STATE OF VERMONT
AGENCY OF TRANSPORTATION

Scoping Report

FOR

Bolton IM 089-2(45)

INTERSTATE 89, BRIDGE 51-3 OVER TOWN HIGHWAY 4

May 31, 2016

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I. Site Information

Bridge 51-3 is a state owned interstate bridge located on I-89. The bridge crosses over Bolton Notch Road (TH 4) at the intersection of Bolton Notch Road with US Route 2 (South end of culvert) and the intersection of Bolton Notch Road with Mountain View Drive (North end of culvert). There is a 12'-6" vertical clearance warning through the culvert. The Long Trail has been relocated to pass under Bridge 51- during the summer of 2015. Varins Gravel Pit is located 0.5 miles north of the bridge on TH 4. The existing conditions were gathered from a combination of a Site Visit, the Inspection Report, the Route Log and Orthophotos. See correspondence in the Appendix for more detailed information.

Roadway Classifications:

I-89	Rural Principal Arterial
TH 4	Local Road

Bridge Type	Reinforced Concrete Box Culvert
Culvert Length	148 feet
Culvert Span	20 feet
Year Built	1964
Ownership	State of Vermont

Need

The following is a list of deficiencies of Bridge 51-3, I-89 and TH-4 in this location:

1. The culvert is rated as fair. There has been settlement of the structure, evident from large vertical cracks in the culvert. Full depth cracks as wide as 2 ½ inches have been observed but appear to have stabilized.

2. TH-4: The width of TH-4 through the culvert is substandard. Additionally, the vertical curve is substandard, and there is not adequate stopping sight distance.

3. The vertical clearance above TH-4 through the culvert is 12'-6", which is substandard. The culvert is used by dump trucks from the gravel pit to the north, and evidence of truck accessories, such as antennas, scraping across the top of the culvert has been observed.

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.

APPROACH	I-89 NB		I-89 SB		TH 4	
TRAFFIC DATA	2015	2035	2015	2035	2015	2035
AADT	13,300	15,900	13,300	15,900	600	640
DHV	1,500	1,800	1,600	1,900	70	70
ADTT	1,600	2,900	1,600	3,000	170	260
%T	7.3	11.4	7.7	12.7	2.6	3.7
%D	100	100	100	100	80	80

A more detailed traffic analysis for each hour during the months May through November can be found in the Appendix. This data is useful in determining the impacts of traffic maintenance during construction.

I-89 Design Criteria

The design standards for this roadway are:

1. AASHTO. *A Policy on Geometric Design of Highways and Streets.* Association of State Highway and Transportation Officials, Washington, DC, 2011. (The Green Book)

2. AASHTO. *Roadside Design Guide.* Association of State Highway and Transportation Officials, Washington, DC, 2011.

Minimum standards are based on a 2,000 > DHV > 1,500, and a design speed of 70 mph for a Freeway.

Design Criteria	Source	Existing Condition	Minimum Standard	Comment
Approach Lane and Shoulder Widths	Green Book Chapter 8.2.4	4'-12'-12'-10' (38')	4'-12'-12'-10' (38')	
Bridge Lane and Shoulder Widths	Green Book Chapter 8.2	4'-12'-12'-10' (38')	4'-12'-12'-10' (38')[1]	Culvert has sufficient length to meet the minimum standard
Clear Zone Distance	Roadside Design Guide Table 3-1		30' fill (1:6 or flatter), 38' fill (1:5 – 1:4), 28' cut (1:6 or flatter), 26' cut (1:5 – 1:4), 22' cut (1:3)	
Banking	Green Book Chapter 8.2.6	Southbound: Normal Crown Northbound: 2.8%	8% (max) for ice and snow conditions	
Speed		65 mph (Posted)	70 mph (Design)	
Horizontal Alignment	AASHTO Green Book Table 3-10b	R = ∞ (Southbound) R = 7,640' (Northbound)	R_{min} = 14,500 @ NC R_{min} = 7,470 @ 2.8%	
Vertical Grade	GB Table 8-1	-2.4076% max Southbound -1.9112% max Northbound	4% (max) for rolling terrain	
K Values for Vertical Curves	Green Book Table 3-34 Green Book Table 3-36	K_{crest} = 280 (Southbound), K_{sag} = 276, 208 (Southbound), K_{crest} = 338 (Northbound)	247 crest / 181 sag	
Vertical Clearance		No Issues Noted	16'-0" (min)	
Stopping Sight Distance	GB Table 7-1	854' (Northbound)	730'	
Bicycle/Pedestrian Criteria		N/A – Bicycles and Pedestrians are Restricted from the Interstate	N/A	
Bridge Railing	Structures Design Manual Section 13	W Beam Rail	TL-4	
Structural Capacity	SM, Ch. 3.4.1	Unknown	Design Live Load: HL-93	

[1] For all total bridge replacement projects consisting of a buried structure, the buried structure shall be of sufficient length to allow the addition of a future 12' maintenance lane for projects on I-89 from exit 10 through exit 18 and on I-91 from the Mass border through exit 3. This future maintenance lane shall be assumed to be adjacent to the left shoulder.

TH-4 Design Criteria

The design standards for this roadway are:

1. Vermont State Standards, dated October 22, 1997.

2. AASHTO. *A Policy on Geometric Design of Highways and Streets.* Association of State Highway and Transportation Officials, Washington, DC, 2011. (The Green Book)

Minimum standards are based on an ADT of 640, and a design speed of 35 mph for a Local Road.

Design Criteria	Source	Existing Condition	Minimum Standard	Comment
Approach Lane and Shoulder Widths	VSS Table 6.3	9'/2' (22')	9'/2' (22')	
Bridge Lane and Shoulder Widths	VSS Table 6.3	9'/1' (20')	9'/2' (22')	Substandard
Clear Zone Distance	VSS Table 6.5	Culvert wingwalls within clear zone	7' fill / 7' cut	Substandard
Banking	VSS Section 6.12	Normal Crown	6% (max) for proximity to intersections	
Speed		35 mph	35 mph (Design)	
Horizontal Alignment	AASHTO Green Book Table 3-9	R = ∞ (Through Culvert) R = 480' (North Approach)	R_{min} = 4,100 @ NC R_{min} = 487 @ 5.6%	
Vertical Grade	VSS Table 6.6	-6.557% max (within project limits) -17.06% max (north of project limits)	13% (max) for mountainous terrain	
K Values for Vertical Curves	VSS Table 6.1	K_{sag} = 7 (South approach), K_{sag} = 15 (North Approach)	40 crest / 50 sag	Substandard
Vertical Clearance	VSS Section 6.7	12'-2"	14'-3" (min)	Substandard
Stopping Sight Distance	VSS Table 6.1	67'	225'	Substandard
Bicycle/Pedestrian Criteria	VSS Table 6.7	1' shoulder	1' shoulder[2]	
Bridge Railing	Structures Design Manual Section 13	None	TL-2	
Structural Capacity	SM, Ch. 3.4.1	Unknown	Design Live Load: HL-93	

Inspection Report Summary

Culvert Rating 5 Fair

05/17/2012 – No change in settlement cracking since the last inspection. Will continue to monitor biennially. Apron at the east end could use pothole repair. Signed for a vertical clearance of 12'-6" at each end. *See latest CM for clearance alteration recommendation by DCP. ~MJ/DK

[2] A 4 foot shoulder should be provided on either side of TH-4 to accommodate The Long Trail hiking trail which will pass through the bridge starting in the summer of 2014.

04/19/10 Culvert has cracking throughout. The settlement at the Route 2 end appears to have stabilized. The posting should be changed to 12'-2". ~DCP

Vertical Clearance

When the culvert was originally constructed there was 12'-9" of vertical clearance along TH 4. However, due to paving, the culvert currently provides a 12'-6" vertical clearance for vehicles traveling on Notch Road through the culvert. Due to the actual 12'-6" vertical clearance measured in inspection the inspection report suggests changing the posted height in order to ensure adequate clearance. The current clearance does not meet the minimum standard of 14'-3". There is evidence of over height vehicles/vehicle accessories impacting the culvert. It is proposed that any new structure should meet the minimum vertical clearance requirement of 14'-3".

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

Municipal Utilities

- There are no municipal water or sewer facilities within this project area; all homes, including those within the Mountain View Drive Development, have private wells and septic systems.

Public Utilities

Underground:

- There is a major underground telephone line which runs along the northern edge of U.S. Route 2 which is owned by FairPoint Communications. This buried cable is only a few feet from the U.S. Route 2 pavement; the cables are encased in concrete.

- There are no buried facilities along the Bolton Notch Road (TH # 4).

Aerial:

- There are aerial electric (three phase) and telephone facilities which run along the northerly edge of U.S. Route 2 thru the entire project area. These facilities cross thru the U.S. 2/TH 4 intersection within 50 feet of the southern end of Bridge # 51-3.

- There is a single phase electric line and one telephone line which cross over I-89 diagonally over Bridge #51-3, to an existing pole in the northwest quadrant of the existing bridge. These facilities then cross diagonally back over TH #4 and proceed along the town highway.

- These existing aerial facilities are owned by Green Mountain Power and Waitsfield Champlain Valley Telecom.

Overhead utilities should not need to be relocated for the recommended alternative.

Right Of Way
The existing Right-of-Way is plotted on the Existing Conditions Layout Sheet. It is anticipated that additional Right-of-Way acquisition will be necessary if the full bridge replacement option is chosen.

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

Biological

This is a dry crossing and carries TH 4 (Notch Road) underneath Interstate 89.

Wetlands/Watercourses

There are no wetlands within the project area.
There are no watercourses within the project area.

Wildlife Habitat

Moderate terrestrial wildlife habitat occurs on both sides of Interstate 89 at this location. According to latest ANR-Fish and Wildlife "BioFinder" mapping there is moderate concentration of components contributing to biological diversity to the north and low concentration of components contributing to biological diversity to the south (see attached ANR mapping). If the structure will be replaced, opportunities for wildlife movement should be explored as the design moves forward.

Rare, Threatened and Endangered Species

According to VT Fish and Wildlife Natural Heritage mapping and US Fish and Wildlife mapping there are no rare, threatened or endangered species within the project area.

