STATE OF VERMONT
AGENCY OF TRANSPORTATION

Scoping Report

FOR

Weathersfield STP 0146(16)

VT ROUTE 131, BRIDGE 15 over MILL BROOK

March 2, 2016

I. Contents

I. Site Information

Bridge 15 is a culvert located in a rural area along VT Route 131 adjacent to the east leg of Jarvis Road Extension, and approximately one third of a mile west of the intersection with TH-1, Weathersfield Center Road. The culvert is located on a straight segment of VT 131 at approximately mile marker 5.83. The depth of cover on top of the culvert is approximately 14'-16'. The existing conditions were gathered from a combination of the Inspection Report, the Route Log and the existing Survey. See correspondence in the Appendix for more detailed information.

Roadway Classification	Rural Major Collector
Culvert Type	Multi-Plate Pipe
Culvert Span	11 feet
Culvert Length	114 ft.
Skew	20 degrees
Year Built	1959
Ownership	State of Vermont

Need

The following is a list of the deficiencies of Bridge 24 and VT Route 11 in this location.

1. This culvert has a rating of 5 "Fair" and has bolt line cracking.

2. There are signs that the culvert is deforming or squashing.

3. There are no known roadway deficiencies.

Traffic

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

TRAFFIC DATA	2017	2037
AADT	4,500	4,800
DHV	510	540
ADTT	370	590
%T	4.0	5.9
%D	55	55

Design Criteria

The design standards for this bridge project are the Vermont State Standards, dated October 22, 1997. Minimum standards are based on an ADT > 2000 and a design speed of 50 mph.

Design Criteria	Source	Existing Condition	Minimum Standard	Comment
Approach Lane and Shoulder Widths	VSS Table 5.3	11'/3' (28')	11'/3' (28')	
Bridge Lane and Shoulder Widths	VSS Table 5.3	11'/3' (28')	11'/3' (28')	
Clear Zone Distance	VSS Table 5.4	Shielded	20' fill / 12' cut (1:3), 14' cut (1:4)	
Banking	VSS Section 5.13	Normal Crown	8% (max), 6% at side roads	
Speed	VSS Section 5.3	50 mph (Unposted)	50 mph (Design)	
Horizontal Alignment	AASHTO Green Book Exhibit 3-26	Roadway is on a tangent at the bridge.		
Vertical Grade	VSS Table 5.6	Roadway centerline slopes at 8.2%.	7% (max) for rolling terrain, 9% (max) for mountainous	
K Values for Vertical Curves	VSS Table 5.1	Bridge not located on vertical curve.	110 crest / 90 sag	
Vertical Clearance Issues	VSS Section 5.8	None noted	14'-3" (min)	
Stopping Sight Distance	VSS Table 5.1	NA – no vertical curve	400'	
Bicycle/Pedestrian Criteria	VSS Table 5.8	3' Shoulder	3' Shoulder[1]	
Bridge Railing	Structures Manual Section 13	Steel Beam Guardrail	Steel Beam Guardrail	
Hydraulics	VTrans Hydraulics Section	Passes Q_{50} storm event without exceeding 1.2X dia., and Q_{100} without exceeding 1.5X dia.	Pass Q_{50} storm event without exceeding 1.2X diameter, and Q_{100} without exceeding 1.5X diameter	Does not meet Bank Full Width[2]
Structural Capacity	SM, Ch. 3.4.1	Unknown	Design Live Load: HL-93	

[1] Table 5.8 of the Vermont State Standards requires an additional foot of shoulder for shared use on bridges. If a complete bridge replacement was chosen and a non-buried structure installed, lane and shoulder widths then would be 11'/4'.

[2] The existing culvert meets the regulatory requirements as written in the Hydraulics Manual, but does not meet the Bank Full Width as calculated by the ANR method.

Inspection Report Summary

Culvert Rating	5 Fair
Channel Rating	6 Satisfactory

12/10/2013 – Pipe is in fair condition with some distortion and bolt line cracking from displacement. A number of loose bolts indicate poor construction and installation technique which likely has led to shape distress as well. Continue to monitor quinquennially. MJ/JS

08/20/08 – Culvert is in fair to good condition. Bolt line cracking along the west side is okay for now. Aggregate along the invert should be removed. DS

Hydraulics

The existing 11' diameter culvert configuration meets the hydraulic standard. Headwater to depth ratios are within allowable limits and the Q_{100} passes the culvert with no overtopping of the roadway. The existing culvert width does not meet field bank full estimates of 15'-20' or the ANR bank full width model of 21 ft. There is a small vertical drop at the outlet end of the culvert, currently inhibiting Aquatic Organism Passage (AOP) at this location.

Recommendations

The Preliminary Hydraulics Report makes recommendations for culvert repair and replacement. A 10' diameter liner could be considered and would meet the hydraulic standard. If a liner is used, it is recommended that a beveled headwall be installed to maximize hydraulic efficiency. The ANR stream management engineer has been consulted and agrees that a liner may be used if a repair option is chosen. A Cured-In-Place Pipe repair solution is not viewed favorably by the River Management Engineers at this time. If the culvert is replaced, AOP is not needed due to the waterfall immediately upstream of the site.

Any replacement structure for this culvert should have a 20' minimum width to meet the ANR bank full width criterion. A minimum clear vertical height of 7' would be acceptable.

The Preliminary Hydraulics Report can be seen in Appendix D.

Utilities

Underground:

There are no known buried utilities at the bridge site.

Aerial:

There are no overhead utility lines passing over the culvert.

Right Of Way

The existing Right-of-Way is shown on the Layout sheet. At the project site, the Right-of-Way is nearly 9 rods wide. It is anticipated that additional Right-of-Way will be required for all options considered except the Do-Nothing alternative.

Resources

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

Biological:

Mill Brook is a cold water fishery, but fish passage immediately upstream of the culvert is blocked by a natural falls. This watercourse is regulated by the US Army Corps of Engineers and the removal of existing vegetation along the stream should be minimized. If there is a need to remove some of this vegetation during construction, the site should be restored by planting native trees and shrubs. If trees are planted, they should either be shielded or outside of the clear zone. The ANR River Management Engineer has preliminarily agreed that AOP is not required on this project due to the waterfall just upstream of the inlet end of the culvert.

Wetlands

There are no mapped wetlands within the project area.

Rare, Threatened and Endangered Species

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

Agricultural

There are no prime agricultural soils within the project area.

Archaeological:
No Archaeological Resources have been identified at the site.

Historic:
The initial input from VTrans Historic staff indicated that no historically significant resources had been identified at the site. Since that memo was issued, a new Historic Officer has arrived at the Agency and is interested in further review of the existing marble masonry headwall at the inlet of the culvert. At the completion of this report, this matter is still under review.

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

Stormwater:
There are no stormwater concerns for this project.

II. Safety

The project area is not in a high crash area. There has been only one reported crash in the five year period ending 12/31/12. The existing conditions within the project area are considered adequate for the purposes of safety with the exception of the existing culvert.

III. Alternatives Discussion

The existing roadway at the culvert location meets standards in terms of roadway geometry and safety features. Even if a replacement alternative is selected that involves open cutting, no work

on the existing roadway alignment is anticipated. The project site is not a high crash location. The alternatives presented here are based on improvement of the condition of the culvert and channel.

No Action

This alternative would involve leaving the culvert in its current condition. A good rule of thumb for the "No Action" alternative is to determine whether the existing structure can stay in place without any work being performed on it during the next 10 years. Given the fair rating on this culvert, it will likely require work within the next 10 years. In the interest of safety to the traveling public, the No Action alternative is not recommended.

Alternative 1: Rehabilitation

Rehabilitation options considered:

a: Invert Repair
b: Pipe Liner
c: Cured In Place Pipe
d: Grout Lining

All rehabilitation options would employ the use of hydroblasting or hydrodemolition to appropriately clean the existing pipe interior prior to rehabilitation. In addition to cleaning, some grouting would be needed to plug holes in the pipe and fill all voids on the outside of the pipe. The Preliminary Hydraulics Report indicates that a new interior pipe dimension of 10' is preferred, although with further Hydraulic Section input a further slight reduction might be allowed. Curing in dry conditions would be required in most cases, necessitating a re-routing of the stream flow during the work and for a prescribed curing period (usually 24 hours). A headwall with beveled inlets would be recommended for all rehabilitation alternatives. A service life of approximately 30 years can be expected if the pipes are rehabilitated.

a. Invert Repair

In many cases, invert repair is used to rehabilitate reinforced concrete pipe where the invert has eroded. Invert repair can be utilized on corrugated steel pipe, but typically consists of paving the invert, which is most effective where no structural capacity needs to be replaced. Although the culvert on this project is rated 5 (Fair), there is some evidence in the photos and bridge inspector's report that some sagging is beginning. Therefore, a solution including some structural enhancement is desired, in addition to measures restoring the invert. Invert Repair alone will not be evaluated further in this report.

b. Pipe Liner

Adding a pipe liner, also called sliplining, consists of pulling a complete new pipe into the existing culvert, then grouting the space between the two. Sliplining can be done using several different types of pipe material including corrugated steel, aluminum, reinforced concrete, and polyethylene, and can restore the structural integrity of the culvert. There are two drawbacks to sliplining: one is that the waterway area is always reduced when sliplining is done; and two, it can be difficult to get the new liner installed, especially if there is

distortion of the original host pipe as would be possible on this project. Crucial to the success of this method would be surveying the interior of the existing CMP to insure that a rigid liner can be installed in the pipes. Temporary Right-of-Way would need to be acquired to provide a staging area at each end to accomplish this alternative.

c. CIPP (Cured In Place Pipe)

CIPP is another way of providing a new lining to the interior of an existing pipe. A resin-saturated felt or fiber tube is inserted into the pipe in a folded configuration, and is then expanded to be in contact with the entire interior surface of the existing culvert. Curing takes place by heating the resin using hot water, steam, or UV light. This method of culvert repair is not considered further in this report because a literature search on the subject yields no data on CIPP over the size of 8' diameter. There are also environmental concerns with this method of repair, which is under review by various parties within VTrans. Therefore, although it is expected that this method of culvert repair will be used in the future in Vermont, it is not considered to be a feasible solution for this project.

d. Spray-On Liners

Spray-On liners provide a new rigid interior surface for the pipe and use either cementitious materials (polymer-enhanced cement mortar) or polyurea. These liners are spray applied either by hand or machine, although some users have had better quality control with hand-applied methods. Cementitious liners installed by these methods can provide full structural support, depending on thickness applied. Proper curing is essential to using spray-on liners to avoid bond failures. There could be water quality impacts associated with the application of these liners, their degree of impact related to selection of materials, and adherence to curing requirements. If a spray-on liner is selected, the polymer-enhanced cement mortar is recommended for environmental and safety reasons. Temporary Right of Way would need to be acquired to provide a staging area at each end to accomplish this alternative.

Advantages: A repair alternative using methods b, c, and d would address the structural deficiencies of the existing culvert pipes without affecting traffic flow, with minimum upfront costs. It would have minimal impacts on resources. Very minimal impacts on traffic flow would be expected.

Disadvantages: A remaining service life of approximately 30 years would be gained, and slight temporary water quality impacts may be seen. Aquatic Organism Passage and wildlife connectivity would not be improved, but has not been requested by VTrans environmental specialists. It is assumed that for any rehabilitation alternative, temporary right-of-way will be necessary for the contractor's access to the ends of the culvert.

Alternative 2: Structure Replacement Using Trenchless Methods

A replacement of the existing culvert adjacent to the current location could be accomplished. Although conventional jack-and-bore or pipe ramming methods would be likely to succeed on this project, an 11' diameter jack and bore would probably not be practical. Pipes as large as 12' diameter have been installed using trenchless technology, but the equipment and expertise for this size project may be unavailable or prohibitively expensive in Vermont. Therefore, Alternative 2 could include the installation of a new 8' pipe inside of the existing pipe and the installation of

one new 8' pipe adjacent to the existing pipe. The pipe diameters are approximate and would be confirmed after the Final Hydraulics Report.

Some regrading would be required at each end to direct water flow into and out of the pipes, which would have some minor temporary impacts to the stream habitat. New headwalls or wingwalls would be required for hydraulic efficiency. This solution would provide for a typical service life for culverts of at least 60 years, depending on material selection. It is assumed that temporary Right of Way will be necessary for the jack-and-bore or pipe ramming equipment.

Traffic for this alternative would be maintained as normal flow through the work zone with minor impacts due to construction vehicles entering and leaving the site.

Advantages: This alternative would be a new structure with an estimated life span of 60 years. Traffic would be maintained through the work area with minor impacts.

Disadvantages: The location of the culvert and a small length of the stream on each end would be slightly modified, to direct flow into both the new and existing pipe. This alternative has higher initial costs than pipe rehabilitation and slightly higher temporary impacts to resources.

Note: This alternative was fully developed during the scoping process, and is addressed in the cost matrix and in the scoping plans. However, Hydraulics staff has indicated during the On-Line-Shared-Review process that a dual culvert installation such as this is not favored hydraulically. It is not efficient, creates additional turbulence, is more prone to debris clogging, and causes more impacts when directing the stream into the second pipe. Therefore, even though addressed throughout this report as a viable option, it was not considered further. The jack and bore installation of one large pipe to replace the existing is also discounted for the reasons sated above in this section.

Alternative 3: Structure Replacement Using Open Cut

Culvert replacement using an open cut was considered. The preliminary hydraulics report suggests several possible configurations for a new structure, including an open bottom precast concrete arch or frame, or a new bridge with either vertical face abutments or integral abutments.

The new culvert could be a 20' wide by 7' high (clear interior) precast concrete arch, frame., or any other shape meeting the waterway requirements. If an arch or frame is used, it should be founded either on bedrock or 6' minimum below the channel bottom, and full depth headwalls used. It is assumed that right-of-way would be required with this alternative.

A new bridge structure should provide the Bank Full Width as determined by the ANR model. This would mean a bottom channel width of 20'. The Preliminary Geotechnical Report indicates that bedrock exists only a few feet below the existing culvert elevation, so it is likely that spread footings would be used, and placed about 6' below the channel bottom to provide scour protection. The horizontal and vertical alignment would stay the same and skew would remain 20 degrees.

A new bridge with spill through abutments was considered, but discarded because this concept would result in a bridge with a span of at least 65 ft, which would seem to be a dramatic change to the landscape. It would also encroach on TH-71.

Traffic would be maintained either by off-site detour or temporary bridge. AOP is not requested, but measures enhancing wildlife connectivity should be considered.

IV. Maintenance of Traffic

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

Option 1: Off-Site Detour

This option would close the bridge and reroute traffic onto an official, signed State detour, which detours traffic north on US 5 and VT 44A, then west on VT 44, through the towns of Windsor and West Windsor, then south on VT 106 through Reading, and back to VT 131.

