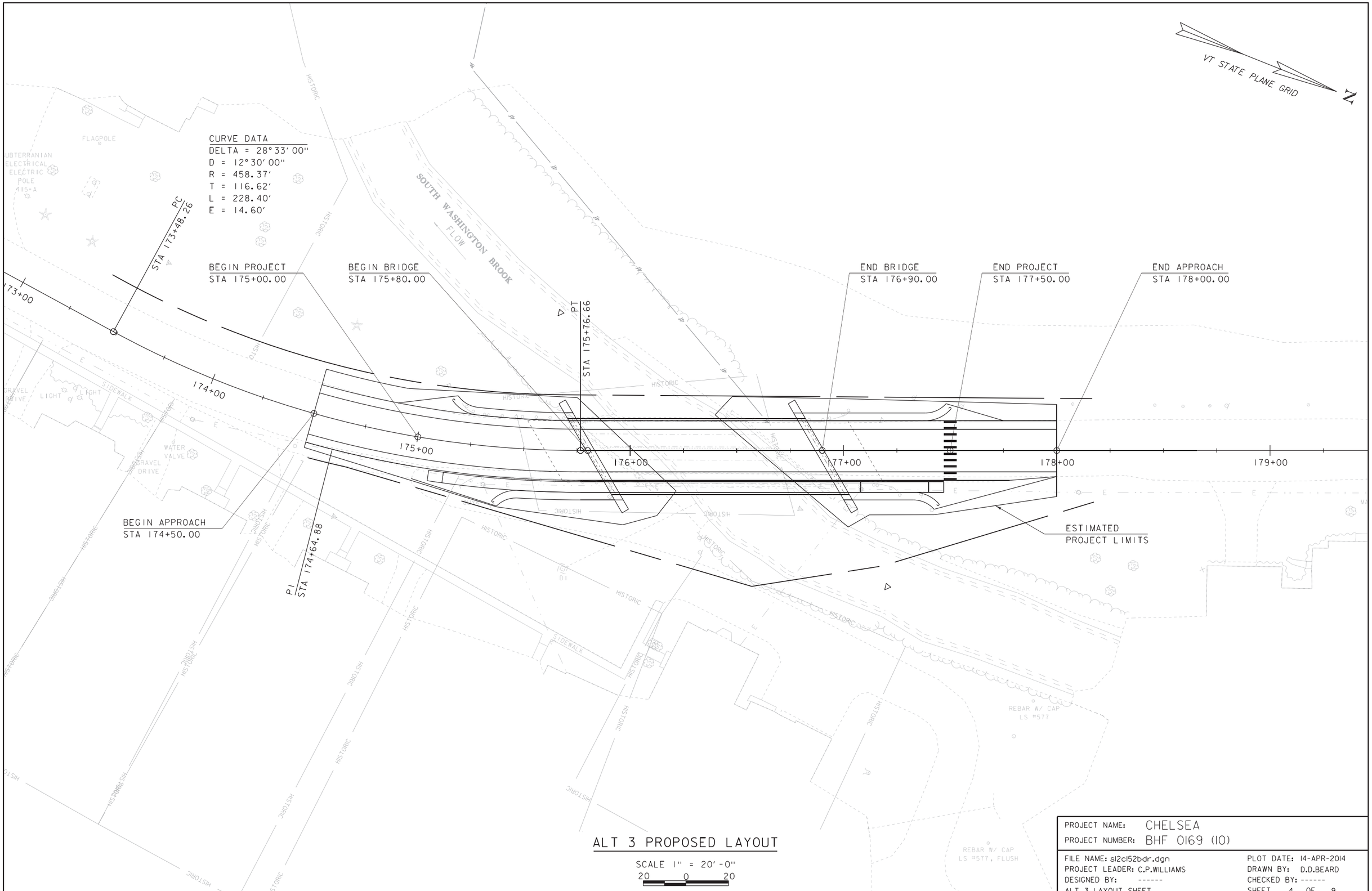
SCALE: HORIZONTAL 1"=20'
VERTICAL 1"=10'

NOTE:

GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

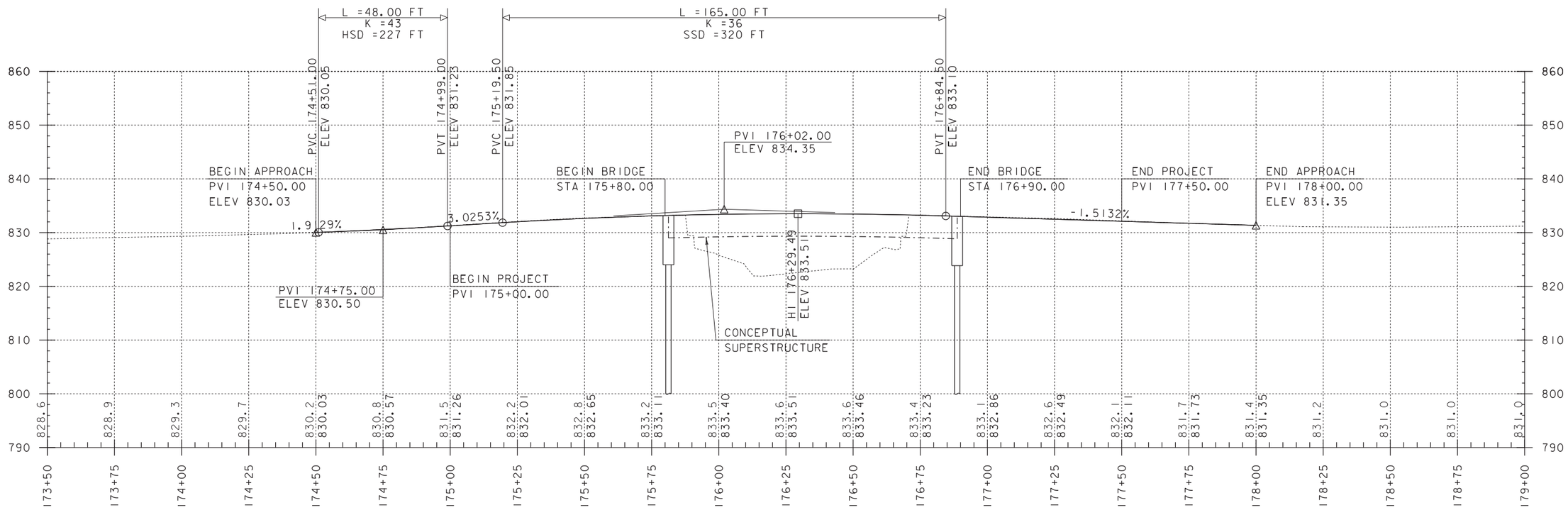
PROJECT NAME: CHELSEA	
PROJECT NUMBER: BHF 0169(10)	
FILE NAME: s12c152profile.dgn	PLOT DATE: 14-APR-2014
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
ALTS 1&2 PROFILE SHEET	SHEET 3 OF 9



ALT 3 PROPOSED LAYOUT

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

PROJECT NAME: CHELSEA	
PROJECT NUMBER: BHF 0169 (10)	
FILE NAME: s12c152bdr.dgn	PLOT DATE: 14-APR-2014
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
ALT 3 LAYOUT SHEET	SHEET 4 OF 9



VT RT 110 ALTERNATIVE 3 PROFILE

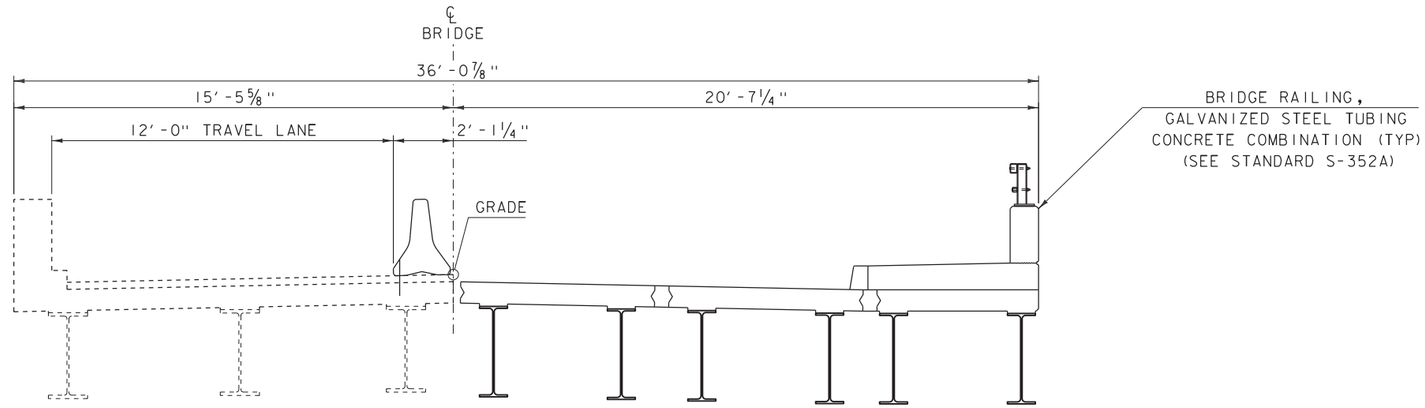
SCALE: HORIZONTAL 1"=20'
VERTICAL 1"=10'