Agricultural

There are mapped prime agricultural soils within the project area (Winooski very fine sandy loam). These soils were formed in alluvial deposits on floodplains and are frequently flooded.

Hazardous Materials

According to the Vermont Agency of Natural Resources (VANR) Vermont Hazardous Sites List, there are no hazardous waste sites located in the vicinity of the project. The closest Hazardous Waste Site along I-89 is located 5,500 feet east of the bridge, and no impacts to this site are expected.

Historic

The bridge is not a historic structure. The only historic resource in the area is the railroad corridor, which is a linear historic district. It is identified on the Layout Sheets. It is anticipated that the railroad historic district will not be impacted.

Archeological

The project area was heavily disturbed during interstate construction and is not considered sensitive for historic or pre-contact archaeology. Staging sites will be reviewed independently when they are submitted by the contractor.

Stormwater

There are no stormwater concerns for this project.

II. Alternatives Discussion

No Action

This alternative would involve leaving the culvert in its current condition. The existing culvert is in fair condition; although the culvert is not in imminent danger of failure, the cracks due to settlement need to be repaired in order to increase the overall life expectancy of the structure. If a bridge is expected to last at least another 10 years, then the No Action alternative may be considered a viable option. However, the culvert has full depth cracks as wide as 2 ½" on both sides. In the interest of salvaging this structure, the No Action alternative is not recommended.

Rehabilitation of Existing Culvert

This option would include repairs to the culvert to extend its useful life. The culvert is rated as fair, and is structurally tolerable according to the federal criteria. However, this culvert has substandard horizontal and vertical clearances and rehabilitating the culvert will not improve these features.

There are a number of different repair types and procedures that could be done to rehabilitate this culvert. However, the simplest would be to use Class I, Class II, and Class III repair's as necessary from the 2011 Standard Specifications for Construction. These repair procedures include removing the bad concrete around the reinforcing, cleaning the reinforcing and casting new concrete around cleaned reinforcing. If needed additional reinforcing could be lapped or mechanically spliced onto the existing exposed reinforcing.

The geotechnical report indicated soft soil conditions were encountered when drilling near the largest crack in the box and that no other borings encountered similar soft spots. The report also states that no voids were encountered during drilling. The lack of voids encountered helps to rule out undermining from unknown water sources and leads to the conclusion of poorly compacted soils when compared with the inspection records. The inspection records indicate that no additional settlement has been observed since 1996. The first recorded evidence of the vertical crack was in 1978 however it is likely the crack began much earlier. Between 1978 and 1996 the crack opened up from a very thin crack to 2 ½" in width. In order to ensure the success of the structural repairs and remaining life of the box culvert soil, stabilization such as injection grouting should also be considered as part of this project. Once all other repairs have been accomplished the structure should be cleaned and silaned in order to provide additional protection from water and winter maintenance practices along TH 4.

Full Bridge Replacement – With New Buried Structures

This alternative would replace the existing bridge with a new buried structure, with larger horizontal and vertical clearances at the existing location. Right-of-Way will be required for this alternative for the reconstruction of TH-4. The various considerations under this option include: the alignment, the bridge width and length, skew, and structure type.

a. Alignment

The current horizontal alignment meets the current standards, so any new structure could be constructed on the existing alignment. By placing a new bridge on the existing horizontal alignment, project limits and impacts to resources can be minimized.

It is possible to maintain traffic on TH-4 for the entirety of construction by constructing an off-alignment new buried structure next to the old structure. This would involve reconstructing approximately 750 feet of Notch road in order to match back into the existing alignment. This would be costly, and have large impacts to adjacent land. As such, this option is not being evaluated.

b. Bridge/Roadway Width

I-89: The current paved width of I-89 through the project area is 38 feet, which is the minimum standard. Since a new 80+ year bridge is being proposed, the bridge geometry should meet the minimum standards. An additional 12 feet should be added to the standard shoulder width to provide a future bridge maintenance lane. By providing this extra width, work can be done to the interstate bridge in the future, while maintaining two lanes of traffic. A 50 foot width bridge will be proposed both northbound and southbound. This 50 foot bridge width will transition down to a roadway width of 38 feet in as short of a distance as possible.

TH-4: The current width provided through the structure when traveling on TH-4 is 20 feet. This does not meet the minimum standard of 22 feet. Since a new 80+ year bridge is being proposed, the bridge geometry should meet the minimum standards. Additionally, the Long Trail passes through the structure, in order to accommodate the increased pedestrian traffic TH-4, a typical section of 2-9-9-2 (22') with a 4.5 sidewalk on the east side of the box will be proposed

c. Bridge Length and Skew

The existing culvert has a barrel length of approximately 150 feet with no skew. If a new buried structure were proposed, a structure with a barrel length of 150 feet would match the existing site conditions and would meet the minimum standard required, as this length would allow for the addition of a 12 foot future bridge maintenance lane. The new buried structure would have no skew.

d. Structure Type

A prefabricated structure will be the preferred choice, due to decreased construction time. The most economical 27' span length buried structure type that is most commonly used in Vermont is a 3 sided precast arch or frame. The structure may be placed on pedestal walls in order to meet the minimum vertical clearance of 14'-3".

Since the structure will be directly exposed to deicing salts on the inside, it is recommended that a corrosive resistant coating is applied to the inside of the concrete to protect against deterioration.

There is visible bedrock located in the project area however borings indicate it is very unlikely that shallow bedrock will be encountered. Therefore, the arch or frame can be supported on piles or a spread footing.

e. Additional Considerations

Since the Long Trail is being relocated under the bridge, it is expected that TH-4 will have heavy pedestrian usage through the culvert. Various considerations to accommodate the trail, such as lighting, or painting the inside of the culvert a light color should be considered in the final design of the structure.

Full Bridge Replacement – With Two (non-buried) Bridges

This alternative would remove the existing culvert, and replace it with two new bridges over TH-4; a bridge for northbound traffic and a bridge for southbound traffic. Right-of-Way will be required for this alternative for the reconstruction of TH-4. The various considerations under this option include: the bridge width and length, skew, superstructure type, and substructure type.

a. Alignment

The current horizontal alignment meets the current standards, so any new structure will be constructed on the existing alignment. By placing a new bridge on the existing horizontal alignment, project limits and impacts to resources can be minimized.

b. Bridge/Roadway Width

I-89: The current paved width of I-89 through the project area is 38 feet, which is the minimum standard. Since a new 80+ year project is being proposed, the bridge geometry should meet the minimum standards. An additional 12 feet should be added to the standard shoulder width to provide a future bridge maintenance lane. By providing this extra width, work can be done to the bridge in the future, while maintaining two lanes of traffic. A 50 foot width bridge will be proposed both northbound and southbound. This 50 foot bridge width will transition down to a roadway width of 38 feet in as short of a distance as possible. Two bridges, each providing a 50 foot width rail-to-rail will be proposed.

TH-4: The current width provided through the structure when traveling on TH-4 is 20 feet. This does not meet the minimum standard of 22 feet. Since a new 80+ year bridge is being proposed, the bridge geometry should meet the minimum standards. Additionally, the Long Trail has been relocated and passes through the existing bridge. In order to accommodate the increased pedestrian traffic on TH-4, a typical section of 4-9-9-4 (26' total) will be proposed. This provides 4 foot shoulders on each side of TH-4, as per our discussion with the VTrans Bicycle and Pedestrian Program Manager. A 26 foot pavement width under the bridge along with appropriate ditching for drainage along TH-4 will be proposed.

c. Bridge Length and Skew

The existing span is 20 feet long and with no skew. If two new steel beam bridges were constructed, 100 foot span bridges would be proposed in order to accommodate The Long Trail and wildlife passage, and match site conditions. TH-4 runs under I-89 perpendicularly, therefore it is proposed that any new bridge have no skew to match this existing site condition.

d. Superstructure Type

A prefabricated structure will be the preferred choice, due to decreased construction time. Since traffic will be maintained along the corridor utilizing a crossover or temporary bridges with reduced construction zone speed limits, accelerated bridge construction techniques are appropriate in order to reduce the disruption to traffic. Based on an approximate 100' span requirement the most economical bridge type that is most commonly used in Vermont, is a steel and composite concrete deck (Prefabricated Bridge Units). This type of structure would maximize the vertical clearance over TH-4 through the structure compared to the buried structure option. TH-4 is used by dump trucks traveling to and from Varins Gravel Pit, and the minimum vertical clearance would be achieved for this bridge type, accommodating those trucks. Additionally, this type of bridge would provide natural lighting for pedestrians, bicycles, and hikers on The Long Trail.

e. Substructure Type

There is visible bedrock located in the project area, however borings indicate that shallow bedrock likely will not be encountered. Given the borings information integral abutments can be used.

III. Maintenance of Traffic

The Vermont Agency of Transportation reviews each new project to determine suitability for the Accelerated Bridge Program, which focuses on faster delivery of construction plans, permitting, and Right of Way, as well as faster construction of projects in the field. One practice that will help in this endeavor is closing bridges for portions of the construction period, rather than providing temporary bridges. In addition to saving money, the intention is to minimize the closure period with faster construction techniques and incentives to contractors to complete projects sooner. The Agency will consider the closure option on most projects where rapid reconstruction or rehabilitation is feasible. The use of prefabricated elements as well as innovative materials in new bridges and rehabilitation 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

I-89:
This option would close the section of I-89 near the bridges to through traffic for a limited time during construction. The detour would utilize US 2 from exit 10 to 11 for traffic traveling north and south along I-89. The through distance on this detour is almost identical at 15 miles, however the estimate time for getting from exit 10 to 11 on US 2 increases to 25 minutes from the 15 minutes it takes on I-89. Given traffic volumes this option will not be considered further.

TH-4:
TH-4 will need to be briefly closed regardless of the alternative that is selected. Since the existing structure is a 4-sided box, with TH-4 running through the box, TH-4 would have to be closed during the removal of the existing box or installation of a new box. Additional activities may warrant the closure of TH-4 for safety reasons, such as the lifting of heavy materials overhead. If rehabilitation is chosen as the preferred alternative a 2-day closure will be required in order to complete repairs in the center of the box where there isn't enough space to pass one lane of traffic around the construction crew.