Thru distance:	7.3 miles	10 minutes
Detour distance:	16.1 miles	23 minutes
Added distance for Thru Traffic:	8.8 miles	13 minutes
End to end distance:	23.4 miles	33 minutes

There are several local bypass routes that may see an increase in traffic from local passenger cars. These routes vary in end-to-end distance from a quarter mile to under 3.0 miles. It is likely that any of these routes could see increased traffic if VT 131 was closed during construction, but since they are town highways and don't necessarily meet State Standards, they are not appropriate for truck traffic. The possible local bypass routes are as follows:

1. TH-71 and TH-14, Jarvis Road Extension, Class 3 unpaved, a loop-shaped road that circumvents the project area, a total end-to-end distance of under 0.4 miles.

2. TH-1, Weathersfield Center Road, Class 2 paved, to TH-9, Gravelin Road, Class 3, unpaved and back to VT 131, with a total end-to-end distance of 4.2 miles.

Other bypass routes may be available. Access to driveways and town highways would be maintained. A map of the detour route can be found in the appendix.

Advantages: Utilizing an off-site detour 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 construct a project in this location. The impacts and amount of temporary rights required to construct a project in this location would also be reduced for this option. The safety of both

construction workers and the travelling public will be improved by removing traffic from the construction site.

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

Option 2: Phased Construction

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

Based on traffic volumes and the existing roadway width, it would be reasonable to close one lane of traffic, and maintain one lane of traffic, both ways, with a traffic signal. However, the excavation to replace the culvert would be approximately 15'-18' deep. Phasing would require a fairly deep braced excavation immediately adjacent to a live traffic lane while the work is performed. Two subsurface borings were drilled on the site in May, 2014. Bedrock was found to be at approximate elevations of 769 and 777 in the two borings. With the bottom of the existing culvert at approximately elevation 780, these bedrock elevations will prohibit the placement of sheet piles to an adequate depth to perform the work in this manner. Phasing will not be considered further on this project.

Option 3: Temporary Bridge

If it is necessary to detour traffic from the work site, initial investigations indicate that a temporary bridge could be located downstream of the existing structure. An upstream location does not seem feasible due to the presence of a building in the logical pathway of a temporary bridge. A temporary bridge downstream would require the removal of many trees and a large volume of temporary fill to construct the approaches. A temporary bridge on alignment was also considered. An on-alignment temporary bridge would require excavation, structure installation, and backfilling operations taking place under the temporary bridge. In-stream work would occur, as much of these operations would not have access from above. The advantage of this method would be that tree removal and the need for temporary Right-of-Way would be reduced or eliminated. This site is on a fairly high fill section, with approximately 16' of cover over the existing pipe. On the upstream side, a few trees would be lost, but there is a waterfall on the upstream side that has some local scenic value, and this would be impacted. Also, there is a building that would be unavoidable if a temporary bridge is placed upstream. An upstream temporary bridge should be avoided. There are no biological or cultural resource impacts of concern, except for the waterway itself.

A one lane temporary bridge with temporary traffic signals would be appropriate based on the daily traffic volumes. It could be argued that this option would have the smallest impacts to the traveling public, but the duration of time that traffic would be using a temporary bridge would be longer than the duration of a closure and off-site detour. A temporary bridge upstream or downstream would require temporary Right-of-Way acquisition. See the Temporary Bridge Layouts in the appendix.

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

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

V. Alternatives Summary

Based on the existing site conditions, culvert condition, and recommendations from hydraulics and others, the following alternatives are offered:

Alternative 1a: Culvert Rehabilitation Using Pipe Liner with Traffic Maintained with Minor, Occasional Interruption.

Alternative 1b: Culvert Rehabilitation Using Spray-On Liner with Traffic Maintained with Minor, Occasional Interruption.

Alternative 2: Culvert Replacement Using Trenchless Technology with Traffic Maintained with Minor, Occasional Interruption.

Alternative 3a: New Rigid Frame Culvert using Open Cut with Traffic Maintained on Offsite Detour.

Alternative 3b: New Rigid Frame Culvert using Open Cut with Traffic Maintained on Downstream Temporary Bridge.

Alternative 3c: New Rigid Frame Culvert using Open Cut with Traffic Maintained on On-Alignment Temporary Bridge.

VI. Cost Matrix[1]

Weathersfield STP 0146(16)		Do Nothing	Alt 1a	Alt 1b	Alt 2	Alt 3a	Alt 3b	Alt 3c
			Culvert Rehab using Slipliner	Culvert Rehab using Spray-On Liner	Culvert Replacement using Trenchless Technology	Culvert Replacement Open Cut	Culvert Replacement Open Cut	Culvert Replacement Open Cut
			No/Minor Traffic Impact	No/Minor Traffic Impact	No/Minor Traffic Impact	Offsite Detour	Downstream Temporary Bridge	On-Alignment Temporary Bridge
COST	Bridge Cost	$0	$254,000	$270,000	$442,000	$630,000	$630,000	$742,000
	Removal of Structure	$0	$0	$0	$0	$20,000	$20,000	$20,000
	Roadway	$0	$135,000	$135,000	$264,000	$383,000	$383,000	$478,000
	Maintenance of Traffic	$0	$10,000	$10,000	$10,000	$40,000	$210,000	$125,000
	Construction Costs	$0	$399,000	$415,000	$716,000	$1,073,000	$1,243,000	$1,365,000
	Construction Engineering + Contingencies	$0	$116,000	$120,000	$208,000	$311,000	$360,000	$396,000
	Total Construction Costs w CEC	**$0**	**$515,000**	**$635,000**	**$924,000**	**$1,384,000**	**$1,603,000**	**$1,761,000**
	Preliminary Engineering[2]	**$0**	**$140,000**	**$145,000**	**$251,000**	**$375,000**	**$435,000**	**$478,000**
	Right of Way	**$0**	**$14,000**	**$14,000**	**$50,000**	**$75,000**	**$112,000**	**$82,000**
	Total Project Costs	$0	$669,000	$794,000	$1,225,000	$1,834,000	$2,150,000	$2,321,000
SCHEDULING	Project Development Duration[3]	NA	2 years	2 years	2 years	4 years	4 years	4 years
	Construction Duration	NA	2 months	2 months	3 months	4 months	18 months	18 months
	Closure Duration (If Applicable)	NA	NA	NA	NA	21 days	NA	NA
ENGINEERING	Typical Section - Roadway (feet)	28'	28’	28’	28’	28’	28’	28’
	Typical Section - Bridge (feet)	3-11-11-3	3-11-11-3	3-11-11-3	3-11-11-3	3-11-11-3	3-11-11-3	3-11-11-3
	Geometric Design Criteria	No Change	No Change	No Change	No Change	No Change	No Change	No Change
	Traffic Safety	No Change	Improved	Improved	Improved	Improved	Improved	Improved
	Alignment Change	No	No	No	No	No	No	No
	Bicycle Access	No Change	No Change	No Change	No Change	No Change	No Change	No Change
	Hydraulic Performance	No Change	Meets Standard	Meets Standard	Meets Standard	Meets Standard	Meets Standard	Meets Standard
	Pedestrian Access	No Change	No Change	No Change	No Change	No Change	No Change	No Change
	Utility	No Change	No Change	No Change	No Change	No Change	No Change	No Change
OTHER	ROW Acquisition	No	Yes	Yes	Yes	Yes	Yes	Yes
	Road Closure	No	No	No	No	Yes	No	No
	Design Life	<10 years	30 years	30 years	60 years	80 years	80 years	80 years

[1] Costs are estimates only, used for comparison purposes.
[2] Preliminary Engineering costs are estimated starting from the end of the Project Definition Phase.
[3] Project Development Durations are staring from the end of the Project Definition Phase.

VII. Conclusion

Alternative 1a or 1b is recommended; repair the existing culvert while maintaining traffic on VT 131. The estimated initial costs for either of the two options recommended are significantly less than the cost of a complete replacement, and both offer some replacement of structural integrity. Preservation of the existing stone headwall at the upstream end could be considered, but the Hydraulics' staff recommendation to provide a mitered headwall should also be incorporated into the design. Neither AOP nor wildlife connectivity is enhanced, nor are changes in roadway geometry proposed.

Traffic Control:

The recommended method of traffic control is to maintain traffic on VT 131 without planned closures. Slight speed reductions may be used and occasional short and minor delays may be experienced as construction vehicles enter and leave the project site.

Small impacts to adjacent properties are expected and it is conservatively estimated that temporary Right-of-Way will be needed for work space.

Other Issues:

It was noted in the Historic section above that the VTrans Historic Officer is reviewing the status of an existing marble masonry headwall at the inlet of the culvert. As this report goes to the Design Project Manager, it is not known what actions may be required to preserve a potentially significant historic wall. Additional requirements may be applied to the project.

VIII. Appendices

- A. Site Pictures
- B. Town Map
- C. Bridge Inspection Report
- D. Preliminary Hydraulics Memo
- E. Preliminary Geotechnical Report
- F. Natural Resources Memo
- G. Resource ID Completion Memo
- H. Archaeology Memo
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Appendix A: Site Pictures

Looking east

Looking west

Looking upstream

Looking upstream

Inlet

Looking downstream from on the end of the pipe

Interior View

Interior View

Appendix B: Town Map

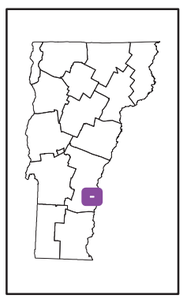
WEATHERSFIELD C15
STP 0146(16)

Scale 1:46,215

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



WEATHERSFIELD
WINDSOR COUNTY
DISTRICT # 2

Appendix C: Bridge Inspection Report

STRUCTURE INSPECTION, INVENTORY and APPRAISAL SHEET

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

Inspection Report for WEATHERSFIELD **bridge no.:** 0015 **District:** 2

Located on: VT131 **over** MILL BROOK **approximately** 2.8 MI W JCT US 5 **Maintained By:** STATE

CONDITION

Deck Rating: N NOT APPLICABLE

Superstructure Rating: N NOT APPLICABLE

Substructure Rating: N NOT APPLICABLE

Channel Rating: 6 SATISFACTORY

Culvert Rating: 5 FAIR

Federal Str. Number: 300146001514201

AGE and SERVICE

Year Built: 1959 **Year Reconstructed:** ____

Type of Service On: 1 HIGHWAY

Type of Service Under: 5 WATERWAY

Lanes On the Structure: 02

Lanes Under the Structure: 00

Bypass, Detour Length (miles): 8

ADT: 4100 **Year of ADT:** 1996

GEOMETRIC DATA

Length of Maximum Span (ft): 11

Structure Length (ft): 11

Lt Curb/Sidewalk Width (ft): 0

Rt Curb/Sidewalk Width (ft): 0

Bridge Rdwy Width Curb-to-Curb (ft): 0

Deck Width Out-to-Out (ft): 0

Appr. Roadway Width (ft): 30

Skew: 20

Bridge Median: 0 NO MEDIAN

Feature Under: FEATURE NOT A HIGHWAY OR RAILROAD

Min Vertical Underclr (ft): 12 FT 00 IN

STRUCTURE TYPE and MATERIALS

Bridge Type: MULTI PLATE PIPE

Number of Main Spans: 1

Kind of Material and/or Design: 3 STEEL

Deck Structure Type: N NOT APPLICABLE

Type of Wearing Surface: N NOT APPLICABLE

Type of Membrane: N NOT APPLICABLE

Deck Protection: N NOT APPLICABLE

CULVERT GEOMETRIC DATA and INDICATORS

Culvert Barrel Length (ft): 114

Average Cover Over Culvert (ft): 16

Waterway Area Through Culvert (sq.ft.): 95

Culvert Wing/Header Rating: 6 SATISFACTORY CONDITION

Steel Culvert Corrosion Indicator: 6 MINOR CORROSION/MINIMAL PERFORATIONS

Multi Plate Culvert Bolt Line Crack Indicator: 1 BOLT LINE CRACKS PRESENT

APPRAISAL

Appr. Rdwy. Alignment: 8 EQUAL TO DESIRABLE CRITERIA

INSPECTION

Inspection Date: 122013 **Inspection Frequency (months):** 60

INSPECTION SUMMARY and NEEDS

12/10/2013 - Pipe is in fair condition with some distortion and bolt line cracking from displacement. A number of loose bolts indicate poor construction and installation technique which likely has lead to shape distress as well. Continue to monitor quinquennially. ~ MJ/JS

Culvert is in fair to good condition. Bolt line cracking along the west side is ok for now. Aggregate along the invert should be removed. Inspected 8-20-08 ~DS

Appendix D: Preliminary Hydraulics Memo

VT AGENCY OF TRANSPORTATION PROGRAM DEVELOPMENT DIVISION

HYDRAULICS UNIT

TO: Christopher Williams, Structures Project Manager

FROM: David Willey, Hydraulics Project Supervisor

DATE: May 2, 2014

SUBJECT: Weathersfield STP 0146(16), VT 131 Br. 15 over Mill Brook
Preliminary Hydraulics
GPS coordinates: N 43.4131° W 72.4559°

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

Existing Conditions

The existing structure is an 11.0' CMPP, providing 95 sq. ft. of waterway area. It was built in 1959. This pipe is in fair condition with bolt-line cracking. The pipe has a laid up stone headwall on the inlet. There are some large ledge falls just upstream of the structure, with a pool area between the base of the falls and the inlet of the pipe. There is about a 4' drop into a large scour pool at the outlet. Thus the structure does not provide AOP.

Our calculations show the existing structure is adequate to convey the design flows. Headwater to depth ratios are within allowable values and all flows up to Q100 pass through the structure with no roadway overtopping. Thus the structure meets the hydraulic standards. However, the structure constricts the natural channel width. Field measurements of bankfull width varied from 15' to 20' in the natural channel areas and up to over 30' in the upstream falls and the pools at the inlet and outlet of the structure. The ANR Vermont Hydraulic Geometry Relationships anticipate a bankfull width of 21 ft. for stream channels in equilibrium at this watershed size. A large scour hole exists at the existing structure outlet indicating that the structure causes a significant hydraulic constriction. Based on the inlet invert elevation of 782.0' shown on the plans, this structure results in a Q50 headwater elevation of 790.1'.

Repair Recommendations

For a repair, we recommend a 10.0' corrugated interior liner with a beveled inlet. This size liner would provide 78.5 sq. ft. of waterway area. It would be adequate hydraulically and there would be no roadway overtopping up to Q100. Headwater elevations would increase and AOP would not be provided. Due to the presence of the waterfalls upstream, that may be acceptable at this site. Assuming the invert of the liner is 0.5' higher than the existing pipe invert, this pipe would result in a Q50 headwater elevation of 790.9'. This liner will require Stone Fill, Type IV protection at the outlet. The stone should extend at least 15' downstream from the outlet.