NOTE:

GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: CHELSEA	
PROJECT NUMBER: BHF 0169(10)	
FILE NAME: s12c152profile.dgn	PLOT DATE: 14-APR-2014
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
ALT 3 PROFILE SHEET	SHEET 5 OF 9

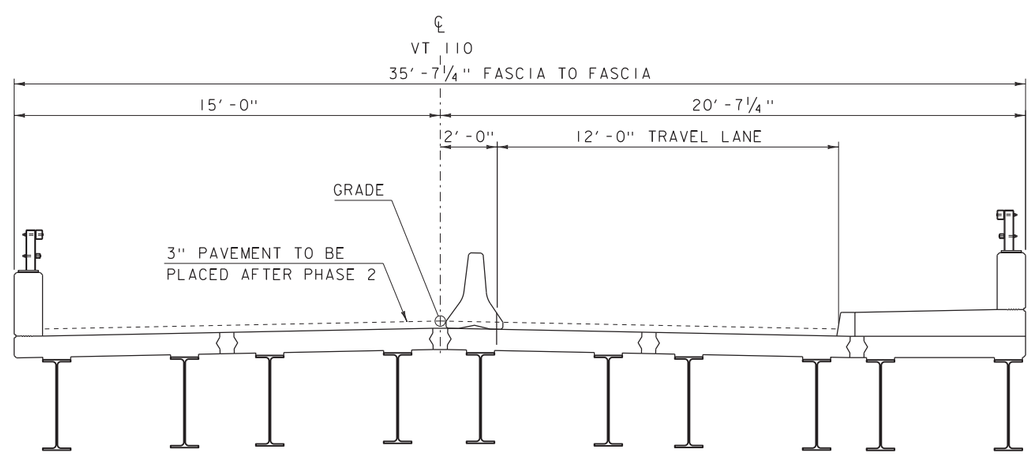


FLOW

PHASE #1 TYPICAL SECTION

SCALE 3/8" = 1'-0"

NOTE: BRIDGE WILL BE CLOSED PRIOR TO THIS PHASE



FLOW

PHASE #2 TYPICAL SECTION

SCALE 3/8" = 1'-0"

NOTE: L100 PRECAST BRIDGE UNITS SHOWN,
SUPERSTRUCTURE NOT YET DESIGNED.
SUPERSTRUCTURE MAY CHANGE.

PROJECT NAME: CHELSEA	
PROJECT NUMBER: BHF 0169(10)	
FILE NAME: 12c152\s12c152Phasing.dgn	PLOT DATE: 14-APR-2014
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: G.SWEENY	CHECKED BY: ------
PHASING TYPICAL SECTIONS	SHEET 6 OF 9

VT STATE PLANE GRID

N

SIGNAL HEAD (TYP)