The shortest route that could be used for vehicles when TH-4 under the bridge is closed has an end-to-end distance of 10.8 miles and would take 30 minutes to drive around. There are steep slopes along the detour route; however the steepest slope is on Notch Road between US Route 2 and the gravel pit, so the truck traffic on TH-4 is already accustomed to these slopes. The detour route is as follows:

1. Notch Road, to Stage Road, US Route 2 back to Notch Road

Since this detour is located on local roads, the towns of Bolton and Richmond would have to agree to let VTrans detour and sign around this route.

Advantages: The costs associated with signing the detour are much lower than the construction costs associated with the other maintenance of traffic options. By detouring traffic away from construction activities, it creates a safer working environment for the construction workers. By not requiring the construction and removal of temporary approaches, temporary bridges and other temporary traffic control measures, the length of construction can be reduced. This is the safest traffic control option since the traveling public is removed from the construction site.

Disadvantages: Traffic will not be maintained along the existing corridor for a limited portion of construction. Through traffic will see an increase in travel times during the closure period.

Option 2: Temporary Bridge

I-89:
The standard maintenance of traffic option based on the length of the bridges and the traffic volumes at this location would be a two lane temporary bridge for each barrel. For this option, a two-lane temporary bridge would be placed both north of the bridges for northbound traffic, and another placed south of the bridges for southbound traffic. Both the northbound and southbound side of the bridge could be constructed at the same time, in order to minimize the construction duration. The vertical alignment of TH-4 slopes upward to the north, and the northern temporary bridge would need to maintain at least, the existing vertical clearance, which is already substandard.

TH-4:
If a temporary bridge is used to maintain traffic on I-89, TH-4 still would not be able to stay open for the duration of all construction activities, if a full bridge replacement is chosen as the best alternative. Since the existing structure is a 4-sided box, with TH-4 running through the box, TH-4 would have to be closed for short durations, during removal of the box.

Advantages: A temporary bridge maintains two-lane traffic along the existing corridor during construction.

Disadvantages: There are extra costs associated with constructing temporary bridges as well as changes in traffic patterns that can increase the probability of accidents. This option would require additional Right-of-Way acquisition for placement of the northern temporary bridge.

Option 3: Phasing

Another method of maintaining traffic along the corridor during construction is to build/repair the structure one lane at a time, or in phases. This allows keeping the road open during construction, while having minimal impacts to adjacent property and environmental resources.

I-89:
Due to vertical constraints, this option will not be considered. There is approximately 6 feet of vertical fill over the existing 16 foot culvert; it would be extremely tricky and costly to hold back 22 feet of fill during each phase for phased construction of a new bridge.

TH-4:
Construction activities for TH-4 that do not require a closure will be done in phases. This will ensure the shortest possible closure of TH-4 during the construction or rehabilitation of Bridge 51-3. This means that for activities such as concrete patching along the edges of the box, TH-4

would be reduced to one lane while the opposite lane is being repaired, then traffic would be switched over to the newly repaired lane while the other lane is under repair.

Advantages: Traffic would be maintained along the existing corridor during construction.

Disadvantages: The costs of construction increases over un-phased work because of this increase in the length of time, the additional inconvenience of working around traffic, and the effort involved in coordinating the joints between the phases. Once again, while the corridor will be open to traffic during construction, traffic will still be delayed and disrupted by the reduction in the number of lanes and by construction vehicles and equipment entering and exiting the site. The construction workers and equipment will still be in close proximity to vehicular traffic increasing the probability of accidents.

Option 4: I-89 Cross-Over

Another method for maintaining traffic on parallel structures with multiple lanes of unidirectional traffic is creating a crossover in the median before and after the structures to get all traffic off one structure and on to the parallel structure. This option is rarely available for most projects, because most non-interstate structures in Vermont do not have parallel bridges. The possibilities on interstates may even be limited based on site distance, traffic patterns or obstructions in the median. With a reduced design speed, it would be possible to maintain I-89 traffic at this location with crossovers. Two way traffic would be moved to the southbound bridge during construction of the northbound bridge and two way traffic routed to the northbound bridge while construction occurred on the southbound bridge.

Hourly traffic data has been compiled for both the northbound and southbound lanes for the months of May through November. This traffic data can be found in the appendix. The traffic volumes highlighted in red are the volumes at which there are unfavorable conditions when traffic is reduced to one lane.

During construction of the first bridge, three lanes can be accommodated over the other side of the existing structure. Based on traffic data, it is most favorable to keep two lanes of northbound traffic open and reduce the southbound traffic to one lane and cross it over to the northbound side. June is the most optimum month to construct the southbound bridge, since southbound traffic has the lowest volume in June. Traffic data shows that during June, the southbound direction can be reduced to one lane without causing significant delays.

The traffic data indicates that for all months other than June, two lanes of traffic need to be accommodated in each direction in order to avoid delays in the afternoon commute. Since the proposed structure will be wider than the existing typical, 4 lanes can be accommodated over the new structure. Therefore, for the second crossover, northbound traffic can be crossed over to the new bridge on the southbound side, while maintaining two lanes going northbound and two lanes going southbound. Typical sections and layouts for these cross over scenarios can be found in the appendix.

Advantages: This would provide the advantage of a temporary bridge or phased construction by maintaining traffic along the existing corridor during construction.

Disadvantages: The costs associated with maintaining traffic with crossovers in this location rivals those for maintaining traffic with temporary bridges. Similar to the disadvantages for a temporary bridge, changes in traffic patterns can increase the probability of accidents. While the corridor will be open to traffic during construction, traffic will still be delayed and disrupted by

the reduction in the number of lanes, potentially reduced speed through the construction zone. Additionally, traffic on TH-4 would not be able to stay open for the duration of all construction activities, if a full bridge replacement is chosen as the best alternative. There would likely be a series of short closures to traffic on TH-4 during some construction activities.

IV. Alternatives Summary

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

Alternative 1: Rehabilitation of the Existing Structure with Traffic Maintained on Alignment Utilizing Phased Construction

Alternative 2a: Full Bridge Replacement with a Buried Structure and Traffic Maintained on a Crossover

Alternative 2b: Full Bridge Replacement with a Buried Structure and Traffic Maintained on Temporary Bridges

Alternative 3a: Full Bridge Replacement with Two Separate Steel Beam Bridges and Traffic Maintained on a crossover

Alternative 3b: Full Bridge Replacement with Two Separate Steel Beam Bridges and Traffic Maintained on Temporary Bridges

V. Cost Matrix[3]

Bolton IM 089-2(45)		**Alt 1** Rehabilitation	**Alt 2** Full Bridge Replacement with Buried Structure		**Alt 3** Full Bridge Replacement with Two Separate Steel Beam Bridges	
			a. Crossover	*b. Temporary Bridge*	*a. Crossover*	*b. Temporary Bridge*
COST	Bridge Cost	$42,377	$1,669,000	$1,669,000	$3,110,300	$3,110,300
	Removal of Structure	$0	$80,000	$80,000	$80,000	$80,000
	Roadway	$132,692	$1,277,000	$1,277,000	$1,201,000	$1,201,000
	Maintenance of Traffic	$75,490	$890,390	$1,000,00	$890,390	$1,000,000
	Construction Costs	$250,559	$3,916,390	$4,026,000	$5,281,700	$5,391,300
	Construction Engineering + Contingencies	$50,200	$783,300	$805,200	$1,056,400	$1,078,300
	Total Construction Costs w CEC	**$300,759**	**$4,504,000**	**$4,630,000**	**$6,074,000**	**$6,201,000**
	Preliminary Engineering[4]	**$110,000**	**$470,000**	**$484,000**	**$529,000**	**$540,000**
	Right of Way	**$0**	**$100,000**	**$120,000**	**$100,000**	**$120,000**
	Total Project Costs	$410,759	$5,074,000	$5,234,000	$6,703,000	$6,861,000
	Annualized Costs	$20,538	$63,425	$65,425	$67,030	$68,610
SCHEDULING	Project Development Duration[5]	1 year	4 years	4 years	4 years	4 years
	Construction Duration	1 year	2 years	2 years	2 years	2 years
	Closure Duration (If Applicable)	2 days	N/A	N/A	N/A	N/A
ENGINEERING	Typical Section – I-89 Roadway (feet)	38’	38’	38’	38’	38’
	Typical Section – TH 4 Roadway (feet)	22’ (20’ in culvert)	4-9-9-4 (26’)	4-9-9-4 (26’)	4-9-9-4 (26’)	4-9-9-4 (26’)
	Typical Section – Bridge (feet)	4’-12’-12’-10’ (38’)	4’-12’-12’-10’ (38’)	4’-12’-12’-10’ (38’)	4’-12’-12’-22’ (50’)	4’-12’-12’-22’ (50’)
	Geometric Design Criteria	Substandard vertical curve on TH 4	Substandard vertical curve on TH 4	Substandard vertical curve on TH 4	Substandard vertical curve on TH 4	Substandard vertical curve on TH 4
	Traffic Safety	No Change	Improved	Improved	Improved	Improved
	Alignment Change	No	No	No	No	No
	Bicycle Access	No Change	Improved on TH-4	Improved on TH-4	Improved on TH-4	Improved on TH-4
	Vertical Clearance	Substandard	Meets Criteria	Meets Criteria	Meets Criteria	Meets Criteria
	Pedestrian Access	No Change	Improved on TH-4	Improved on TH-4	Improved on TH-4	Improved on TH-4
	Utility	No Change	Relocation	Relocation	Relocation	Relocation
OTHER	ROW Acquisition	No	No	No	No	No
	Road Closure	No	No	No	No	No
	Design Life	20+ years	80 years	80 years	100 years	100 years

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

VI. Conclusion

We recommend **Alternative 1**; to repair the existing concrete box culvert utilizing phased construction with a 2-day closure.

This alternative includes improving the existing soil conditions through soil stabilization as well as repairing the cracked/deteriorated portions of the culvert with standard cast-in-place concrete repair methods. The alternative will have no impacts on I-89 other than a possible lane closure during soil stabilization. The work will be accomplished utilizing alternating one-way traffic along TH-4 maintained by flagging or temporary signals. For work done near the center third of the box a short closure will be required as there will not be enough space to allow traffic to pass around the construction activities. At this phase in the project a weekend closure is expected to be sufficient to accomplish the necessary work.