Liners as small as 8.5' would still meet the hydraulic standard but substantially increase risk (debris, ice, erosion, flooding). If a liner smaller than 10' is needed please let us know so we can calculate specific outlet requirements.

ANR should be contacted to see if any size liner is allowable.

Replacement Recommendations

In sizing a new structure we attempt to select structures that meet both the current VTrans hydraulic standards, state environmental standards with regard to span length and opening height, and allow for roadway grade and other site constraints. Based on the above considerations and the information available, we recommend any of the following structures as a replacement at this site:

1. An open bottom precast concrete arch with a 20' minimum clear span and 7' minimum clear height, providing at least 120 sq. ft. of waterway area. Based on the same inlet invert elevation as the existing pipe, this structure will result in an approximate headwater depth at Q50 = 787.1'.

2. A bridge or rigid frame type structure with a 20' wide by 7' high minimum waterway opening, providing 140 sq. ft. of waterway area. This structure will result in a headwater depth at Q50 = 786.3'.

3. A bridge with spill-through abutments, such as integral abutments, should have a trapezoidal waterway opening. The channel bottom width should be 20', with 1 vertical to 1.5 horizontal slopes up to the abutments. The abutment locations and bridge length can be determined by the desired abutment height. The bridge should have at least 7' of vertical clearance above the average channel bottom and provide at least 140 sq. ft. of waterway area.

4. Any similar structure with a minimum clear span of 20', a minimum channel width of 20', a clear height of at least 7' and at least 120-sq. ft. of waterway area, that fits the site conditions, could be considered.

General comments

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

If the open bottom arch option is installed, we recommend full height concrete headwalls be constructed at the inlet and outlet. The bottom of abutment footings under the arch should be at least six feet below the channel bottom, or to ledge, to prevent undermining.

It is always desirable for a new structure of this size to have flared wingwalls at the inlet and outlet, to smoothly transition flow through the structure, and to protect the structure and roadway approaches from erosion. The wingwalls should match into the channel banks. Any new structure should be properly aligned with the channel, and constructed on a grade that matches the channel.

Additional large stone fill may be required at the structures outlet, due to the anticipated high outlet velocities. We will make recommendations for stone fill when we do Final Hydraulics.

Prior to any further action toward implementation of any of the above recommendations, structure size and type must be confirmed, and may be modified, by the VT ANR River Management Engineer to ensure compliance with state environmental standards for stream crossing structures, and achieve the best, least cost alternative for the design life of the structure. Other regulatory authorities, including the US Army Corps of Engineers may have additional concerns or requirements regarding replacement of this structure.

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

Attachment

DCW

cc: Hydraulics Project File via NJW
Hydraulics Chrono File

Appendix E: Preliminary Geotechnical Report

AGENCY OF TRANSPORTATION **OFFICE MEMORANDUM**

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

From: Marcy Meyers, Geotechnical Engineer via Callie Ewald, P.E., Senior Geotechnical Engineer
CEE

Date: May 29th, 2014

Subject: Weathersfield STP 0146(16) – Preliminary Subsurface Investigation

1.0 INTRODUCTION

We have completed our preliminary geological and geotechnical subsurface investigation for the proposed replacement of Bridge No. 15 located on VT Route 131 over the Mill Brook in Weathersfield, Vermont. The proposed project includes the replacement of the existing bridge with a new structure. Contained herein are the results of field sampling and testing, laboratory analyses of soil and rock samples, as well as boring logs.

2.0 FIELD INVESTIGATION

The field investigation was conducted between May 21st, 2014 and May 22nd, 2014. Two standard penetration borings were drilled to determine the existing subsurface stratum. A summary of the location of each boring and corresponding ground surface elevation can be found in Table 1. The values for the Northings and Eastings are based on the Vermont State Plane Grid Coordinate System NAD 83, and were located by a handheld GPS. Elevations, stations, and offsets were then taken off a provided survey file.

Table 1: Boring Locations and Elevations

Boring Number	Easting (ft)	Northing (ft)	Station (ft)	Offset (ft)	Ground Elevation (ft)	Top of Bedrock Elevation (ft)
B – 101	1652145.06	332786.72	41+64	-13.0	803.9	768.8
B – 102	1652097.56	332782.31	41+24	12.8	807.3	776.6

During the boring operations, split spoon samples and standard penetration tests (SPT) were taken continuously to twenty feet and every five feet thereafter until bedrock. When bedrock was encountered, NX rock cores were taken 10 feet into bedrock to collect five foot core sample runs. The notation 'NXDC' found on the boring logs signifies that the core barrel was used to core ahead through a boulder, cobble, or very dense material. For each boring, soil samples were visually identified and SPT blow counts were recorded on the boring logs.

3.0 FIELD AND LABORATORY TESTING

The standard penetration resistance of the in-situ soil is determined by the number of blows required to drive a 2 inch OD split barrel sampler into the soil with a 140 pound hammer dropped from a height of 30 inches, in accordance with procedures specified in AASHTO T206. During the standard penetration test (SPT), the sampler is driven for a total length of 2 feet, while counting the blows for each 6 inch

increment. The SPT N-value, which is defined as the sum of the number of blows required to drive the sampler through the second and third increments, is commonly used with established correlations to estimate a number of soil parameters, particularly the shear strength and density of cohesionless soils. The N values provided on the boring logs are raw values and have not been corrected for energy, borehole diameter, rod length or overburden pressure. The VT Agency of Transportation has determined a hammer correction value, C_E, to account for the efficiency of the SPT hammer on the drill rig. For this project, a CME 45C Skid Rig was used, with a hammer energy correction factor of 1.33. This value, included on the boring logs, should be used in calculations to determine soil parameters. Laboratory tests were conducted on all samples to evaluate grain size, moisture content, and percent finer than No. 200 sieve. Results from this testing can be found on the attached boring logs.

A detailed description of the rock cores is presented on the logs in addition to Recovery and Rock Quality Designation (RQD). The percent recovery is defined as the length of core obtained expressed as a percentage of the total length cored. RQD is the total length of core pieces, 4 inches or greater in length, expressed as a percentage of the total length cored. RQD provides an indication of the integrity of the rock mass and relative extent of seams, jointing and bedding planes.

4.0 FOUNDATION RECOMMENDATIONS

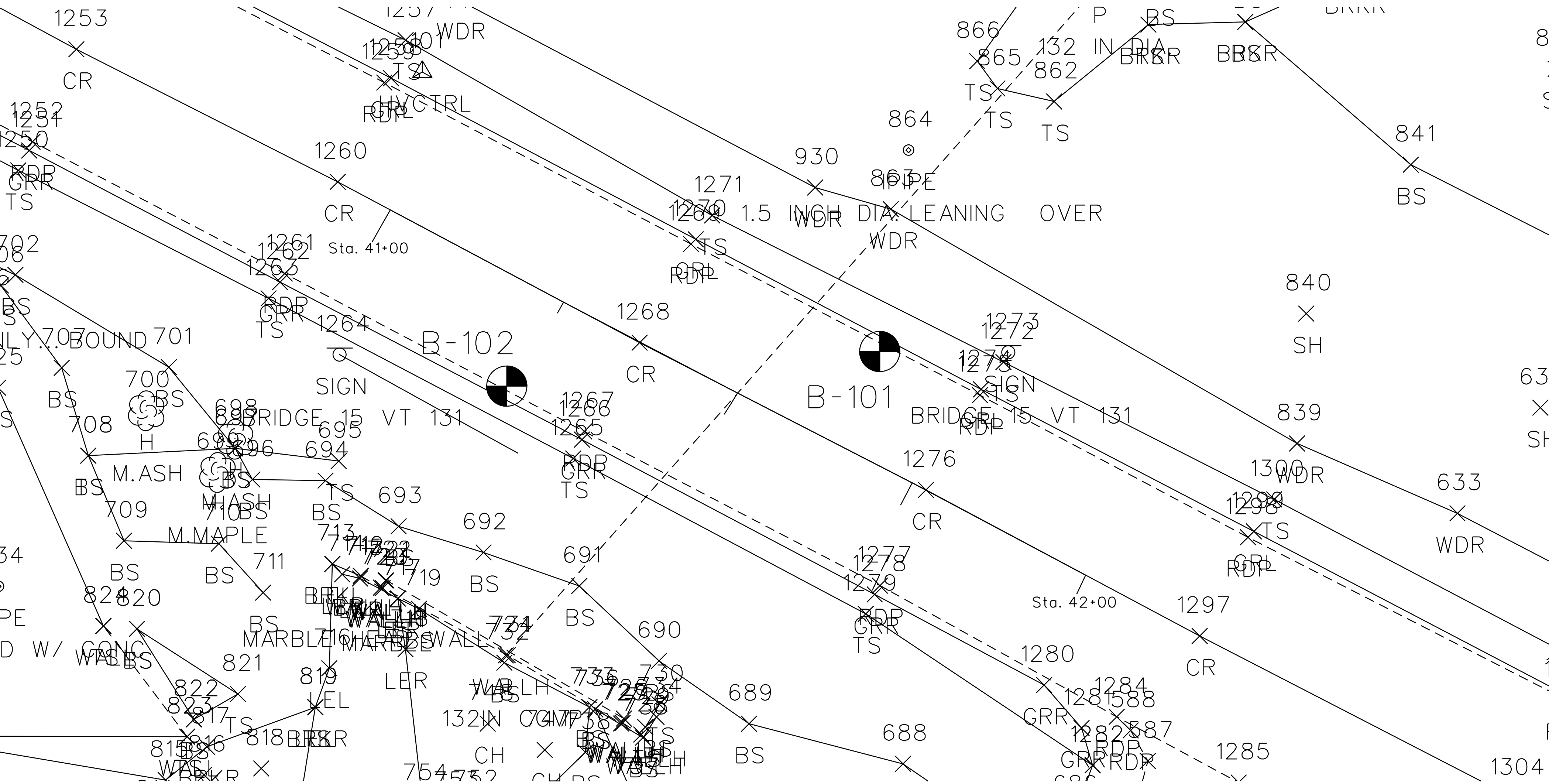
Based on a preliminary look at the subsurface investigation results and the presence of bedrock at depths close to the current bottom of culvert location, a precast arch bridge supported on spread footings or a reinforced concrete box culvert with new headwalls and wingwalls are considered feasible options. The dense granular overburden material as well as the moderately hard and unweathered bedrock appear to be suitable for spread footings on soil or rock.

5.0 CONCLUSION

Once further information becomes available, we would be happy to assist in the analysis and design of components of the substructure. If you have any questions, or you would like to discuss this report, please contact us at (802) 828-2561. The boring logs are attached as available in the M:Projects\00C266\MaterialsResearch folder.

Enclosures: Boring Location Plan – 1 page
Boring Logs – 2 pages

cc: Electronic Read File/WEA
Project File/CEE
MLM


B-102
B-101
Sta. 41+00
Sta. 42+00
SIGN
BRIDGE 15 VT 131
1.5 INCH DIA. LEANING OVER
HVCTRL
IPIPE
M.ASH
M.MAPLE
MARBLE
132 IN DIA
CR
TS
BS
SH
WDR
RDP
GRR
1253
1260
1268
1276
1297
1300
841
840
839
633
632
930
864
866
865
862
701
700
708
709
711
694
693
692
691
690
689
688
1285
1304

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

BORING LOG

WEATHERSFIELD
STP 0146(16)
VT-131 BR-15

Boring No.: **B-101**
Page No.: 1 of 2
Pin No.: 00C266
Checked By: MLM

Boring Crew: DAIGNEAULT, NIETO, HOOK
Date Started: 5/21/14 Date Finished: 5/21/14
VTSPG NAD83: N 332786.72 ft E 1652145.06 ft
Station: 41+64 Offset: -13.00
Ground Elevation: 803.9 ft

	Casing	Sampler
Type:	WB	SS
I.D.:	4 in	1.5 in
Hammer Wt:	N.A.	140 lb.
Hammer Fall:	N.A.	30 in.
Hammer/Rod Type:	Auto/AWJ	
Rig:	CME 45C SKID	C_F = 1.33

Groundwater Observations

Date	Depth (ft)	Notes
05/21/14	7.1	After drilling.

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Asphalt Pavement, 0.0 ft - 1.24 ft								
		Field Note:, No Recovery, Roller coned and cleaned out casing.				11-12-9-13 (21)				
2.5		A-2-4, SiSaGr, Lt/brn, Moist, Rec. = 0.6 ft, Roller coned and cleaned out casing.				10-9-33-R@2.5" (42)	11.4	41.5	32.5	26.0
5.0		A-1-b, SiSaGr, Dk/brn, Moist, Rec. = 0.6 ft, Lab Note: Broken Rock was within sample.				22-34-33-R@5.0" (67)	11.9	51.2	27.6	21.2
		Field Note:, Roller coned and cleaned out casing.								
		Field Note:, No Recovery				R@5.0" (R)				
7.5		Field Note:, NXDC								
10.0		A-2-4, GrSiSa, Dk/brn-gry, Moist, Rec. = 1.0 ft, NXDC and cleaned out casing.				14-16-23-31 (39)	12.8	28.3	36.3	35.4
12.5		A-2-4, SiSaGr, gry-Dk/brn, Moist, Rec. = 1.0 ft, NXDC and cleaned out casing. Lab Note: Broken Rock was within sample.				32-28-25-R@1.0" (53)	11.8	38.1	33.5	28.4
		A-2-4, SiSaGr, gry, Moist, Rec. = 1.4 ft, NXDC and cleaned out casing. Lab Note: Broken Rock was within sample.				15-13-19-14 (32)	14.9	37.1	31.8	31.1
15.0		A-4, GrSaSi, gry, Moist, Rec. = 1.2 ft, NXDC and cleaned out casing. Lab Note: Broken Rock was within sample.				13-8-7-6 (15)	14.5	26.6	36.4	37.0
17.5		A-2-4, SiGrSa, gry, Moist, Rec. = 0.8 ft, NXDC and cleaned out casing. Lab Note: Broken Rock was within sample.				3-3-4-10 (7)	14.6	34.6	36.3	29.1
20.0		A-4, GrSiSa, gry-tan, Moist, Rec. = 0.8 ft				8-24-17-8 (41)	16.9	25.0	39.1	35.9
22.5										
		Field Note:, NXDC								

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.

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

BORING LOG

WEATHERSFIELD
STP 0146(16)
VT-131 BR-15

Boring No.: **B-101**
Page No.: 2 of 2
Pin No.: 00C266
Checked By: MLM

Boring Crew: DAIGNEAULT, NIETO, HOOK
Date Started: 5/21/14 Date Finished: 5/21/14
VTSPG NAD83: N 332786.72 ft E 1652145.06 ft
Station: 41+64 Offset: -13.00
Ground Elevation: 803.9 ft

	Casing	Sampler
Type:	WB	SS
I.D.:	4 in	1.5 in
Hammer Wt:	N.A.	140 lb.
Hammer Fall:	N.A.	30 in.
Hammer/Rod Type:	Auto/AWJ	
Rig:	CME 45C SKID	C_F = 1.33

Groundwater Observations

Date	Depth (ft)	Notes
05/21/14	7.1	After drilling.