173+00

174+00

175+00

176+00

177+00

178+00

179+00

VT 110 TO CHELSEA

VT 110 TO WASHINGTON

SOUTH WASHINGTON BROOK

FLOW

STONE FILL

FLAGPOLE

UBTERRANIAN ELECTRICAL ELECTRIC POLE 415-A

FIRE HYDRANT

GRAVEL DRIVE

LIGHT

SIDEWALK

COMB 416

WATER VALVE

SEWER MANHOLE

UNDERGROUND ELECTRIC COMB 6 417

12" CPEP FLOW

D1

PAVED DRIVE

PARKING LOT

COMB 342A 139 418

COMB 498 419

15" CPEP FLOW

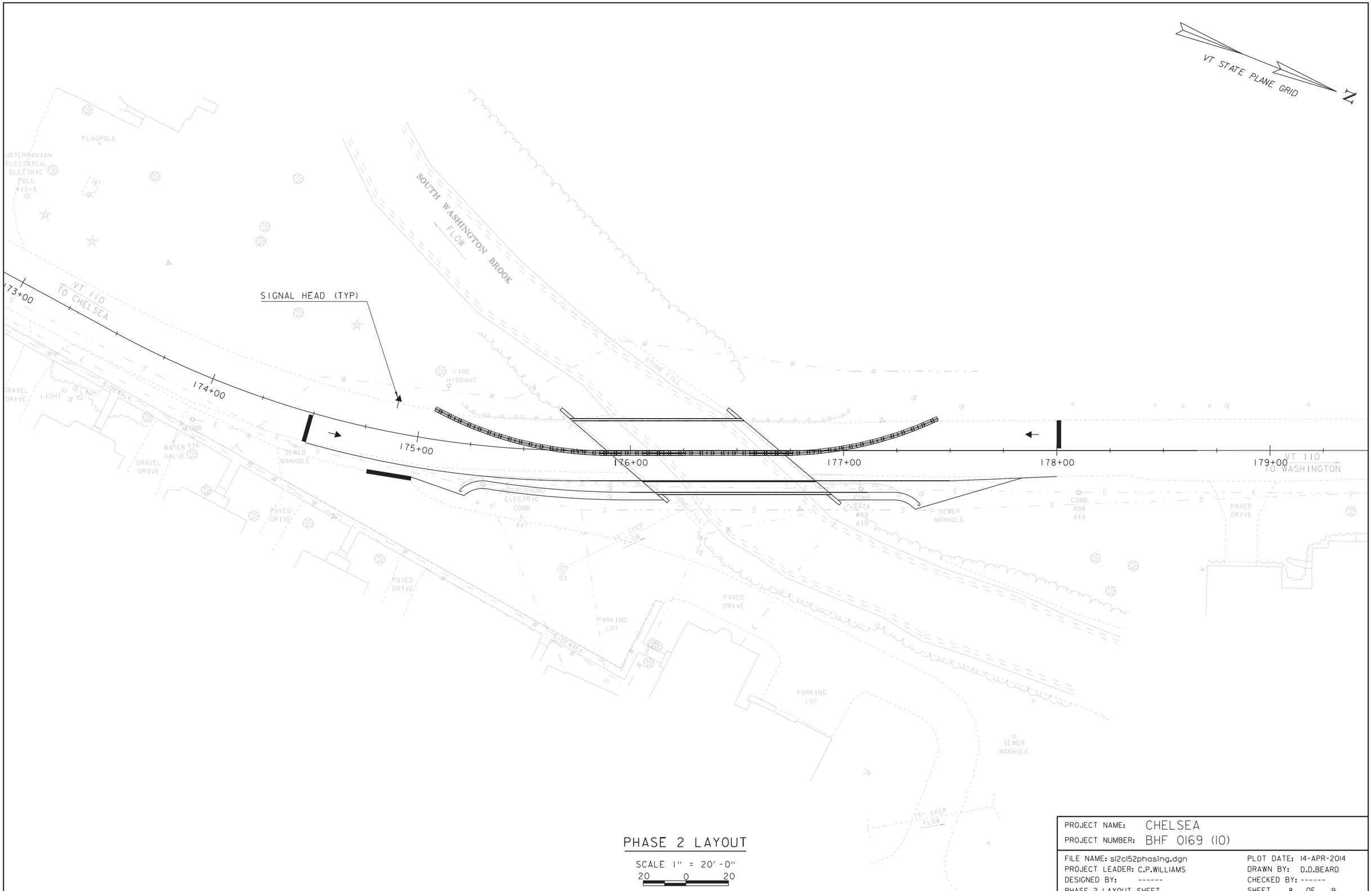
LIGHTPOST

PHASE I LAYOUT

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME: CHELSEA	
PROJECT NUMBER: BHF 0169 (10)	
FILE NAME: s12c152phasing.dgn	PLOT DATE: 14-APR-2014
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
PHASE I LAYOUT SHEET	SHEET 7 OF 9