The Long Trail:
As of the summer of 2015, The Long Trail has been relocated to pass under bridge 51-3. During construction of the bridge, there will be closures to the trail under the bridge. Long Trail hikers can use the pre-2015 Long Trail path located on the Bolton Valley Access Road or find an alternate route around.

VII. Appendices

Site Pictures

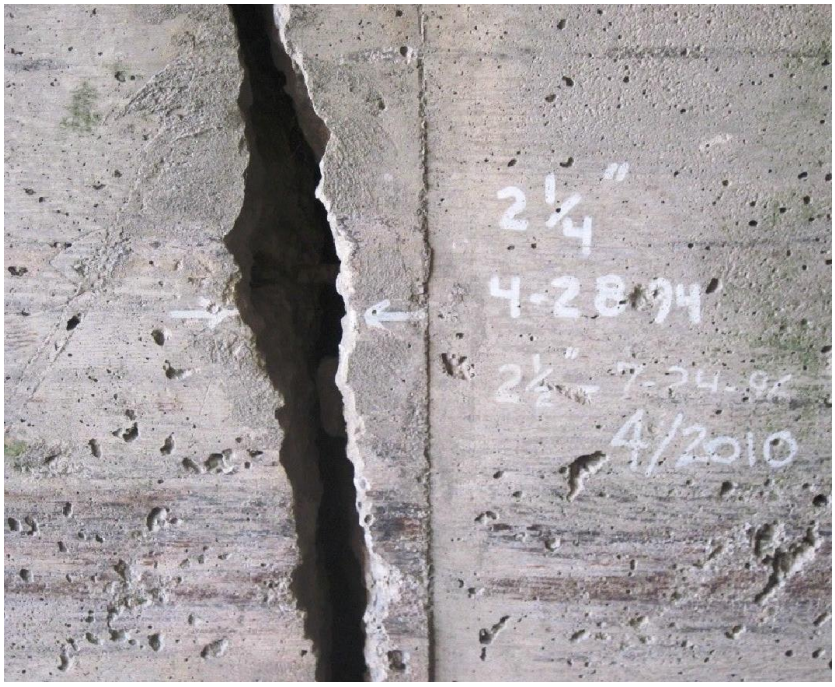
Looking West Towards US Route 2

Looking East

Large Vertical Crack (South Side)

Large Vertical Crack (South Side Close up)

Large Vertical Crack (North Side)

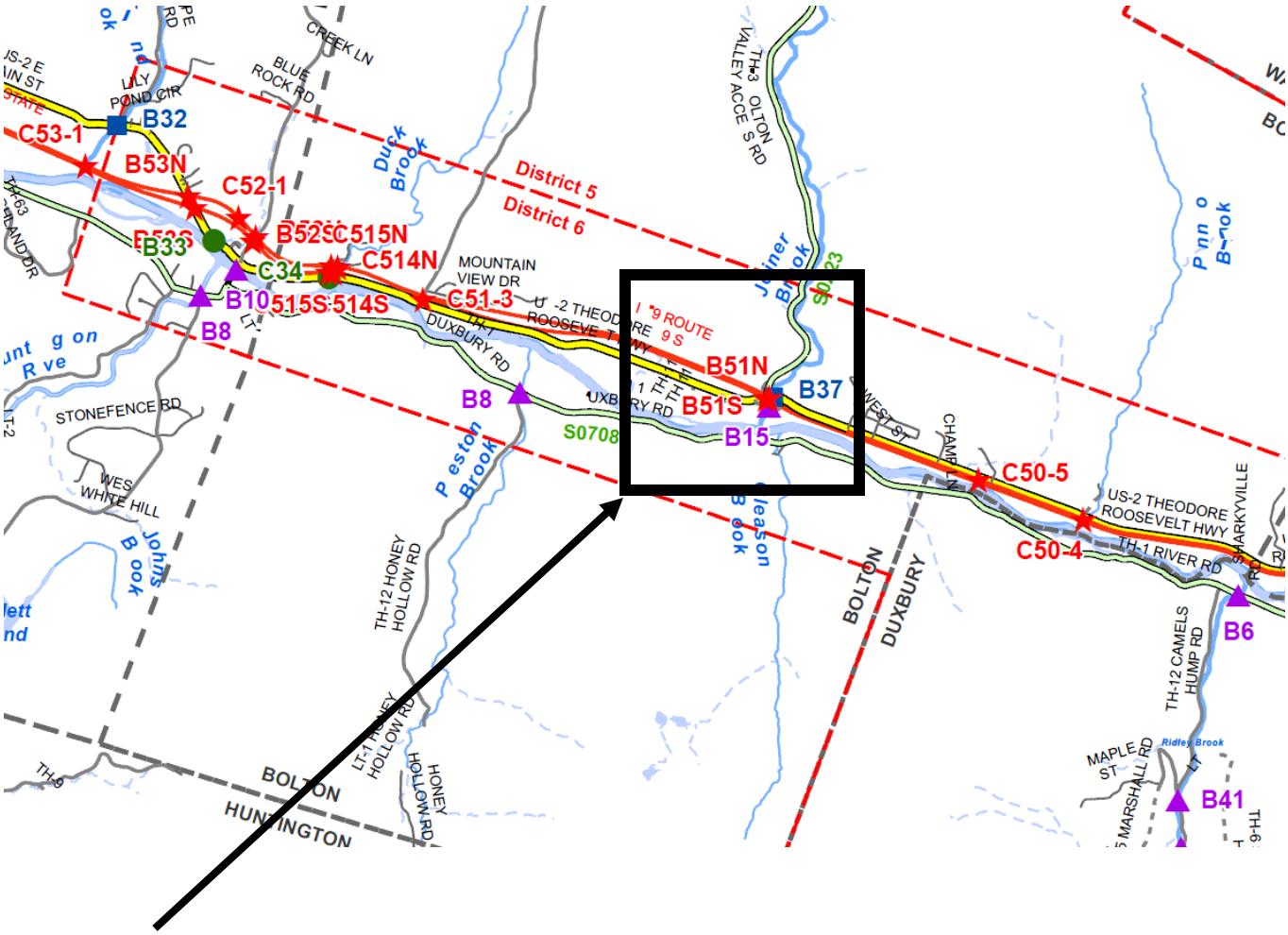


Large Vertical Crack (North Side Close up)

Evidence of Impact/Scraping

Evidence of Over Height Vehicle Accessories (Such as Antenna’s)

Town Map



Project Location B51

Bridge Inspection Report

STRUCTURE INSPECTION, INVENTORY and APPRAISAL SHEET

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

Inspection Report for **BOLTON** *bridge no.:* **051-3** *District:* **6**

Located on: **I 00089 ML** *over* **I 89 OVER TH NO 4** *approximately* **5.8 MI S EXIT 11** *Owner:* **01 STATE-OWNED**

CONDITION

Deck Rating: **N NOT APPLICABLE**

Superstructure Rating: **N NOT APPLICABLE**

Substructure Rating: **N NOT APPLICABLE**

Channel Rating: **N NOT APPLICABLE**

Culvert Rating: **5 FAIR**

Federal Str. Number: **20008951-304012**

Federal Sufficiency Rating: **064.6**

Deficiency Status of Structure: **FD**

AGE and SERVICE

Year Built: **1964** *Year Reconstructed:* **0000**

Service On: **1 HIGHWAY**

Service Under: **1 HIGHWAY**

Lanes On the Structure: **04**

Lanes Under the Structure: **01**

Bypass, Detour Length (miles): **01**

ADT: **023700** *% Truck ADT:* **13**

Year of ADT: **1998**

GEOMETRIC DATA

Length of Maximum Span (ft): **0020**

Structure Length (ft): **000020**

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): **076**

Skew: **00**

Bridge Median: **1 OPEN MEDIAN**

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

Feature Under: **HIGHWAY BENEATH STRUCTURE**

Min Vertical Underclr (ft): **12 FT 05 IN**

STRUCTURE TYPE and MATERIALS

Bridge Type: **R.C. BOX CULVERT**

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

Kind of Material and/or Design: **1 CONCRETE**

Deck Structure Type: **N NOT APPLICABLE**

Type of Wearing Surface: **N NOT APPLICABLE**

Type of Membrane **N NOT APPLICABLE**

Deck Protection: **N NOT APPLICABLE**

APPRAISAL *AS COMPARED TO FEDERAL STANDARDS

Bridge Railings: **N SAFETY FEATURE NOT REQUIRED**

Transitions: **N SAFETY FEATURE NOT REQUIRED**

Approach Guardrail: **N SAFETY FEATURE NOT REQUIRED**

Approach Guardrail Ends: **N SAFETY FEATURE NOT REQUIRED**

Structural Evaluation: **5 BETTER THAN MINIMUM TOLERABLE CRITERIA**

Deck Geometry: **N NOT APPLICABLE**

Underclearances Vertical and Horizontal: **3 INTOLERABLE, CORRECTIVE ACTION NEEDED**

Waterway Adequacy: **N NOT OVER WATER**

Approach Roadway Alignment: **8 EQUAL TO DESIRABLE CRITERIA**

Scour Critical Bridges: **N NOT OVER WATERWAY**

DESIGN VEHICLE, RATING, and POSTING

Load Rating Method (Inv): **5 NO RATING ANALYSIS PERFORMED**

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: **5 HS 20**

INSPECTION and CROSS REFERENCE

X-Ref. Route:

Insp. Date: **052012** *Insp. Freq. (months)* **24** *X-Ref. BrNum:*

INSPECTION SUMMARY and NEEDS

*5/17/2012 - No change in settlement cracking since the last inspection. Will continue to monitor biennially. Apron at the east end could use pothole repair. Signed for a vertical clearance of 12' - 6" at each end. * See latest CM for clearance alteration recommendation by DCP. – MJ/DK*

Culvert has cracking through out. The settlement at the rt.2 end appears to have stabilized. The posting should be changed to 12'-2". 4/19/10 DCP

Preliminary Geotechnical Information

AGENCY OF TRANSPORTATION **OFFICE MEMORANDUM**

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

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

Date: August 26st, 2013

Subject: Bolton IM 089-2(45) 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. 51, located at the intersection of US Route 2 and Town Highway 4 (Bolton Notch Rd.) directly under Interstate I-89 in the town of Bolton, VT. This report includes a review of available historical subsurface data and field observations made during a recent site visit. The materials referenced in this investigation include: VTrans boring files and record plans, Agency of Natural Resources (ANR) water well logs, ANR Environmental Interest Locator, USDA Natural Resources Conservation soil survey records and USGS bedrock and Vermont Geological Survey surficial geologic maps.