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		A-1-b, GrSa, Lt/brn, Moist, Rec. = 0.7 ft, Lab Note: Broken Rock was within sample.				9-7-41-28 (48)	10.8	36.1	50.9	13.0
27.5		Visual Description:, Mostly Broken Rock with silty sand, Dk/gry, Moist, Rec. = 0.2 ft					9.5			
		Field Note:, NXDC								
30.0		A-1-b, SiGrSa, gry, Moist, Rec. = 0.5 ft, Lab Note: Broken Rock was within sample.				28-R@3.5" (R)	13.9	35.4	42.7	21.9
32.5		Field Note:, NXDC								
		A-1-b, SiGrSa, gry, Moist, Rec. = 0.1 ft				R@1.0" (R)	13.1	37.6	40.6	21.8
35.0		35.1 ft - 40.1 ft, Dark-to light-gray, lustrous, carbonaceous chlorite-biotite-muscovite-quartz Phyllite, with thin beds of quartzite. Moderately hard, Unweathered, Fair rock, NXMDC, RMR = 56	1 (40)	94 (66)	5 8 8 7 6	Top of Bedrock @ 35.1 ft				
37.5										
40.0		40.1 ft - 45.1 ft, Dark-to light-gray, lustrous, carbonaceous chlorite-biotite-muscovite-quartz Phyllite, with thin beds of quartzite. Moderately hard, Unweathered, Good rock, NXMDC, RMR = 63	2 (40)	94 (90)	5 7 7 9 7					
42.5										
45.0		Hole stopped @ 45.1 ft								
47.5		Remarks: Hole collapsed at 16.7 ft.								

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.

BORING LOG 2 WEATHERSFIELD STP 0146(16).GPJ VERMONT AOT.GDT 5/29/14

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

BORING LOG

WEATHERSFIELD
STP 0146(16)
VT-131 BR-15

Boring No.: **B-102**
Page No.: 1 of 2
Pin No.: 00C266
Checked By: MLM

Boring Crew: DAIGNEAULT, JUDKINS
Date Started: 5/22/14 Date Finished: 5/22/14
VTSPG NAD83: N 332782.31 ft E 1652097.56 ft
Station: 41+24 Offset: 12.80
Ground Elevation: 807.3 ft

	Casing	Sampler
Type:	WB	SS
I.D.:	4 in	1.5 in
Hammer Wt:	N.A.	140 lb.
Hammer Fall:	N.A.	30 in.
Hammer/Rod Type:	Auto/AWJ	
Rig:	CME 45C SKID	C_F = 1.33

Groundwater Observations

Date	Depth (ft)	Notes
		Not recorded.

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Asphalt Pavement, 0.0 ft - 1.21 ft								
		Visual Description:, GrSa with Asphalt Pavement, Dk/brn, Moist, Rec. = 0.9 ft				13-12-12-15 (24)	11.3			
2.5		A-1-b, GrSa, brn, Moist, Rec. = 1.1 ft				7-14-9-6 (23)	11.4	34.5	48.7	16.8
5.0		Visual Description:, SaSi with Asphalt Pavement, brn, Moist, Rec. = 0.9 ft				9-8-48-27 (56)	13.8			
7.5		A-4, SaGrSi, brn, Moist, Rec. = 0.4 ft, NXDC. Lab Note: Broken Rock was within sample.				8-4-5-8 (9)	14.0	34.7	27.4	37.9
		A-4, SaSi, Lt/brn, MTW, Rec. = 0.5 ft, NXDC and Cleaned out casing.				6-2-2-2 (4)	18.9	17.3	33.7	49.0
10.0		A-2-4, GrSiSa, Lt/brn, MTW, Rec. = 0.2 ft, NXDC and Cleaned out casing.				4-3-2-4 (5)	17.2	24.2	43.5	32.3
12.5		A-1-b, SaGr, brn, MTW, Rec. = 0.4 ft, NXDC. Lab Note: Broken Rock was within sample.				9-3-3-5 (6)	14.4	54.7	28.0	17.3
15.0		A-2-4, SiSaGr, brn, MTW, Rec. = 0.9 ft, NXDC. Lab Note: Broken Rock was within sample.				6-5-6-6 (11)	16.6	37.3	33.7	29.0
17.5		A-2-4, SiSaGr, brn-gry, MTW, Rec. = 0.6 ft, NXDC. Lab Note: Broken Rock was within sample.				5-11-7-7 (18)	19.7	44.0	30.2	25.8
20.0		Visual Description:, SaGr, brn-gry, MTW, Rec. = 0.1 ft, Insufficient sample for testing.				5-3-8-4 (11)	30.5			
22.5										
		Field Note:, NXDC and Cleaned out casing.								

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.

BORING LOG 2 WEATHERSFIELD STP 0146(16).GPJ VERMONT AOT.GDT 5/29/14

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

BORING LOG

WEATHERSFIELD
STP 0146(16)
VT-131 BR-15

Boring No.: **B-102**
Page No.: 2 of 2
Pin No.: 00C266
Checked By: MLM

Boring Crew: DAIGNEAULT, JUDKINS
Date Started: 5/22/14 Date Finished: 5/22/14
VTSPG NAD83: N 332782.31 ft E 1652097.56 ft
Station: 41+24 Offset: 12.80
Ground Elevation: 807.3 ft

	Casing	Sampler
Type:	WB	SS
I.D.:	4 in	1.5 in
Hammer Wt:	N.A.	140 lb.
Hammer Fall:	N.A.	30 in.
Hammer/Rod Type:	Auto/AWJ	
Rig:	CME 45C SKID	C_F = 1.33

Groundwater Observations

Date	Depth (ft)	Notes
		Not recorded.

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Field Note:, No Recovery, Appears to be silty sand in water return.				4-1-2-1 (3)				
27.5		Field Note:, NXDC and Cleaned out casing.								
30.0		Lab Note, Sample was mostly fractured rock pieces, Dk/gry, Wet, Rec. = 0.5 ft				35-R@2.5" (R)	46.0	42.7	38.9	18.4
		30.7 ft - 35.7 ft, Dark-to light-gray, lustrous, carbonaceous chlorite-biotite-muscovite-quartz Phyllite, with thin beds of quartzite. Moderately hard, Unweathered, Fair rock, NXMDC, RMR = 51	1 (40)	94 (38)	4 5 4 6 12	Top of Bedrock @ 30.7 ft				
32.5										
35.0										
		35.7 ft - 40.7 ft, Dark-to light-gray, lustrous, carbonaceous chlorite-biotite-muscovite-quartz Phyllite, with thin beds of quartzite. Moderately hard, Unweathered, Fair rock, NXMDC, RMR = 51	2 (40)	100 (34)	4 6 5 6 8					
37.5										
40.0		Hole stopped @ 40.7 ft								
42.5		Remarks: Hole collapsed at 7.2 ft.								
45.0										
47.5										

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.

BORING LOG 2 WEATHERSFIELD STP 0146(16).GPJ VERMONT AOT.GDT 5/29/14

Appendix F: Natural Resources Memo

AGENCY OF TRANSPORTATION **OFFICE MEMORANDUM**

TO: Lee Goldstein, Environmental Specialist

FROM: John Lepore, Transportation Biologist

DATE: February 6, 2014

SUBJECT: **Weathersfield STP 0146 (16)**
Natural Resources ID
Bridge 15 on VT 131

I have completed my review of this project which included both a desk review and a site visit. Based on my review, I have report the following:

Wetlands
There are no mapped wetlands in the immediate vicinity of this crossing.

Agricultural Soils
There are no prime agricultural soils located in the vicinity of this crossing.

Floodplains
This project is not located on a mapped floodplain.

Fisheries
Mill Brook is a direct tributary of the Connecticut River and has a cold-water fishery. Just the same, immediately upstream of this crossing is a natural falls which appears to be a barrier to fish passage. If the structure is designed with a provision for aquatic organism passage, it would be more resilient for high flows and scour.

Species of Special Concern
There are no rare, threatened or endangered species or habitats of special concern in the vicinity of this crossing.

Permits & Construction
This watercourse is regulated by the US Army Corps of Engineers, and the removal of existing vegetation along the stream should be minimized, and if there is a need to removal some of this vegetation during construction, the site should be restored by planting native trees and shrubs.

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

Appendix G: Natural Resources ID

Completion Memo

OFFICE MEMORANDUM

AOT - PROGRAM DEVELOPMENT DIVISION

RESOURCE IDENTIFICATION COMPLETION MEMO

TO: Chris Williams, Project Manager
FROM: Jeff Ramsey, Environmental Specialist
DATE: June 4, 2014
PIN: 00C266

Project: Weathersfield STP 0146 (16)

ENVIRONMENTAL RESOURCES:

Wetlands:	___	Yes	X	No
Historic/Historic District:	___	Yes	X	No
Archaeological Site:	___	Yes	X	No
4(f) Property:	___	Yes	X	No
6(f) Property:	___	Yes	X	No
Agricultural Land:	X	Yes	___	No Statewide on both sides
Fish & Wildlife Habitat:	X	Yes	___	No Mill Brook
Endangered Species:	___	Yes	X	No
Hazardous Waste:	___	Yes	X	No
Stormwater:	___	Yes	X	No
USDA-Forest Service Lands:	___	Yes	X	No
Wildlife Habitat Connectivity:	X	Yes	___	No habitat connectivity rating of 7 (10 being the best habitat), consider wildlife passage for this structure
Scenic Highway/ Byway:	___	Yes	X	No
Act 250 Permits:	___	Yes	___	No unknown

If you have any questions or need additional information please let me know.
Thanks,
Jeff

cc:
Project File

Appendix H: Archaeological Memo

VERMONT

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

Agency of Transportation

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

To: Lee Goldstein, Environmental Specialist

From: Jeannine Russell, VTrans Archaeology Officer

Date: June 4, 2014

Subject: Weathersfield STP 0146(16) – Archaeological Resource ID

The scope of this project has not yet been determined but includes the area surrounding Culvert 15 on VT 131. An Archaeological Resources ID was completed on 5-22-14. For the purposes of this resource ID, a 200 foot radius around the bridges was used as the project area.

The area surrounding the project consists of steeply sloping terrain along VT 131. There is a small level area on the south side of 131 that contains a few properties, a stone wall and waterfall. The culvert itself is a corrugated steel pipe but the inlet is faced with crafted marble. This is a very interesting feature but the culvert itself is not significant for archaeological resources. Unless there is a previously existing agreement to retain the marble facing, it is not an archaeological concern for this project. There are no other archaeologically sensitive areas or known sites within or adjacent to the project area.

A formal clearance will be issued once plans are available for review.
Please contact me if you have any questions.

Thank you,
Jen Russell
VTrans Archaeology Officer

VTrans Working to Get You There
Vermont Agency of Transportation

Appendix I: Historic Memo

Ramsey, Jeff

From: Newman, Scott
Sent: Tuesday, February 04, 2014 11:00 AM
To: Ramsey, Jeff
Cc: O'Shea, Kaitlin; Williams, Chris
Subject: CW Bridges Resource ID's

Jeff –

I have completed the resource ID for the following bridge projects:

Londonderry BF 016-1(33)
Searsburg BF 010-1(50)
Weathersfield STP 0146(16)

None of the above bridges are historic, and none of the project areas contain any above-ground historic or Section 4(f) resources. When these projects come in for NEPA they will be processed as NHPA for 106 and n/a for 4(f)

Thanks,
Scott

Appendix J: Local Input

Local & Regional Input Questionnaire

Project Name: Weathersfield VT131 Bridge(Culvert) 15 over Mill Brook
Project Number: Weathersfield STP 0146(16)

Note: Weathersfield has several villages/ hamlets within town – including Ascutney, Perkinsville and Amsden-Downers. The town also has two post offices – Ascutney and Perkinsville.

Attachments Uploaded at
https://drive.google.com/folderview?id=0B2jtfm2nTjt4M3BKdGNJNEF0SVU&usp=sharing

- Current Land Use Map
- Public Facilities Map

Community Considerations

1. Are there any scheduled public events in the community that will generate increased traffic (e.g. vehicular, bicycles and/or pedestrians), or may be difficult to stage if the bridge is closed during construction? Examples include: a bike race, festivals, cultural events, farmers market, concerts, etc. that could be impacted? If yes, please provide date, location and event organizers' contact info.
   No particular events.

2. Is there a "slow season" or period of time from May through October where traffic is less?
   No particular slow season

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

   Ascutney Volunteer Fire Department. Postal address – PO Box 91, Ascutney, VT 05030. Physical address – just west of I-91 on VT-131. Fire Chief: Darrin Spaulding
   West Weathersfield Fire Department. 7259 Route 131, Perkinsville, VT 05151. Fire Chief: Josh Dauphin

   Ambulance. Golden Cross Ambulance, Claremont, NH

   Weathersfield Police Department. Postal address – PO Box 550, Ascutney, VT 05030. Police Chief William Daniels. 5259 Route 5, Ascutney, VT.

   Emergency Management Director – John Arrison wattsup#@tds.net

   Emergency Response Routes – VT-131 is the key (and only paved) east-west road in town.

4. Where are the schools in your community and what are their schedules?
   Weathersfield School (Elementary School) 135 Schoolhouse Road, Ascutney, VT 05030 – Summer dates approx June 16 through August 22

   Springfield High School or Windsor High School

5. In the vicinity of the bridge, is there a land use pattern, existing generators of pedestrian and/or bicycle traffic, or zoning that will support development that is likely to lead to significant levels of walking and bicycling? Please explain.
   Rural residential land use in the area. No pedestrians. Some cyclists along the roadway, but not a significant number.

6. Are there any businesses (including agricultural operations) that would be adversely impacted either by a detour or due to work zone proximity?
   No

7. Are there any important public buildings (town hall or community center) or community facilities (recreational fields or library) in close proximity to the proposed project?
   No

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

9. Are there any other municipal operations that could be adversely impacted if the bridge is closed during construction? If yes, please explain.
   No if short term closure of a few days.
   Transfer station (5024 Route 106, Perkinsville, VT 05151) would be affected if more than a few days.

10. Please identify any local communication channels that are available—e.g. weekly or daily newspapers, blogs, radio, public access TV, Front Porch Forum, etc. Also include any unconventional means such as local low-power FM.
    Message for the Week – Weekly newspaper
    Eagle Times – Daily newspaper
    Newspaper of record is Valley News.
    News updates emailed from Town Website - http://www.weathersfieldvt.org/home
    Facebook - https://www.facebook.com/weathersfieldvt

11. Is there a local business association, chamber of commerce or other downtown group that we should be working with?
    No local business association, chamber of commerce or downtown group to work with

Design Considerations

1. Are there any concerns with the alignment of the existing bridge? For example, if the bridge is located on a curve, has this created any problems that we should be aware of?
   No particular concerns

2. Are there any concerns with the width of the existing bridge?
   No particular concerns

3. What is the current level of bicycle and pedestrian use on the bridge?
   No pedestrians. Some cyclists, but not many (on-road bicycling).