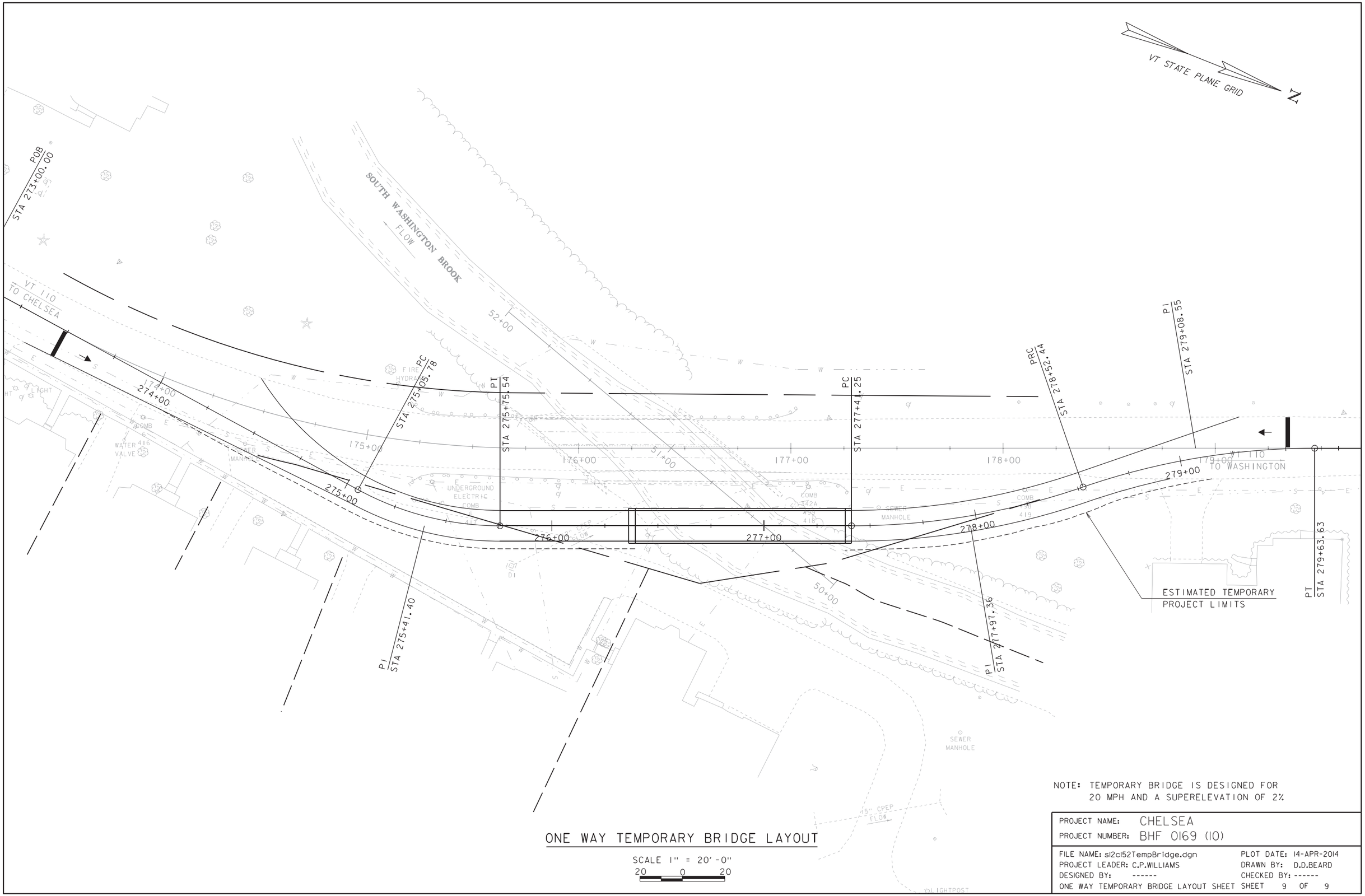


PHASE 2 LAYOUT

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME: CHELSEA	
PROJECT NUMBER: BHF 0169 (10)	
FILE NAME: s12c152phasing.dgn	PLOT DATE: 14-APR-2014
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
PHASE 2 LAYOUT SHEET	SHEET 8 OF 9



NOTE: TEMPORARY BRIDGE IS DESIGNED FOR 20 MPH AND A SUPERELEVATION OF 2%

ONE WAY TEMPORARY BRIDGE LAYOUT

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME: CHELSEA	
PROJECT NUMBER: BHF 0169 (10)	
FILE NAME: s12c152TempBridge.dgn	PLOT DATE: 14-APR-2014
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
ONE WAY TEMPORARY BRIDGE LAYOUT SHEET	SHEET 9 OF 9