2.0 HISTORICAL SUBSURFACE INFORMATION

2.1 Previous Projects

No boring information was noted on the record plans recovered for Bridge No. 51. No boring log data were found in the Soils & Foundations project database or the in-house historical boring log records in the vicinity of this bridge.

2.2 ANR Water Well Logs

Drilling logs from private drinking water wells in the area of a project can be helpful in anticipating what may be encountered in the subsurface strata. The Agency of Natural Resources (ANR) Private Well Locator interactive map was reviewed for these purposes. The data provided estimates the depth to bedrock and expected soils types encountered on the site. It should be noted that these logs were developed and provided by well drilling companies whose employees may have had little to no formal training in identifying soil and rock. Water wells in close proximity of the subject bridge are highlighted in Figure 1.

Figure 1 Site map with well locations.

Four wells were identified within an approximate radius of 1,000 feet, and the information for each is listed in Table 1.

Table 1. Well log descriptions of surrounding sites.

Well Tag Number	Distance From Project (feet)	Depth to Bedrock (feet)	Material Description
-- (1)	750	44	Hardpan
447B	675	1	--
-- (2)	400	--	Sand, gravel with boulders

2.3 USDA Environmental Interest Locator

The U.S. Department of Agriculture (USDA) provides online maps with data locating potential environmental hazards. It was determined that there were currently no hazardous waste sites or designated wetlands within the project vicinity. There are currently no land use restrictions on this area.

2.4 USDA Soil Survey

The U.S. Department of Agriculture (USDA) Natural Resources Conservation (NRC) soil survey records provide online published soil data. These indicated that the existing soils

at the project site consist of both Winooski very fine sandy loam. The Winooski soils are typically very deep to bedrock and moderately well drained with a seasonal high water table ranging from 1.5-3.0 feet and an erosion factor of 0.49.

2.5 USGS Bedrock Maps

Based on recent bedrock mapping for the 2011 State bedrock geologic map (Ratcliffe, N.M., Stanley, R.S, Gale, M.H., Thompson, P.J., and Walsh, G.J., 2011, Bedrock Geologic Map of Vermont: U.S. Geological Survey Scientific Investigations Map 3184, 3 sheets, scale 1:100,000), the rock type underlying this area consists of schist and phyllite, described as "Silvery-green quartz-muscovite-chlorite schist and phyllite, commonly with albite and magnetite, locally contains dolomite". No bedrock outcrops were observed during the site visit.

3.0 FIELD OBSERVATIONS

Pertinent information was gathered during an initial site visit in order to determine any potential issues with boring observations or design considerations.

Figure 3. View of existing site. Photograph was taken facing north.

An overhead utility runs across the bridge from the northwest to southeast corner, as seen in Figure 3. The existing structure is a four sided box structure that passes under the interstate and does not cross a waterway. Placement of the borings will be affected by large ditches and heavy vegetation on all corners of bridge and should be located in an accessible area. Other considerations should include obtaining information that can be applicable to the wingwalls as well as the culvert structure.

4.0 RECOMMENDATIONS

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

- Reinforced concrete abutment on spread footings
- Precast arch on spread footings
- Stub abutments with spread footings on MSE Walls

It is recommended that a minimum of two borings be drilled to a depth of 50 feet at opposite ends of the box in order to assess the subsurface conditions. Additional borings at opposite ends of the wingwalls may be necessary in this case as well, due to the extent of the existing structure. If variable conditions are noted or shallow bedrock is encountered, additional borings should be advanced to establish a more detailed bedrock profile.

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

cc: Read File/WEA
Project File/CCB
LAR

Natural Resources Memo

VERMONT

State of Vermont
Program Development Division
One National Life Drive
Montpelier, VT 05633-5001
www.aot.state.vt.us

Agency of Transportation

[phone] 802-828-3979
[fax] 802-828-2334
[ttd] 800-253-0191

To: Jeff Ramsey, VTrans Environmental Specialist

From: Glenn Gingras, VTrans Environmental Biologist

Date: 9/24/2013

Subject: Bolton IM 089-2(45) - Natural Resource ID

I have completed my natural resource scoping review for the above referenced project. My evaluation has included the following resources: wetlands, wildlife habitat, agricultural soils, and rare, threatened and endangered species. I have reviewed all existing mapped information and project information including photos in the project file. A site visit was been made on 9/23/13.

The project involves the bridge 51-3 N&S on Interstate 89. This is a dry crossing and carries TH 4 (Notch Road) underneath Interstate 89. At this time we are identifying resources within the project area as a scope has not been defined. The current structure is a R.C. box culvert.

Wetlands/Watercourses
There are no wetlands within the project area.

There are no watercourses within the project area.

Wildlife Habitat
Moderate terrestrial wildlife habitat occurs on both sides of Interstate 89 at this location. According to latest ANR-Fish and Wildlife "BioFinder" mapping there is moderate concentration of components contributing to biological diversity to the north and low concentration of components contributing to biological diversity to the south (see attached ANR mapping). It the structure will be replaced opportunities for wildlife movement will be explored as the design moves forward.

Rare, Threatened and Endangered Species
According to VT Fish and Wildlife Natural Heritage mapping and US Fish and Wildlife mapping there are no rare, threatened or endangered species within the project area.

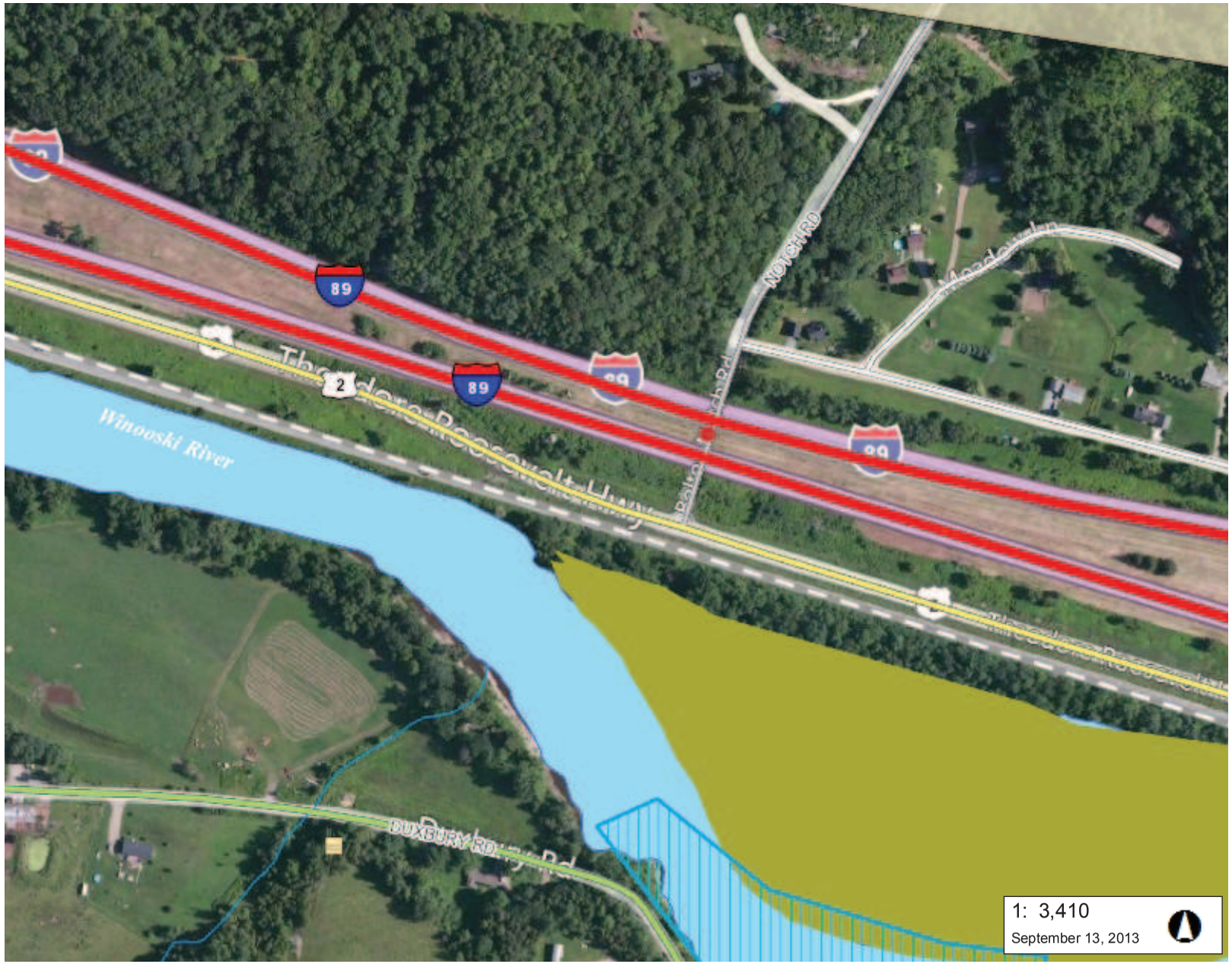
Agricultural Soils
There are mapped prime agricultural soils within the project area (Winooski very fine sandy loam). These soils were formed in alluvial deposits on floodplains and are frequently flooded.