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

5. Does the Town have plans to construct either bicycle or pedestrian facilities leading up to the bridge? Please provide a copy of the planning document that demonstrates this (e.g. scoping study, master plan, corridor study) Please explain and provide documentation.
   No plans for bicycle or pedestrian facilities nearby

6. Does the bridge provide an important link in the town or statewide bicycle or pedestrian network such that you feel that bicycle and pedestrian traffic should be accommodated during construction?
   Good link from I-91 to scenic highway (VT-131 in Cavendish) and Ludlow. But no particular accommodations for bicycle or pedestrian traffic needed during construction

7. Are there any special aesthetic considerations we should be aware of?
   Not aware of any

8. Are there any traffic, pedestrian or bicycle safety concerns associated with the current bridge? If yes, please explain.
   No particular concerns

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

10. Are you aware of any nearby Hazardous Material Sites?
    None known

11. Are you aware of any historic, archeological and/or other environmental resource issues?
    None known

12. Are there any other comments you feel are important for us to consider that we have not mentioned yet?
    No

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

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

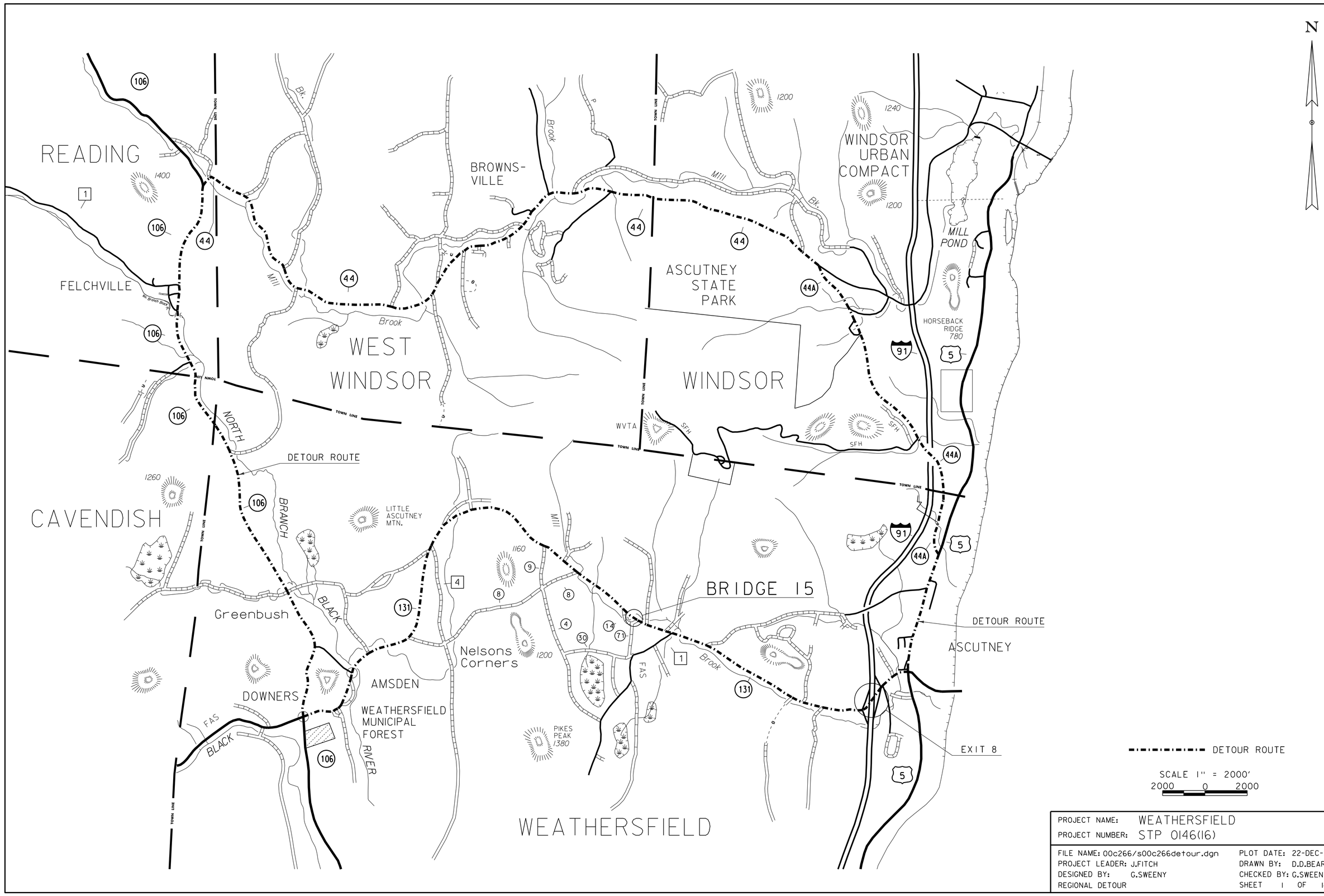
2. Please provide a copy of your existing and future land use map, if applicable.

Current Land Use Map uploaded at
https://drive.google.com/folderview?id=0B2jtfm2nTjt4M3BKdGNJNEF0SVU&usp=sharing
Future Land Use map currently being revised, so not uploaded.

3. Are there any existing, pending or planned development proposal that would impact future transportation patterns near the bridge? If so please explain.
   None

4. Is there any planned expansion of public transit service in the project area? If not known please contact your Regional Public Transit Provider.
   None known. Currently no transit service

Appendix K: Detour



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PROJECT NUMBER:	STP 0146(16)
FILE NAME: 00c266/s00c266detour.dgn	PLOT DATE: 22-DEC-2014
PROJECT LEADER: J.FITCH	DRAWN BY: D.D.BEARD
DESIGNED BY: G.SWEENY	CHECKED BY: G.SWEENY
REGIONAL DETOUR	SHEET 1 OF 14

Appendix L: Plans

ROSSI, PELLEGRINO A. & DONNA M.

LUTZ, IAN R. & JENNIFER C.

N

VT STATE PLANE GRID

EXISTING STATE RIGHT-OF-WAY

IRON PIPE 2" DIA. FILLED W/ CONCRETE

42" DIA CONCRETE TILE) WELL

MM I-3TO 1-4TO 0580

IRON PIPE 1.5" DIA. LEANING OVER

SIGN VD-TOI BRIDGE 15

HVCTRL 101

HVCTRL 3

MILL BROOK FLOW

WOODS DRIVE

VT ROUTE 131 TO CAVENDISH

VT ROUTE 131 TO I-91

51+00

52+00

40+00

41+00

42+00

43+00

HVCTRL 4

REBAR BOUNDRY MARKER

SIGN VD-TOI BRIDGE 15 VT-131

MARBLE HEADWALL

SIGN VR-017 (24K)

SIGN D3-1 (JARVIS RD)

SIGN RIVT MM I-3TO 1-4TO 0598

EXISTING STATE RIGHT-OF-WAY

COMB 82 154

GUY

TV ANTENNA

BENCH MARK
RAIL ROAD SPIKE
IN TREE
ELEV. = 820.13

42" DIA CONCRETE WELL COVER

IRON PIPE 2" DIA. FILLED W/ CONCRETE

ROW OF 5 MAILBOXES

CONCRETE BOUNDRY MARKER

TH 71 (JARVIS ROAD)

CONCRETE BOUNDRY MARKER STHD

50+00

HVCTRL 100

MILL BROOK FLOW

WOODEN FOOT BRIDGE

AER E&T

COMB 84 152

COMB 83 153

COMB 14

EXISTING TOWN RIGHT-OF-WAY

ROBERTS, JASON J. & ELIZABETH J.

ROSSI, PELLEGRINO A. & DONNA M.

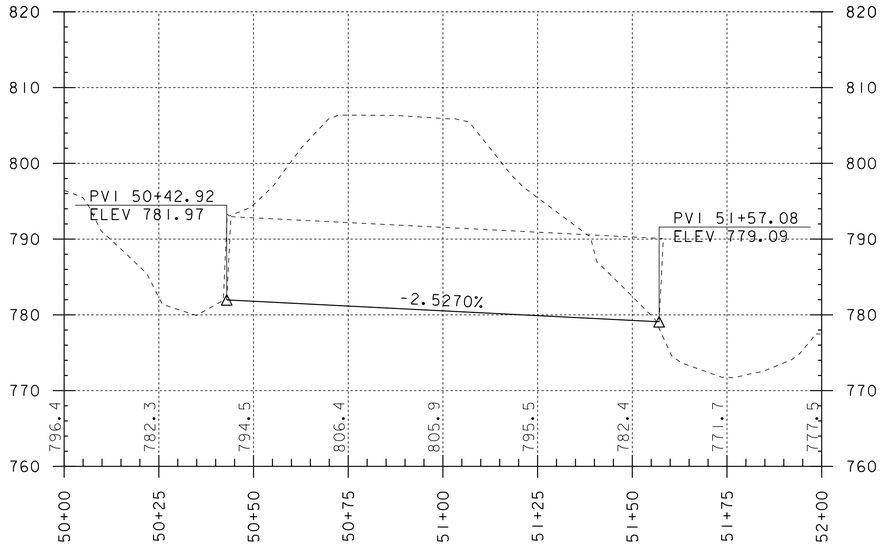
TOWNE, DORIS A.

EXISTING CULVERT INFO
11'-0" CORRIGATED GALVIANIZED
MULTIPLATE PIPE 114'-0" LONG
WATERWAY AREA = 95 SQFT
16' AVERAGE COVER

EXISTING CONDITIONS

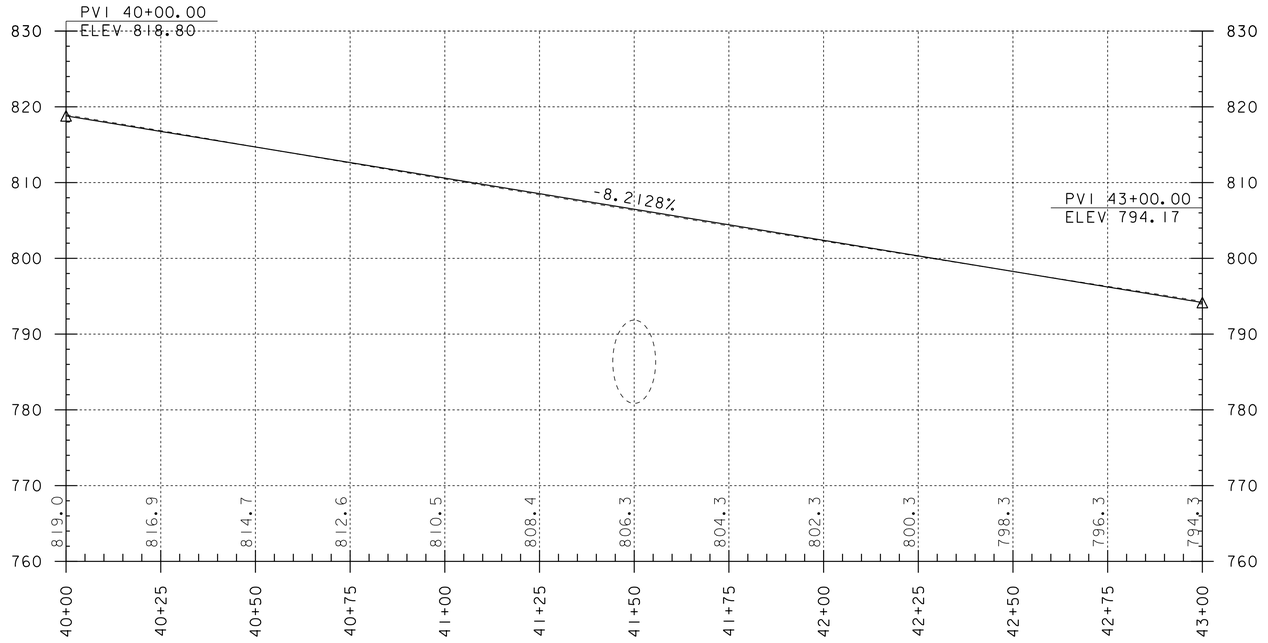
SCALE 1" = 20'-0"
20 0 20

PROJECT NAME:	WEATHERSFIELD
PROJECT NUMBER:	STP 0146(16)
FILE NAME: 00c266/s00c266border.dgn	PLOT DATE: 22-DEC-2014
PROJECT LEADER: J.FITCH	DRAWN BY: D.D.BEARD
DESIGNED BY: G.SWEENY	CHECKED BY: G.SWEENY
EXISTING CONDITIONS	SHEET 2 OF 14



CULVERT 15 EXISTING PROFILE

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



VT 131 EXISTING PROFILE

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

NOTE:

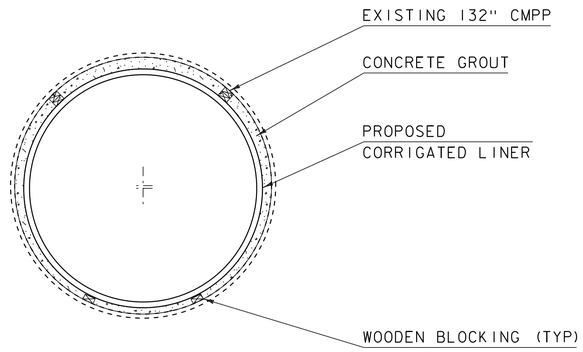
GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: WEATHERSFIELD
PROJECT NUMBER: STP 0146(16)

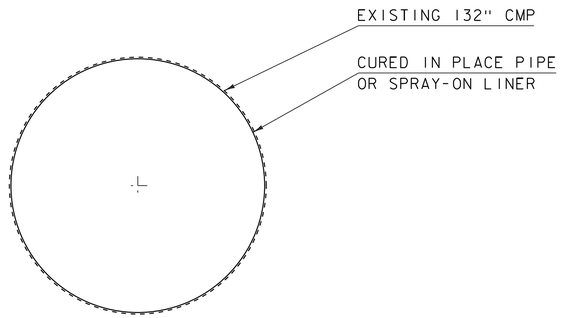
FILE NAME: 00c266/s00c266profile.dgn
PROJECT LEADER: J.FITCH
DESIGNED BY: G.SWEENY
EXISTING PROFILE SHEET

PLOT DATE: 22-DEC-2014
DRAWN BY: D.D.BEARD
CHECKED BY: G.SWEENY
SHEET 3 OF 14



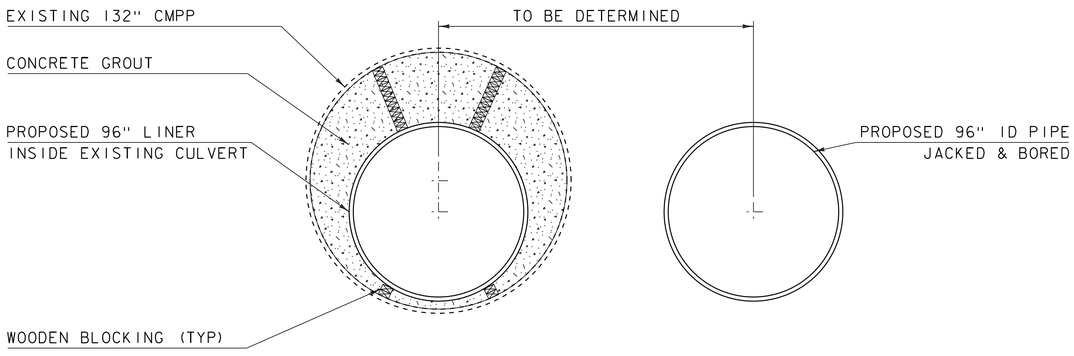
ALTERNATIVE 1A TYPICAL SECTION

N.T.S.