VERMONT

Bolton IM 089-2(45)

Vermont Agency of Natural Resources

vermont.gov



LEGEND

- Rare Threatened Endangered
  - Threatened or Endangered
  - Rare
- Significant Natural Community
- Uncommon Species and Other
  - Animal
  - Plant
  - Natural Community
- Deer Wintering Areas
- Indiana Bat Hibernacula
- Wetlands - VSWI
  - Class 1 Wetland
  - Class 2 Wetland
- Wetlands - VSWI Advisory Lay
- Special Flood Hazard Areas (F DFIRM)
  - AE (1-percent annual chance floodp
  - A (1-percent annual chance floodpl
  - AO (1-percent annual chance zone feet)
  - 0.2-percent annual chance flood ha
- Act250 Permits **INCOMPLET
- Roads
  - Principal Arterial
  - Minor Arterial
  - Rural Major Collector
  - Rural Minor Collector
  - Urban Collector

1: 3,410

September 13, 2013

173.0 0 86.00 173.0 Meters

WGS_1984_Web_Mercator_Auxiliary_Sphere 1" = 284 Ft. 1cm = 34 Meters

THIS MAP IS NOT TO BE USED FOR NAVIGATION

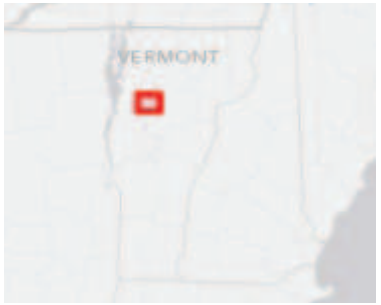
NOTES

Map created using ANR's Natural Resources Atlas

VERMONT BioFinder

Bolton IM 089-2(45)

vermont.gov



LEGEND

- Town Boundary *NOT A COMI
- Component Concentration
  - Tier 1 = Greatest
  - Tier 2 = Very High
  - Tier 3 = High
  - Tier 4 = Moderate
  - Tier 5 = Low
  - Tier 6 = Insufficient Data

NOTES

0.3 0 0.16 0.3 Miles

WGS_1984_Web_Mercator_Auxiliary_Sphere

THIS MAP IS NOT TO BE USED FOR NAVIGATION

VERMONT

BioFinder Tier Report

Component Concentration

- Tier 1 - Greatest
- Tier 2 - Very High
- Tier 3 - High
- Tier 4 - Moderate
- Tier 5 - Low
- Tier 6 - Insufficient data

TIER	ACRES	Description
1	48.77	Greatest concentration of components contributing to biological diversity or presence of rare species or natural communities.
2	229.31	Very high concentration of components contributing to biological diversity.
3	125.3	High concentration of components contributing to biological diversity.
4	986.95	Moderate concentration of components contributing to biological diversity.
5	909.62	Low concentration of components contributing to biological diversity.

Tiers show relative concentration of the components contributing to biological diversity. See contributing components for more information. This Tier Report does not replace the need for site-specific evaluation.

Component Concentration

- Tier 1 - Greatest
- Tier 2 - Very High
- Tier 3 - High
- Tier 4 - Moderate
- Tier 5 - Low
- Tier 6 - Insufficient data

TIER	ACRES	Description
6	68.4	Insufficient data. There are currently no data identifying components assessed during the development of BioFinder. Site evaluation may identify one or more components.

Tiers show relative concentration of the components contributing to biological diversity. See contributing components for more information. This Tier Report does not replace the need for site-specific evaluation.

Archaeology 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: Jeff Ramsey, VTrans Environmental Specialist

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

Date: 9/23/2013

Subject: Bolton IM 089-2(45) – Archaeological Resource ID

Jeff,

I completed a field review of the proposed Bridge 51-3 replacement/rehab project located over TH-4 in Bolton. The project area was heavily disturbed during interstate construction and is not considered sensitive for historic or precontact archaeology. Staging sites will be reviewed independely when they are submitted by the contractor.

Brennan

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

VTrans Working to Get You There

Historic Memo

Ramsey, Jeff

From: O'Shea, Kaitlin
Sent: Thursday, September 12, 2013 10:01 AM
To: Ramsey, Jeff
Cc: Newman, Scott; Williams, Chris; Spooner, Karen
Subject: RE: Bolton IM 089-2 (45) Resource ID request

Good morning Jeff,

I have completed the resource ID for this project: Bolton IM 089-2(45). The bridge is not a historic structure. The only historic resource in the area is the railroad corridor, which is a linear historic district. It is identified in arcmap, under the project number. Note that I've drawn historic district lines on either side of the rail corridor near the project, but the district would continue through the entire corridor.

Let me know if you have any questions.
Thanks,

Kaitlin

From: Ramsey, Jeff
Sent: Wednesday, September 11, 2013 4:23 PM
To: Armstrong, Jon; Gingras, Glenn; Russell, Jeannine; Gauthier, Brennan; O'Shea, Kaitlin; Newman, Scott
Cc: Williams, Chris
Subject: Bolton IM 089-2 (45) Resource ID request

Hi all,
Chris Williams would like resources identified for this project.

From: Jeff Ramsey, Environmental Specialist
Date: September 11, 2013
Project: Bolton IM 089-2 (45)
PIN: 13A090 **EA:** 0892045 001
Project Manager: Chris Williams

Link to Photos: Z:\Projects-Engineering\BoltonIM089-2(45)13a090\Structures\Pictures

The project manager would like resources identified for this project.

If there aren't any resources present, please feel free to issue a Resource Clearance for the CE as well.

Link:
Z:\Projects-Engineering\BoltonIM089-2(45)13a090\Environmental

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

Stormwater Memo

Ramsey, Jeff

From: Armstrong, Jon
Sent: Thursday, September 19, 2013 11:07 AM
To: Ramsey, Jeff
Subject: RE: Bolton IM 089-2 (45) Resource ID request

Hi Jeff,
There are no notable stormwater related resources of concern associated with this project.
I don't anticipate the need for an operational stormwater discharge permit for this project, but should see some plans before making a final jurisdictional determination.

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

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From: Ramsey, Jeff
Sent: Wednesday, September 11, 2013 4:23 PM
To: Armstrong, Jon; Gingras, Glenn; Russell, Jeannine; Gauthier, Brennan; O'Shea, Kaitlin; Newman, Scott
Cc: Williams, Chris
Subject: Bolton IM 089-2 (45) Resource ID request

Hi all,
Chris Williams would like resources identified for this project.

From: Jeff Ramsey, Environmental Specialist
Date: September 11, 2013
Project: Bolton IM 089-2 (45)
PIN: 13A090 **EA:** 0892045 001
Project Manager: Chris Williams

Link to Photos: Z:\Projects-Engineering\BoltonIM089-2(45)13a090\Structures\Pictures

The project manager would like resources identified for this project.

If there aren't any resources present, please feel free to issue a Resource Clearance for the CE as well.

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

Local Input

Community Considerations from the Town of Bolton, Amy Grover, Town Clerk 10/15/2103 Possible Impact on the Notch Road Tunnel Under I89 Bridge 51-3

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.
    - **Community events would include July celebrations at Wheeler Field in West Bolton for all of the Bolton community.**
2. Is there a "slow season" or period of time from May through October where traffic is less?
    - **LESS TRAFFIC: There would be no school/school bus traffic during school summer vacation time (the end of June through the end of August).**
    - **MORE TRAFFIC: May – October is probably a very busy season for the Beckman's Gravel Pit business located near 499 Notch Road, with customers' trucks almost exclusively using the Notch Road tunnel for access to their business.**
3. Please describe the location of emergency responders (fire, police, ambulance) and emergency response routes.
    - **The Bolton Notch Road tunnel provides the most expedient emergency access to all of Notch Road, Mill Brook Road, Cemetery Road,Black Fly Hill Road, Mountain View Drive, Fern Hollow Road, Bear Mountain Road and parts of Stage Road. Tunnel delays/closures would require access to these areas via RT 2 west to Jonesville, 3 miles, then onto Stage Road to access all the afore mentioned roads. Please contact the Bolton Highway Foreman if you would like precise mileages.**
    - **Emergency Responders:**
      Fire Department: Bolton VFD responds from the RT 2 station in Bolton.
      Ambulance: Richmond Rescue responds from Richmond or Waterbury Ambulance responds from Waterbury
      Police: VT State Police responds from the Williston barracks or on the road.
4. Where are the schools in your community and what are their schedules?
   Schools: prek – 4th grade attend Smilie School at 2712 Theodore Rossevelt Highway (RT 2) in Bolton.
   Middle School – CHMS in Richmond
   High School – MMU in Jericho.
   They follow the CESU school calendar available on the CESU VT website.
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?
   The Green Mountain Club's (GMC) confirmed re route of the Long Trail in Bolton will utilize the tunnel for all hiker traffic in this area.
6. Are there any businesses (including agricultural operations) that would be adversely impacted either by a detour or due to work zone proximity?
   Beckman's gravel pit, previously mentioned, and there may be other home based businesses as well.
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?
   Town land is located near the tunnel and as noted above, will include GMC's rerouted Long Trail.
8. Are there any town highways that might be adversely impacted by traffic bypassing the construction on another local road?
   Stage Road in Jonesville could see a huge increase in traffic, it lies within both Richmond and Bolton.
9. Are there any other municipal operations that could be adversely impacted if the bridge is closed during construction? If yes, please explain.
    - **All town highway maintenance and plowing of all the roads mentioned in question #2.**

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.
    - **Town of Bolton Facebook page**
    - **Town of Bolton Front Porch Forum**
    - **Monthly Newsletter; The Bolton Gazette**

11. Is there a local business association, chamber of commerce or other downtown group that we should be working with?
    We have none of those entities in Bolton.

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?
   Bridge: n/a
2. Are there any concerns with the width of the existing bridge?
   Bridge: n/a
   Tunnel: too narrow for 2 vehicles, especially for 1 vehicle and a truck coming from the gravel pit fully loaded, and too narrow for pedestrians, hiker, and bikers.

3. What is the current level of bicycle and pedestrian use on the bridge?
   Bridge: n/a
   Tunnel: school buses from MMU and CHMS drop students off to walk through the tunnel to get home, bike commuters utilize the tunnel.

4. If a sidewalk or wide shoulder is present on the existing bridge, should the new structure have one?
   Bridge: n/a
   Tunnel: yes the tunnel should have wide shoulders and a pedestrian/bike lane clearly marked, and perhaps even elevated

5. Is there a need for a sidewalk or widened shoulder if one does not currently exist? Please explain.
   Bridge: n/a
   Tunnel: YES, to accommodate hikers, walkers and bikers with increased safety in the tunnel.