ALTERNATIVE 1B TYPICAL SECTION

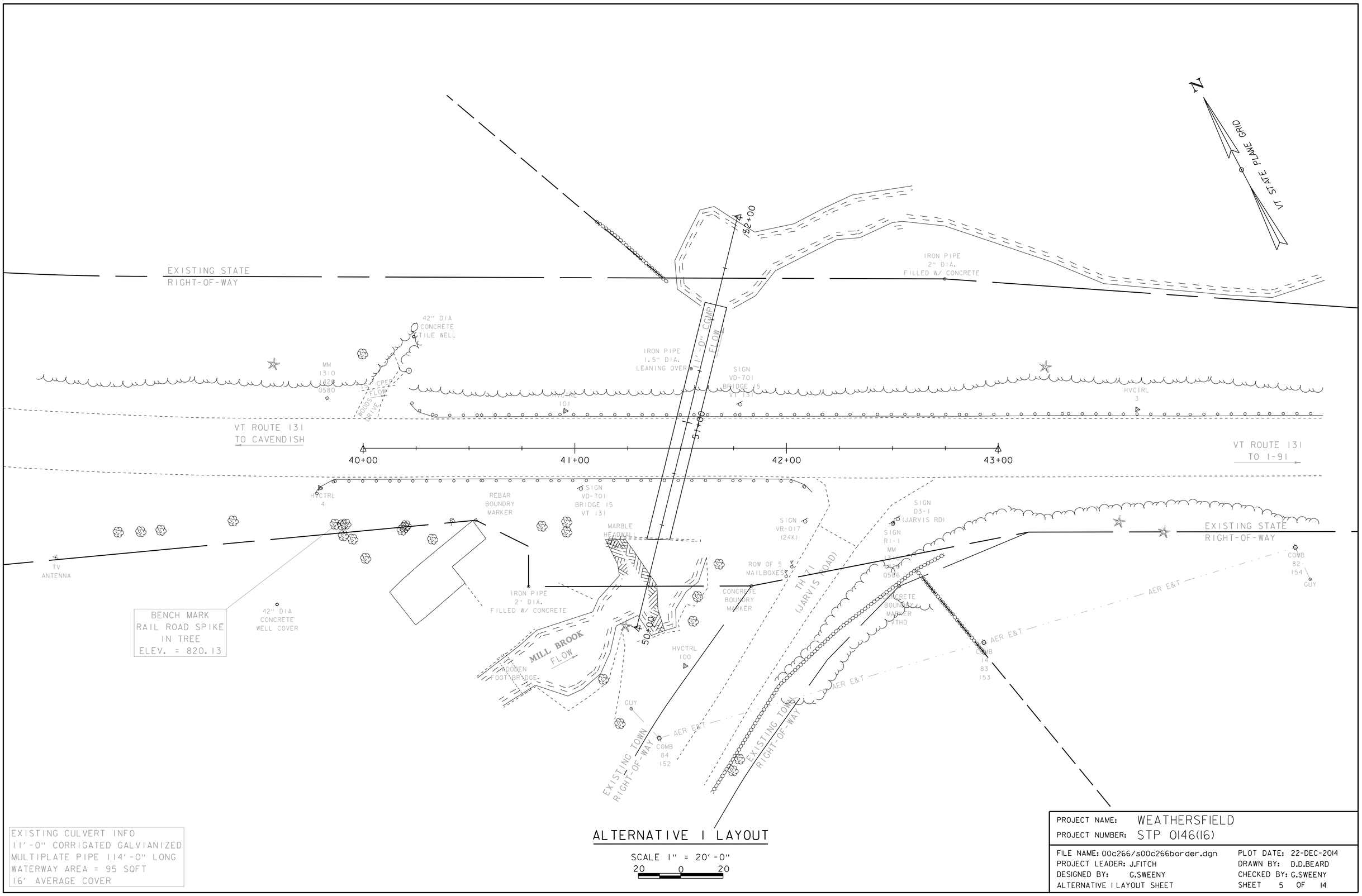
N.T.S.



ALTERNATIVE 2 TYPICAL SECTION

N.T.S.

PROJECT NAME:	WEATHERSFIELD
PROJECT NUMBER:	STP 0146(16)
FILE NAME: 00c266/s00c266typical.dgn	PLOT DATE: 22-DEC-2014
PROJECT LEADER: J.FITCH	DRAWN BY: D.D.BEARD
DESIGNED BY: G.SWEENY	CHECKED BY: G.SWEENY
TYPICAL SECTIONS	SHEET 4 OF 14



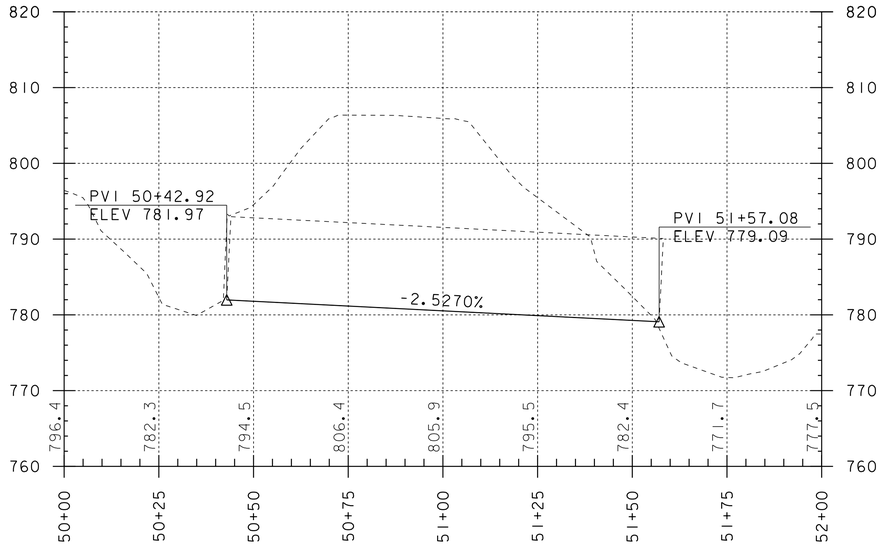
ALTERNATIVE 1 LAYOUT

SCALE 1" = 20'-0"

20 0 20

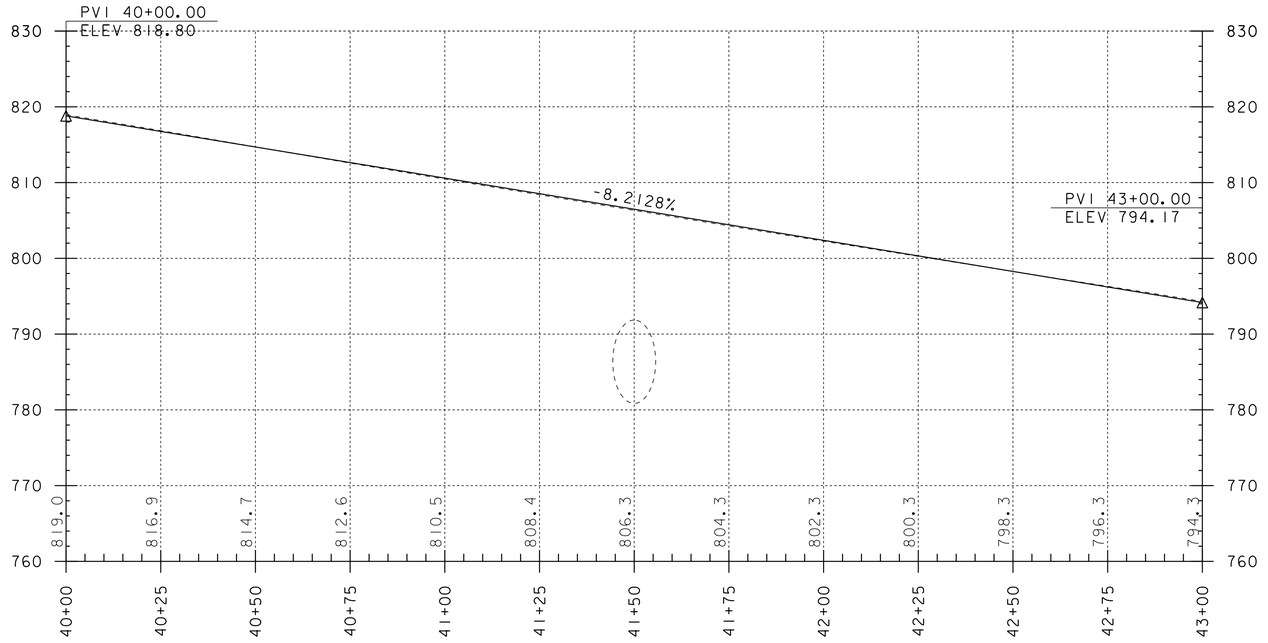
EXISTING CULVERT INFO
11'-0" CORRIGATED GALVIANIZED
MULTIPLATE PIPE 114'-0" LONG
WATERWAY AREA = 95 SQFT
16' AVERAGE COVER

PROJECT NAME:	WEATHERSFIELD
PROJECT NUMBER:	STP 0146(16)
FILE NAME: 00c266/s00c266border.dgn	PLOT DATE: 22-DEC-2014
PROJECT LEADER: J.FITCH	DRAWN BY: D.D.BEARD
DESIGNED BY: G.SWEENY	CHECKED BY: G.SWEENY
ALTERNATIVE 1 LAYOUT SHEET	SHEET 5 OF 14



CULVERT 15 ALTERNATIVE 1 PROFILE

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



VT 131 ALTERNATIVE 1 PROFILE

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

NOTE:

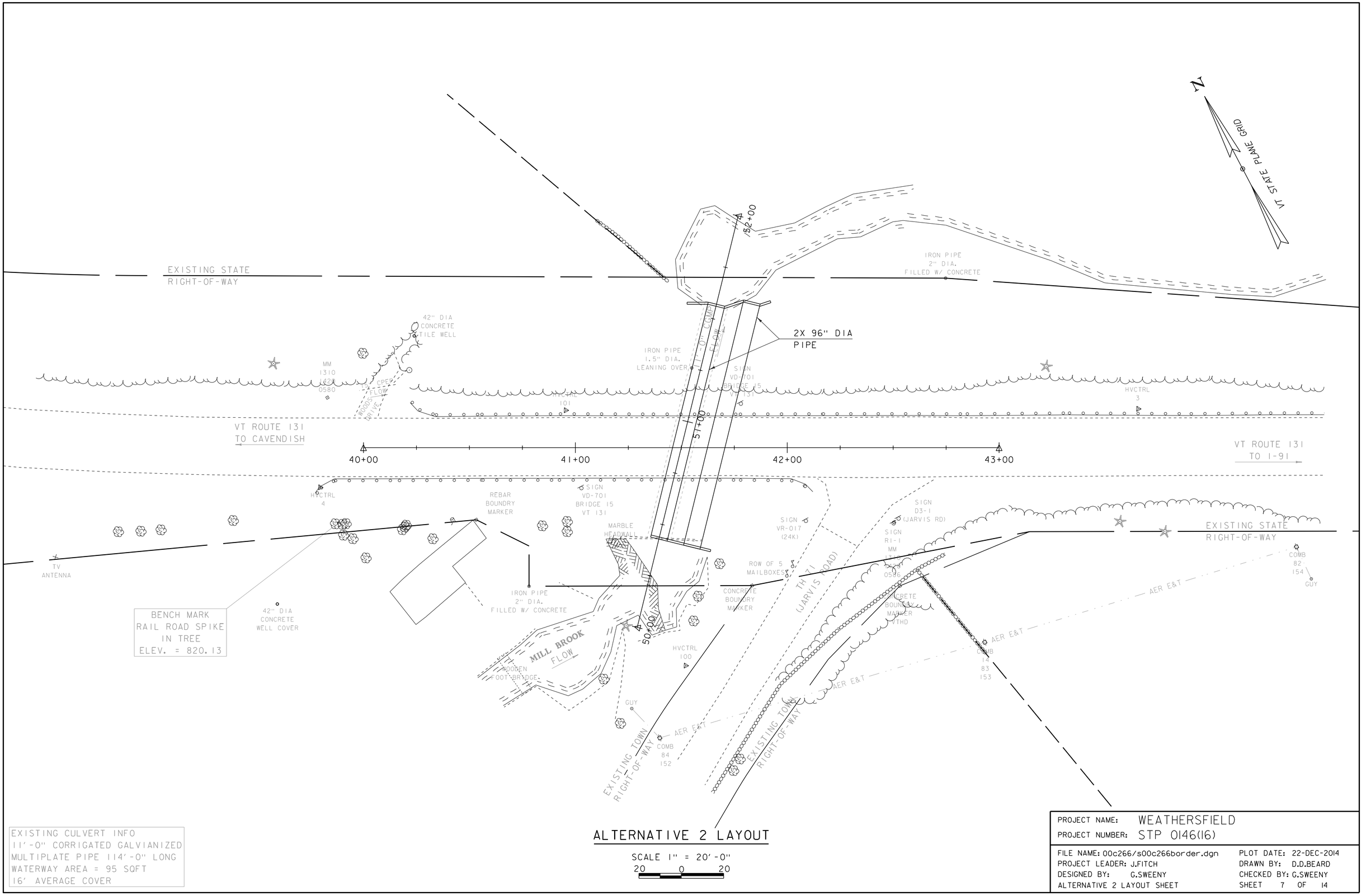
GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: WEATHERSFIELD
PROJECT NUMBER: STP 0146(16)