6. Does the bridge provide an important link in the town or statewide bicycle or pedestrian network such that bicycle and pedestrian traffic should be accommodated during construction?
   Bridge: n/a
   Tunnel: YES!

7. Are there any special aesthetic considerations we should be aware of?
   No.

8. Are there any traffic, pedestrian or bicycle safety concerns associated with the current bridge? If yes, please explain.
   Bridge – no
   Tunnel – yes – too narrow for all the reasons stated above in #5, #4, #3, #2.

9. Does the location have a history of flooding? If yes, please explain.
   The area in front of as well as the tunnel were flooded during tropical storm Irene. There was no access through the tunnel during flooding.

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

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

12. Are there any other comments you feel are important for us to consider that we have not mentioned yet?
    The Notch Road Tunnel is a vital connector to every single road, home, and business on the north side of RT 2 in Bolton and West Bolton. Closure of any type would have an enormous negative impact on our community, not only adding increased time and distance for commuters, school buses, mail and other deliveries, for access to the recreational opportunities on Stage Road (Preston Pond Hiking trails, CRAG VT climbing areas) but particularly on businesses, for recreation and especially on all emergency access.

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

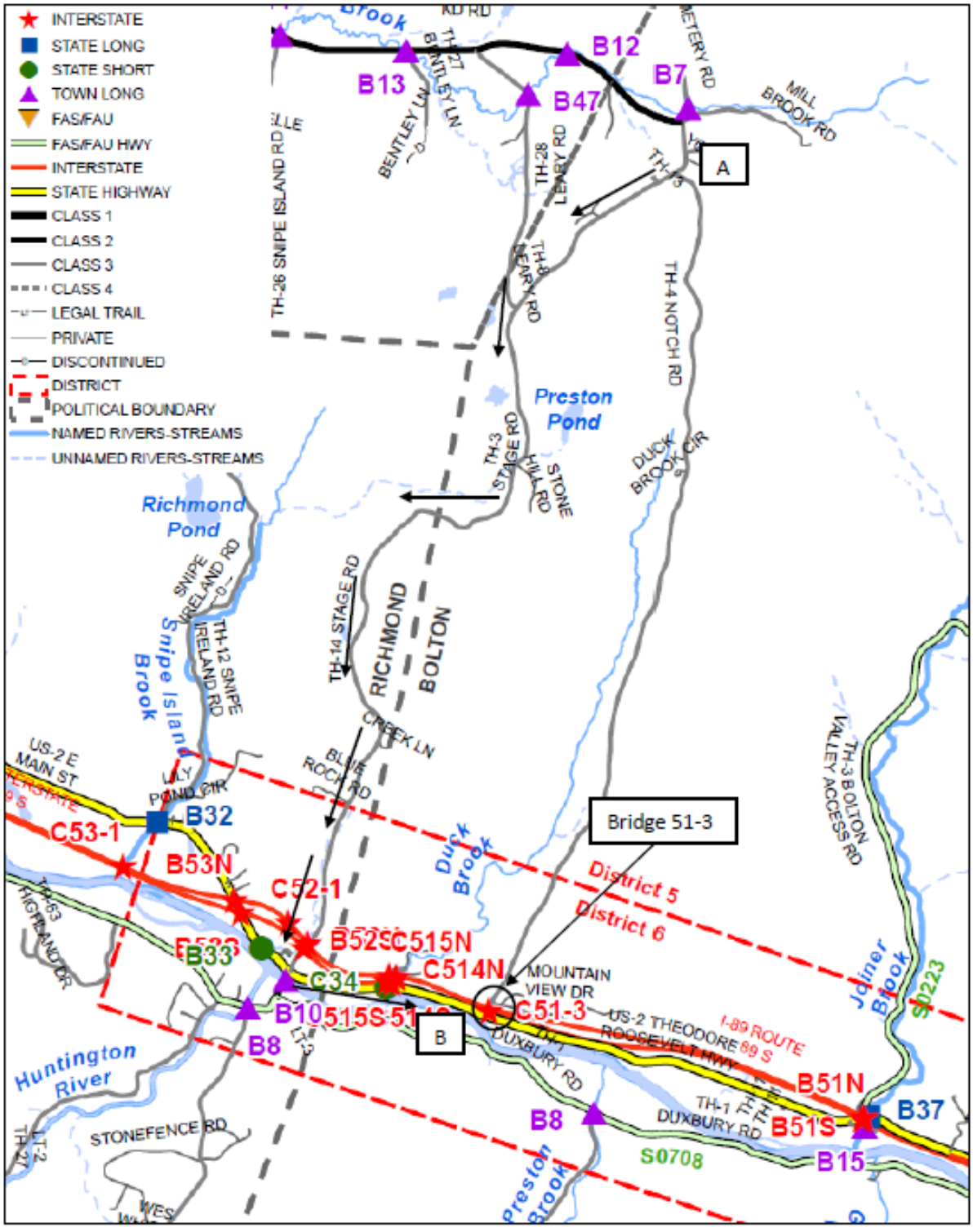
1. Does your municipal land use plan reference the bridge in question? If so please provide a copy of the applicable section or sections of the plan. **No.**
2. Please provide a copy of your existing and future land use map, if applicable.

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

   Not at this time.

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

TH-4 Detour



Detour Route
Notch Road, to Stage Road, US Route 2 back to Notch Road

A – B Through Route: 6.2 Miles
A – B Detour Route: 4.6 Miles
Added Miles: 1.6 Miles
End-End Distance: 10.8 Miles

Traffic Data

I-89 between Exits 10 and 11

Estimated Hourly Volumes for Year 2015 (Based on P6W089(13))

Threshold values: According to the 2010HCM, the maximum capacity for a two-lane highway which has been reduced to a single lane, is 1400 vehicles/hour. VTrans field data indicates that the capacity is slightly less, around 1350 vehicles/hour, if there is a crossover in place

DIRECTION NB
Month May

Avg Vol 2015	Day		
Begin Hour	Mon-Thu	Fri	Sat-Sun
12:00 AM	44	62	69
1:00 AM	35	43	73
2:00 AM	35	52	52
3:00 AM	54	56	47
4:00 AM	143	148	67
5:00 AM	341	348	117
6:00 AM	840	853	303
7:00 AM	1180	1192	375
8:00 AM	856	935	492
9:00 AM	774	816	730
10:00 AM	751	800	909
11:00 AM	744	892	1044
12:00 PM	781	908	1042
1:00 PM	787	952	988
2:00 PM	863	1071	996
3:00 PM	1003	1271	965
4:00 PM	1189	1438	940
5:00 PM	1074	1290	818
6:00 PM	632	884	644
7:00 PM	432	645	518
8:00 PM	329	519	402
9:00 PM	256	451	290
10:00 PM	149	270	192
11:00 PM	83	125	127

DIRECTION NB
Month Jun

Avg Vol 2015	Day		
Begin Hour	Mon-Thu	Fri	Sat-Sun
12:00 AM	54	60	83
1:00 AM	36	36	48
2:00 AM	35	42	35
3:00 AM	55	56	40
4:00 AM	155	140	66
5:00 AM	387	363	132
6:00 AM	912	844	245
7:00 AM	1267	1090	370
8:00 AM	976	911	511
9:00 AM	831	899	731
10:00 AM	787	845	904
11:00 AM	802	960	992
12:00 PM	829	1038	1041
1:00 PM	843	1085	1009
2:00 PM	910	1129	994
3:00 PM	1055	1292	985
4:00 PM	1277	1497	965
5:00 PM	1151	1386	857
6:00 PM	667	922	688
7:00 PM	441	654	544
8:00 PM	355	579	455
9:00 PM	269	493	381
10:00 PM	172	298	266
11:00 PM	95	168	145

DIRECTION NB
Month Jul

Avg Vol 2015	Day		
Begin Hour	Mon-Thu	Fri	Sat-Sun
12:00 AM	65	76	93
1:00 AM	44	45	53
2:00 AM	44	44	40
3:00 AM	57	56	41
4:00 AM	138	134	66
5:00 AM	383	335	127
6:00 AM	846	713	200
7:00 AM	1137	952	290
8:00 AM	923	837	466
9:00 AM	853	863	715
10:00 AM	870	923	933
11:00 AM	890	1029	1093
12:00 PM	906	1120	1120
1:00 PM	931	1176	1087
2:00 PM	1020	1243	1176
3:00 PM	1106	1425	1157
4:00 PM	1316	1535	1125
5:00 PM	1221	1364	998
6:00 PM	719	951	792
7:00 PM	481	686	651
8:00 PM	383	616	566
9:00 PM	326	496	441
10:00 PM	221	352	302
11:00 PM	126	190	168

DIRECTION NB
Month Aug

Avg Vol 2015	Day		
Begin Hour	Mon-Thu	Fri	Sat-Sun
12:00 AM	65	80	111
1:00 AM	43	52	59
2:00 AM	39	41	50
3:00 AM	49	55	40
4:00 AM	137	134	65
5:00 AM	341	316	118
6:00 AM	798	719	224
7:00 AM	1205	1074	319
8:00 AM	1014	949	459
9:00 AM	907	977	759
10:00 AM	924	1054	1018
11:00 AM	949	1162	1228
12:00 PM	970	1191	1272
1:00 PM	985	1227	1237
2:00 PM	1067	1344	1264
3:00 PM	1187	1461	1269
4:00 PM	1399	1648	1247
5:00 PM	1374	1496	1133
6:00 PM	825	1093	926
7:00 PM	538	794	730
8:00 PM	436	709	592
9:00 PM	361	563	463
10:00 PM	223	375	342
11:00 PM	124	216	190

DIRECTION NB
Month Sep

Avg Vol 2015	Day		
Begin Hour	Mon-Thu	Fri	Sat-Sun
12:00 AM	52	53	85
1:00 AM	37	52	49
2:00 AM	32	41	38
3:00 AM	46	44	35
4:00 AM	140	131	71
5:00 AM	316	306	107
6:00 AM	793	792	206
7:00 AM	1256	1188	296
8:00 AM	1002	957	446
9:00 AM	829	835	732
10:00 AM	799	833	932
11:00 AM	821	908	1107
12:00 PM	850	937	1102
1:00 PM	858	1035	1039
2:00 PM	938	1149	1052
3:00 PM	1106	1352	1094
4:00 PM	1256	1562	1064
5:00 PM	1236	1517	999
6:00 PM	749	1052	814
7:00 PM	464	703	648
8:00 PM	325	550	508
9:00 PM	229	455	387
10:00 PM	150	325	279
11:00 PM	84	169	147