FILE NAME: 00c266/s00c266profile.dgn
PROJECT LEADER: J.FITCH
DESIGNED BY: G.SWEENY
ALTERNATIVE 1 PROFILE SHEET

PLOT DATE: 22-DEC-2014
DRAWN BY: D.D.BEARD
CHECKED BY: G.SWEENY
SHEET 6 OF 14



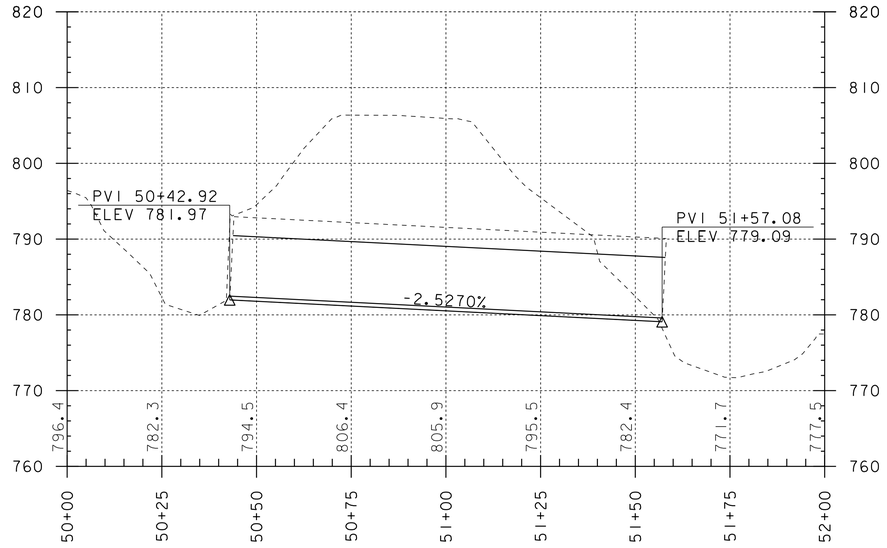
ALTERNATIVE 2 LAYOUT

SCALE 1" = 20'-0"

20 0 20

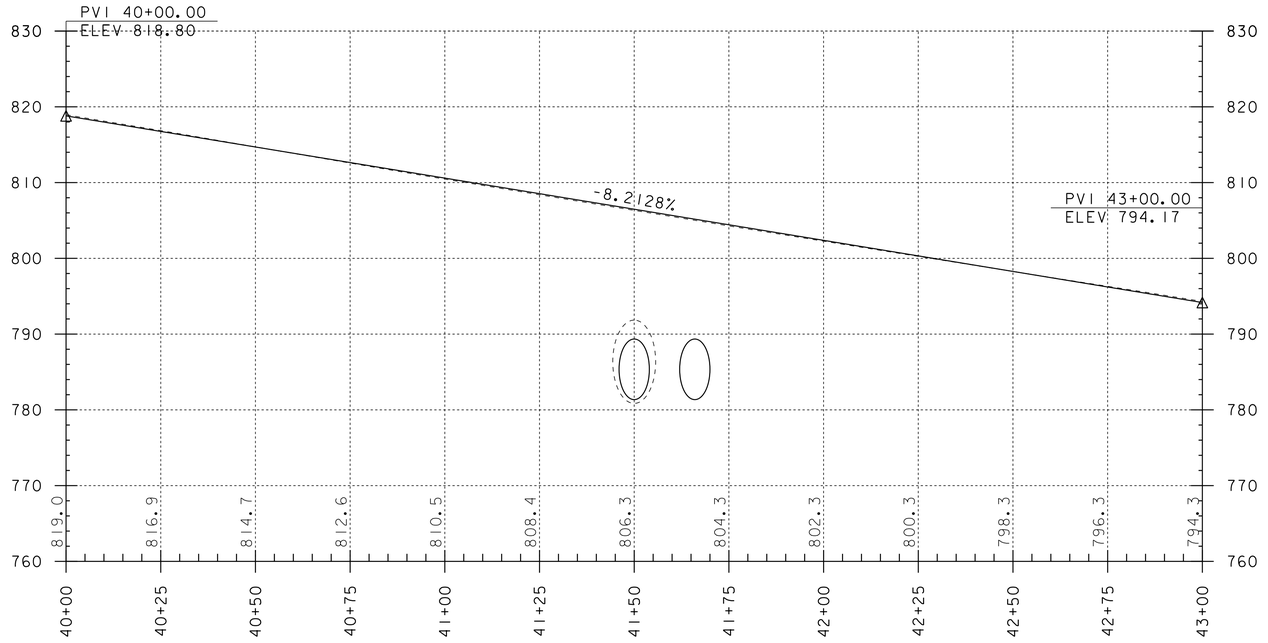
EXISTING CULVERT INFO
11'-0" CORRIGATED GALVIANIZED
MULTIPLATE PIPE 114'-0" LONG
WATERWAY AREA = 95 SQFT
16' AVERAGE COVER

PROJECT NAME:	WEATHERSFIELD
PROJECT NUMBER:	STP 0146(16)
FILE NAME: 00c266/s00c266border.dgn	PLOT DATE: 22-DEC-2014
PROJECT LEADER: J.FITCH	DRAWN BY: D.D.BEARD
DESIGNED BY: G.SWEENY	CHECKED BY: G.SWEENY
ALTERNATIVE 2 LAYOUT SHEET	SHEET 7 OF 14



CULVERT 15 ALTERNATIVE 2 PROFILE

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



VT 131 ALTERNATIVE 2 PROFILE

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

NOTE:

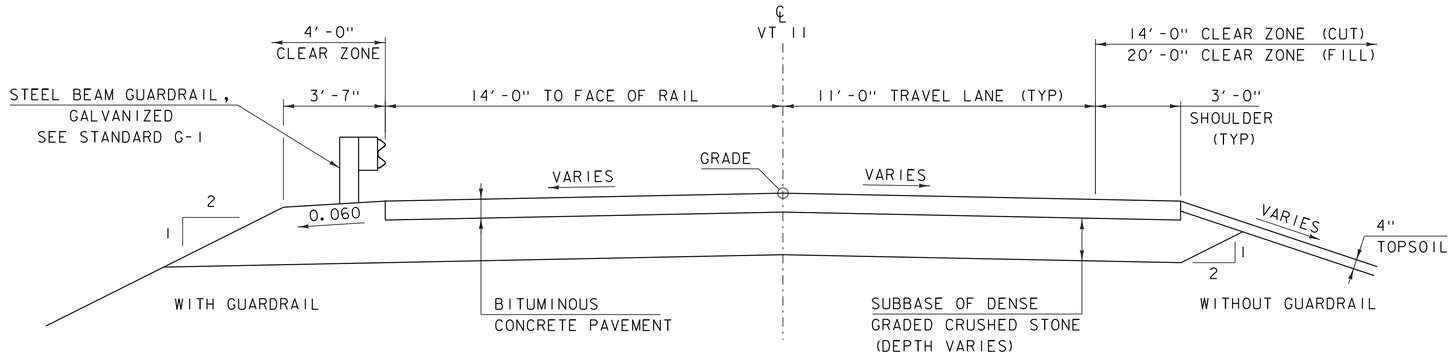
GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: WEATHERSFIELD
PROJECT NUMBER: STP 0146(16)

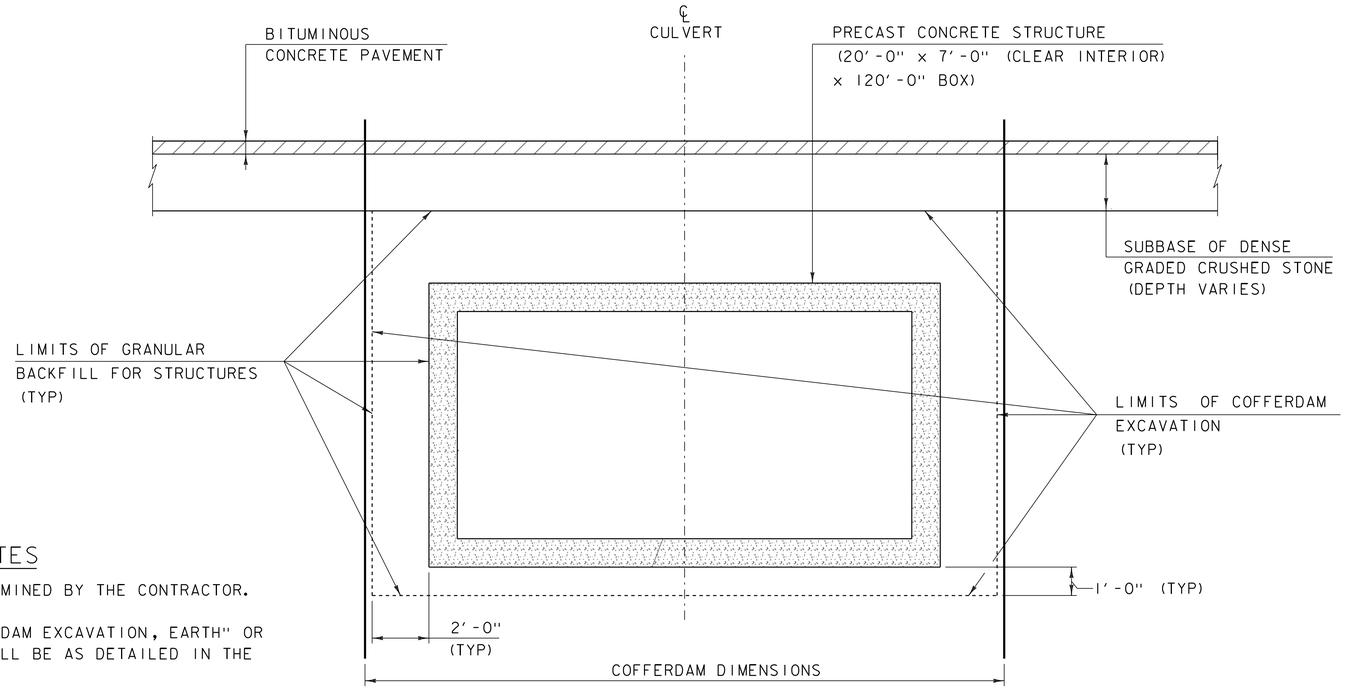
FILE NAME: 00c266/s00c266profile.dgn
PROJECT LEADER: J.FITCH
DESIGNED BY: G.SWEENY
ALTERNATIVE 2 PROFILE SHEET

PLOT DATE: 22-DEC-2014
DRAWN BY: D.D.BEARD
CHECKED BY: G.SWEENY
SHEET 8 OF 14



PROPOSED VT 11 TYPICAL SECTION

SCALE 3/8" = 1'-0"



ALTERNATIVE 3

N.T.S.

COFFERDAM NOTES

1. COFFERDAM DIMENSIONS TO BE DETERMINED BY THE CONTRACTOR.
2. THE PAY LIMITS OF EITHER "COFFERDAM EXCAVATION, EARTH" OR "COFFERDAM EXCAVATION, ROCK" SHALL BE AS DETAILED IN THE TYPICAL SECTION.
3. IF A COFFERDAM IS CONSTRUCTED WHICH IS LARGER THAN DETAILED ABOVE, NO MEASUREMENT AND PAYMENT WILL BE MADE FOR COFFERDAM EXCAVATION AND GRANULAR BACKFILL FOR STRUCTURES OUTSIDE THOSE PAY LIMITS.

MATERIAL TOLERANCES

(IF USED ON PROJECT)

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

PROJECT NAME: WEATHERSFIELD
PROJECT NUMBER: STP 0146(16)

FILE NAME: 00c266\s00c266typical.dgn
PROJECT LEADER: J.FITCH
DESIGNED BY: G.SWEENY
TYPICAL SECTIONS

PLOT DATE: 22-DEC-2014
DRAWN BY: D.D.BEARD
CHECKED BY: G.SWEENY
SHEET 9 OF 14

N

VT STATE PLANE GRID

EXISTING STATE
RIGHT-OF-WAY

IRON PIPE
2" DIA.
FILLED W/ CONCRETE

42" DIA
CONCRETE
TILE WELL

MM
1310
1420
0580

CPEP
FLOW

WOODS
DRIVE

IRON PIPE
1.5" DIA
LEANING OVER

11'-0" CGMP
FLOW

SIGN
VD-701
BRIDGE 15
VT 131

HVCTRL
101

HVCTRL
3

VT ROUTE 131
TO CAVENDISH

52+00

51+00

40+00

41+00

42+00

43+00

VT ROUTE 131
TO I-91

HVCTRL
4

REBAR
BOUNDRY
MARKER

SIGN
VD-701
BRIDGE 15
VT 131

MARBLE
HEADWALL

SIGN
VR-017
(24K)

SIGN
D3-1
(JARVIS RD)

SIGN
RI-1
MM
1310
1420
0596

EXISTING STATE
RIGHT-OF-WAY

TV
ANTENNA

BENCH MARK
RAIL ROAD SPIKE
IN TREE
ELEV. = 820.13

42" DIA
CONCRETE
WELL COVER

IRON PIPE
2" DIA.
FILLED W/ CONCRETE

MILL BROOK
FLOW

WOODEN
FOOT BRIDGE

50+00

ROW OF 5
MAILBOXES

CONCRETE
BOUNDRY
MARKER

TH 71
(JARVIS ROAD)

CONCRETE
BOUNDRY
MARKER
VTHD

HVCTRL
100

GUY

COMB
84
152

COMB
14
83
153

COMB
82
154

GUY

AER E&T

AER E&T

AER E&T

AER E&T

EXISTING TOWN
RIGHT-OF-WAY

EXISTING TOWN
RIGHT-OF-WAY

EXISTING CULVERT INFO
11'-0" CORRIGATED GALVIANIZED
MULTIPLATE PIPE 114'-0" LONG
WATERWAY AREA = 95 SQFT
16' AVERAGE COVER

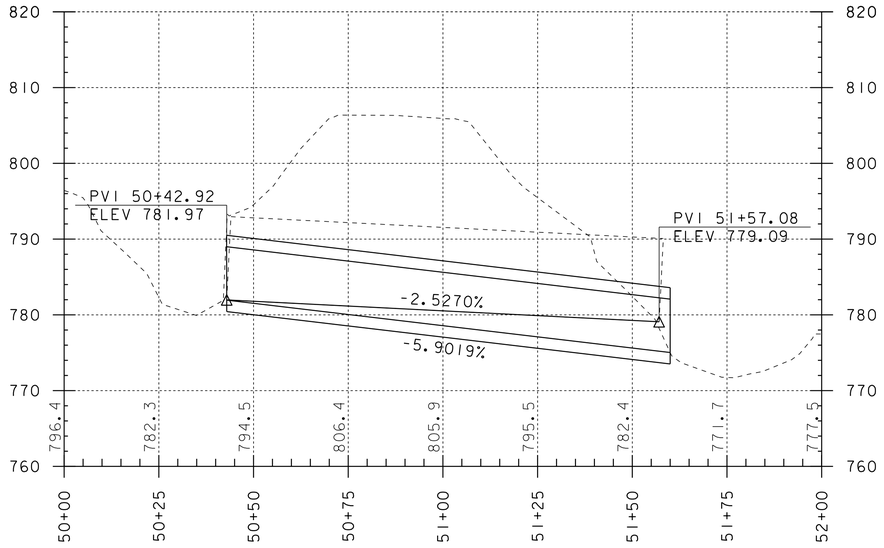
ALTERNATIVE 3 LAYOUT

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

PROJECT NAME: WEATHERSFIELD
PROJECT NUMBER: STP 0146(16)

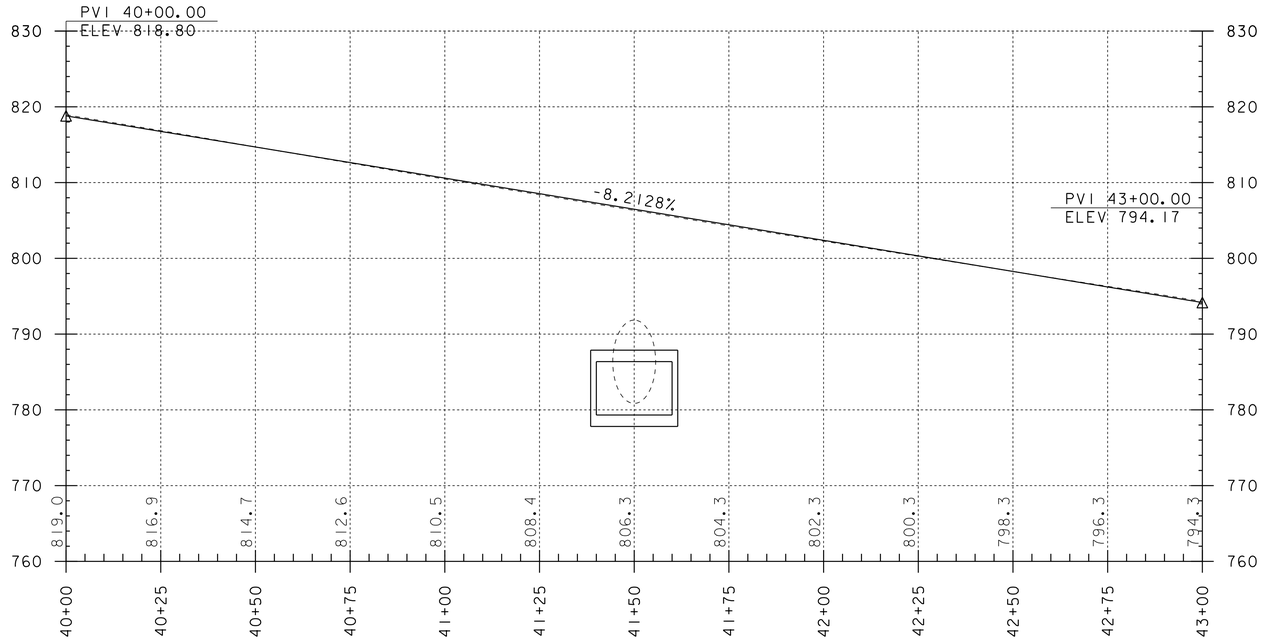
FILE NAME: 00c266/s00c266border.dgn
PROJECT LEADER: J.FITCH
DESIGNED BY: G.SWEENY
ALTERNATIVE 3 LAYOUT SHEET

PLOT DATE: 22-DEC-2014
DRAWN BY: D.D.BEARD
CHECKED BY: G.SWEENY
SHEET 10 OF 14



CULVERT 15 ALTERNATIVE 3 PROFILE

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



VT 131 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: WEATHERSFIELD
PROJECT NUMBER: STP 0146(16)

FILE NAME: 00c266/s00c266profile.dgn
PROJECT LEADER: J.FITCH
DESIGNED BY: G.SWEENY
ALTERNATIVE 3 PROFILE SHEET

PLOT DATE: 22-DEC-2014
DRAWN BY: D.D.BEARD
CHECKED BY: G.SWEENY
SHEET 11 OF 14

N

VT STATE PLANE GRID

EXISTING STATE
RIGHT-OF-WAY

IRON PIPE
2" DIA.
FILLED W/ CONCRETE

42" DIA
CONCRETE
TILE WELL

MM
1310
1420
0580

WOODS FLOW
DRIVE

IRON PIPE
1.5" DIA
LEANING OVER

11'-0" CCMP
FLOW

SIGN
VD-701
BRIDGE 15
VT 131

HVCTRL
101

HVCTRL
3

52+00

51+00

VT ROUTE 131
TO CAVENDISH

40+00

41+00

42+00

43+00

VT ROUTE 131
TO I-91

HVCTRL
4

REBAR
BOUNDRY
MARKER

SIGN
VD-701
BRIDGE 15
VT 131

MARBLE
HEADWALL

SIGN
VR-017
(24K)

SIGN
D3-1
(JARVIS RD)

SIGN
RI-1
MM
1310
1420
0586

EXISTING STATE
RIGHT-OF-WAY

COMB
82
154

GUY

TV
ANTENNA

BENCH MARK
RAIL ROAD SPIKE
IN TREE
ELEV. = 820.13

42" DIA
CONCRETE
WELL COVER

IRON PIPE
2" DIA.
FILLED W/ CONCRETE

ROW OF 5
MAILBOXES

CONCRETE
BOUNDRY
MARKER

TH 71
(JARVIS ROAD)

CONCRETE
BOUNDRY
MARKER
(THD

AER E&T

COMB
14
83
153

50+00

MILL BROOK
FLOW

HVCTRL
100

WOODEN
FOOT BRIDGE

GUY

EXISTING TOWN
RIGHT-OF-WAY

AER E&T

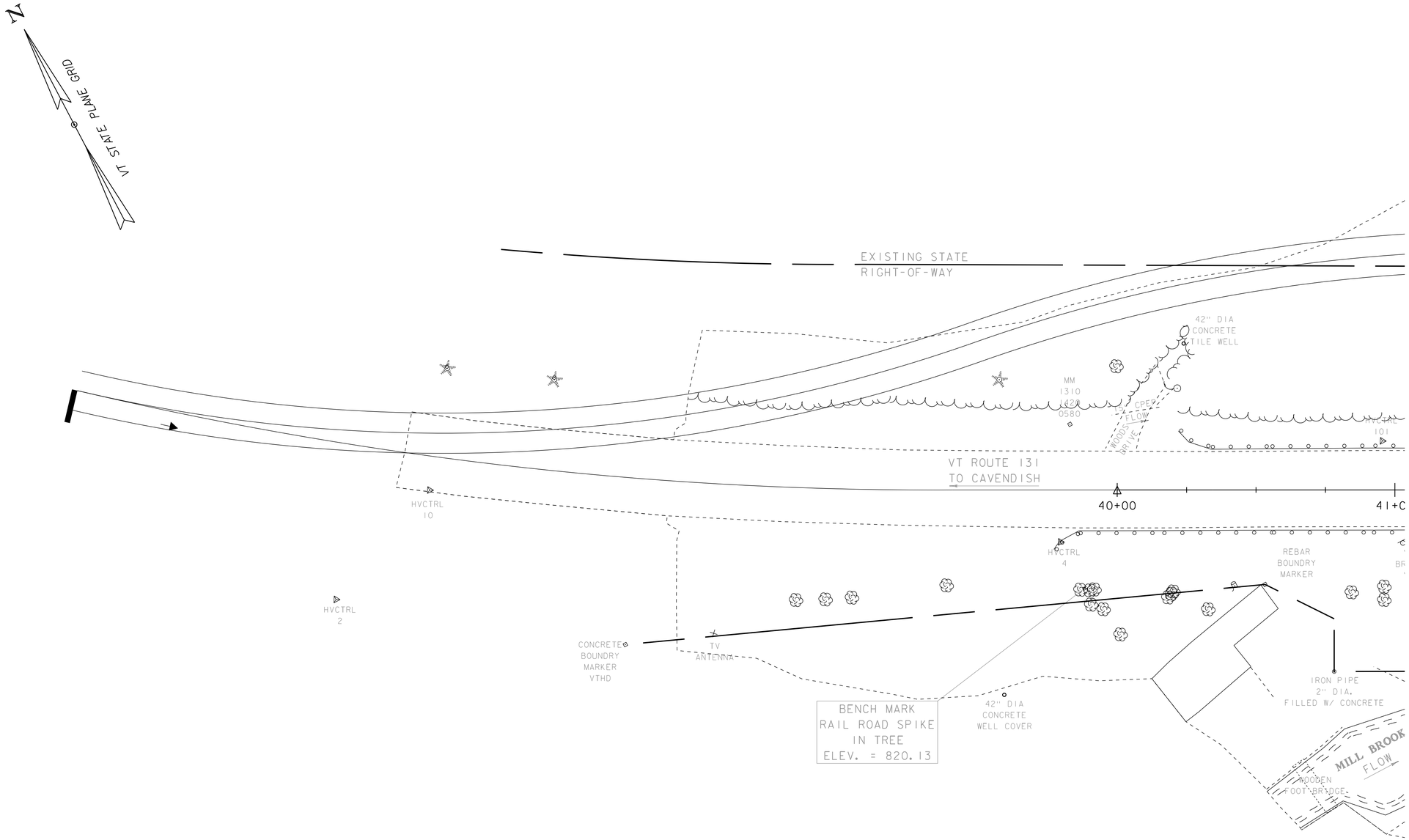
COMB
84
152

EXISTING TOWN
RIGHT-OF-WAY

ON ALIGNMENT TEMP BRIDGE

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

PROJECT NAME:	WEATHERSFIELD
PROJECT NUMBER:	STP 0146(16)
FILE NAME: 00c266/s00c266TCborder.dgn	PLOT DATE: 22-DEC-2014
PROJECT LEADER: J.FITCH	DRAWN BY: D.D.BEARD
DESIGNED BY: G.SWEENY	CHECKED BY: G.SWEENY
TEMPORARY BRIDGE LAYOUT	SHEET 12 OF 14

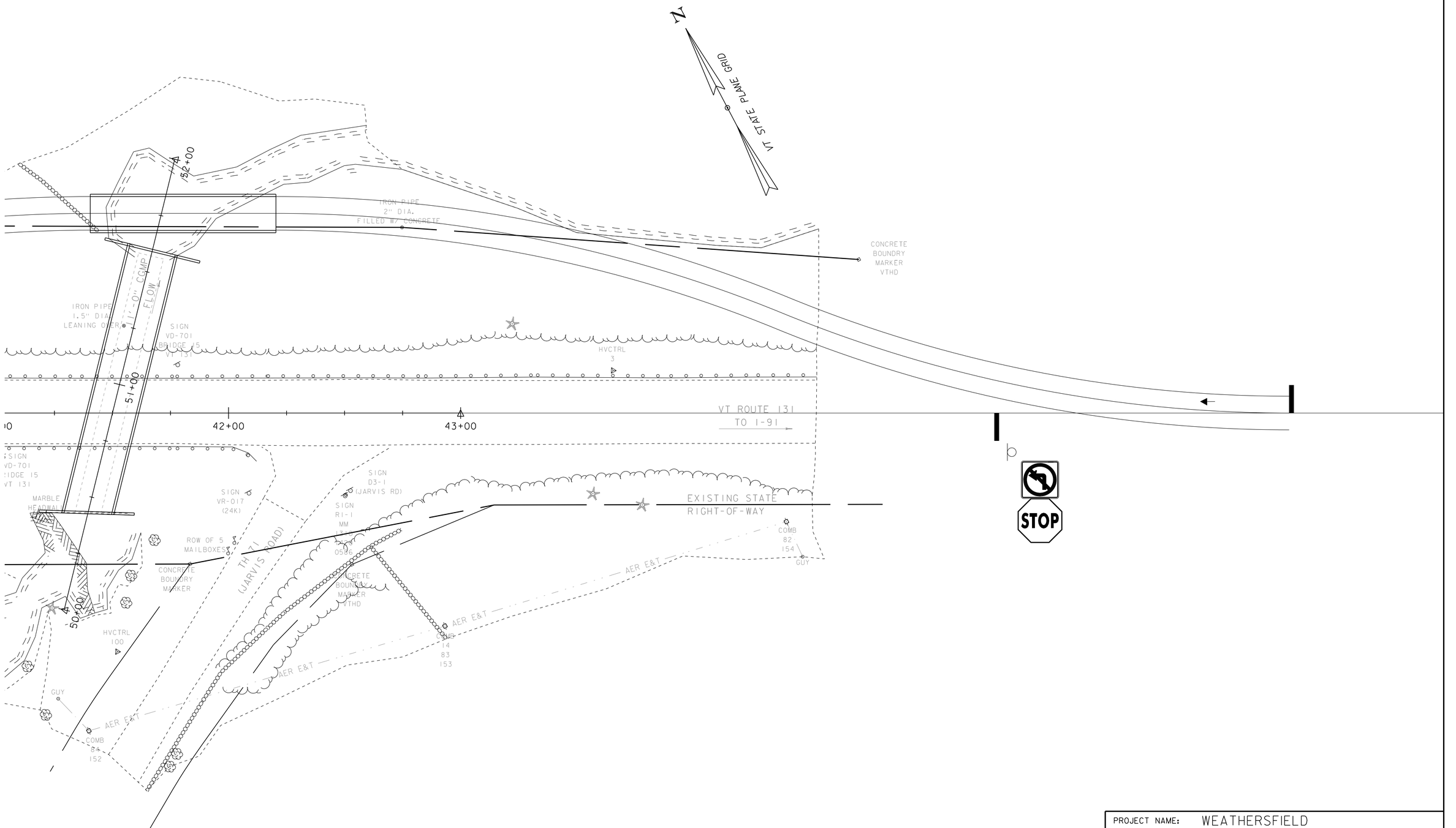


DOWNSTREAM TEMP BRIDGE

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME:	WEATHERSFIELD
PROJECT NUMBER:	STP 0146(16)
FILE NAME: 00c266/s00c266TCborder.dgn	PLOT DATE: 22-DEC-2014
PROJECT LEADER: J.FITCH	DRAWN BY: D.D.BEARD
DESIGNED BY: G.SWEENY	CHECKED BY: G.SWEENY
DOWNSTREAM TEMPORARY BRIDGE LAYOUT 1	SHEET 13 OF 14



DOWNSTREAM TEMP BRIDGE

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

PROJECT NAME:	WEATHERSFIELD
PROJECT NUMBER:	STP 0146(16)
FILE NAME: 00c266/s00c266TCborder.dgn	PLOT DATE: 22-DEC-2014
PROJECT LEADER: J.FITCH	DRAWN BY: D.D.BEARD
DESIGNED BY: G.SWEENY	CHECKED BY: G.SWEENY
DOWNSTREAM TEMPORARY BRIDGE LAYOUT 2	SHEET 14 OF 14