DIRECTION NB
Month Oct

Avg Vol 2015	Day		
Begin Hour	Mon-Thu	Fri	Sat-Sun
12:00 AM	47	53	101
1:00 AM	36	37	60
2:00 AM	30	39	37
3:00 AM	49	46	42
4:00 AM	146	129	72
5:00 AM	318	292	102
6:00 AM	797	736	180
7:00 AM	1264	1148	272
8:00 AM	1043	990	451
9:00 AM	838	866	732
10:00 AM	787	871	919
11:00 AM	780	927	1089
12:00 PM	814	1015	1120
1:00 PM	828	1060	1068
2:00 PM	930	1176	1099
3:00 PM	1111	1386	1119
4:00 PM	1277	1591	1194
5:00 PM	1238	1539	1148
6:00 PM	724	1125	876
7:00 PM	430	725	627
8:00 PM	306	574	482
9:00 PM	227	471	332
10:00 PM	150	404	244
11:00 PM	81	220	140

DIRECTION NB
Month Nov

Avg Vol 2015	Day		
Begin Hour	Mon-Thu	Fri	Sat-Sun
12:00 AM	44	52	63
1:00 AM	30	34	50
2:00 AM	30	35	30
3:00 AM	50	52	34
4:00 AM	128	140	59
5:00 AM	280	260	100
6:00 AM	736	672	177
7:00 AM	1159	1009	266
8:00 AM	917	867	388
9:00 AM	739	784	656
10:00 AM	726	816	833
11:00 AM	729	842	985
12:00 PM	756	916	1003
1:00 PM	733	955	967
2:00 PM	798	1020	972
3:00 PM	968	1234	983
4:00 PM	1164	1387	952
5:00 PM	1067	1271	821
6:00 PM	582	800	597
7:00 PM	352	522	428
8:00 PM	277	394	348
9:00 PM	214	328	252
10:00 PM	140	224	178
11:00 PM	73	125	110

DIRECTION SB
Month May

Avg Vol 2015	Day		
Begin Hour	Mon-Thu	Fri	Sat-Sun
12:00 AM	79	99	125
1:00 AM	48	53	50
2:00 AM	42	47	42
3:00 AM	38	47	34
4:00 AM	72	72	35
5:00 AM	187	182	79
6:00 AM	497	517	191
7:00 AM	1027	1026	355
8:00 AM	953	897	521
9:00 AM	709	783	647
10:00 AM	672	712	739
11:00 AM	728	813	835
12:00 PM	755	952	900
1:00 PM	805	1035	959
2:00 PM	882	1176	1054
3:00 PM	1039	1297	1120
4:00 PM	1262	1375	1085
5:00 PM	1250	1360	936
6:00 PM	815	1039	734
7:00 PM	526	701	569
8:00 PM	422	528	446
9:00 PM	320	444	329
10:00 PM	180	301	208
11:00 PM	117	211	150

DIRECTION SB
Month Jun

Avg Vol 2015	Day		
Begin Hour	Mon-Thu	Fri	Sat-Sun
12:00 AM	84	99	129
1:00 AM	50	52	66
2:00 AM	42	62	46
3:00 AM	36	43	33
4:00 AM	80	82	43
5:00 AM	207	185	102
6:00 AM	541	519	219
7:00 AM	1079	989	403
8:00 AM	985	990	565
9:00 AM	756	836	746
10:00 AM	710	854	886
11:00 AM	733	940	975
12:00 PM	778	1012	1026
1:00 PM	803	1141	1027
2:00 PM	893	1231	1087
3:00 PM	1056	1260	1055
4:00 PM	1237	1312	1012
5:00 PM	1254	1297	873
6:00 PM	899	1218	704
7:00 PM	557	666	562
8:00 PM	430	522	420
9:00 PM	349	539	344
10:00 PM	200	299	232
11:00 PM	138	215	162

DIRECTION SB
Month Jul

Avg Vol 2015	Day		
Begin Hour	Mon-Thu	Fri	Sat-Sun
12:00 AM	86	102	118
1:00 AM	59	61	74
2:00 AM	47	45	53
3:00 AM	46	49	37
4:00 AM	81	99	57
5:00 AM	206	192	132
6:00 AM	514	499	274
7:00 AM	1006	918	514
8:00 AM	987	950	679
9:00 AM	817	899	903
10:00 AM	812	938	1095
11:00 AM	847	1016	1179
12:00 PM	866	1109	1154
1:00 PM	897	1132	1153
2:00 PM	973	1205	1135
3:00 PM	1149	1338	1134
4:00 PM	1274	1385	1127
5:00 PM	1272	1457	984
6:00 PM	895	1113	772
7:00 PM	539	657	591
8:00 PM	443	508	460
9:00 PM	386	498	392
10:00 PM	244	314	261
11:00 PM	155	213	169

DIRECTION SB
Month Aug

Avg Vol 2015	Day		
Begin Hour	Mon-Thu	Fri	Sat-Sun
12:00 AM	94	99	145
1:00 AM	57	67	73
2:00 AM	42	53	41
3:00 AM	42	46	42
4:00 AM	72	75	51
5:00 AM	201	192	103
6:00 AM	521	471	238
7:00 AM	1050	982	449
8:00 AM	1067	1014	646
9:00 AM	870	977	911
10:00 AM	850	988	1111
11:00 AM	900	1060	1209
12:00 PM	895	1089	1194
1:00 PM	917	1210	1170
2:00 PM	1015	1341	1193
3:00 PM	1183	1478	1211
4:00 PM	1386	1699	1183
5:00 PM	1458	1627	1051
6:00 PM	996	1235	853
7:00 PM	609	810	666
8:00 PM	490	639	546
9:00 PM	399	537	439
10:00 PM	248	404	292
11:00 PM	154	235	211

DIRECTION SB
Month Sep

Avg Vol 2015	Day		
Begin Hour	Mon-Thu	Fri	Sat-Sun
12:00 AM	81	109	130
1:00 AM	45	57	65
2:00 AM	42	49	41
3:00 AM	37	46	33
4:00 AM	63	72	40
5:00 AM	195	195	90
6:00 AM	527	523	191
7:00 AM	1039	1037	372
8:00 AM	1060	1048	567
9:00 AM	780	865	756
10:00 AM	728	842	888
11:00 AM	769	952	1008
12:00 PM	795	982	1038
1:00 PM	792	1057	1091
2:00 PM	879	1187	1086
3:00 PM	1040	1359	1103
4:00 PM	1305	1604	1102
5:00 PM	1347	1607	945
6:00 PM	862	1112	751
7:00 PM	561	715	576
8:00 PM	421	538	444
9:00 PM	321	461	340
10:00 PM	190	338	261
11:00 PM	131	203	179

DIRECTION SB
Month Oct

Avg Vol 2015	Day		
Begin Hour	Mon-Thu	Fri	Sat-Sun
12:00 AM	78	108	119
1:00 AM	47	67	70
2:00 AM	39	52	43
3:00 AM	37	44	33
4:00 AM	64	70	40
5:00 AM	199	200	95
6:00 AM	550	550	203
7:00 AM	1079	1071	382
8:00 AM	1076	1090	584
9:00 AM	773	931	805
10:00 AM	702	916	932
11:00 AM	738	1029	1064
12:00 PM	792	1080	1073
1:00 PM	789	1128	1091
2:00 PM	909	1305	1123
3:00 PM	1059	1464	1130
4:00 PM	1307	1672	1118
5:00 PM	1359	1654	963
6:00 PM	843	1162	750
7:00 PM	534	753	564
8:00 PM	397	538	409
9:00 PM	311	467	344
10:00 PM	191	355	241
11:00 PM	115	191	134

DIRECTION SB
Month Nov

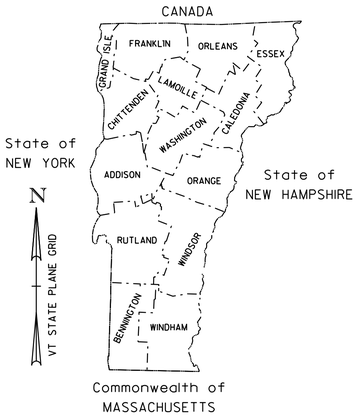
Avg Vol 2015	Day		
Begin Hour	Mon-Thu	Fri	Sat-Sun
12:00 AM	72	91	106
1:00 AM	51	62	61
2:00 AM	38	54	39
3:00 AM	35	49	30
4:00 AM	58	78	47
5:00 AM	189	191	104
6:00 AM	523	476	188
7:00 AM	998	949	357
8:00 AM	982	955	528
9:00 AM	723	763	647
10:00 AM	642	757	717
11:00 AM	682	803	852
12:00 PM	734	899	870
1:00 PM	738	987	896
2:00 PM	799	1087	926
3:00 PM	970	1237	947
4:00 PM	1222	1476	966
5:00 PM	1176	1336	782
6:00 PM	703	948	593
7:00 PM	460	597	464
8:00 PM	339	437	330
9:00 PM	278	424	282
10:00 PM	167	276	202
11:00 PM	112	171	134

Plans

REVIEWERS NOTES:

1:

STATE OF VERMONT
AGENCY OF TRANSPORTATION



PROPOSED IMPROVEMENT
BRIDGE PROJECT

TOWN OF BOLTON
COUNTY OF CHITTENDEN

ROUTE NO : I-89, RURAL PRINCIPAL ARTERIAL BRIDGE NO : 51-3

PROJECT LOCATION: OVER TH-4, APPROXIMATELY 25 FEET NORTH OF THE INTERSECTION OF TH-4 AND US-2

PROJECT DESCRIPTION: REMOVAL OF EXISTING STRUCTURE AND REPLACEMENT WITH A NEW STRUCTURE.

LENGTH OF STRUCTURE: xx.xx FEET
LENGTH OF ROADWAY: xxx.xx FEET
LENGTH OF PROJECT: xxx.xx FEET

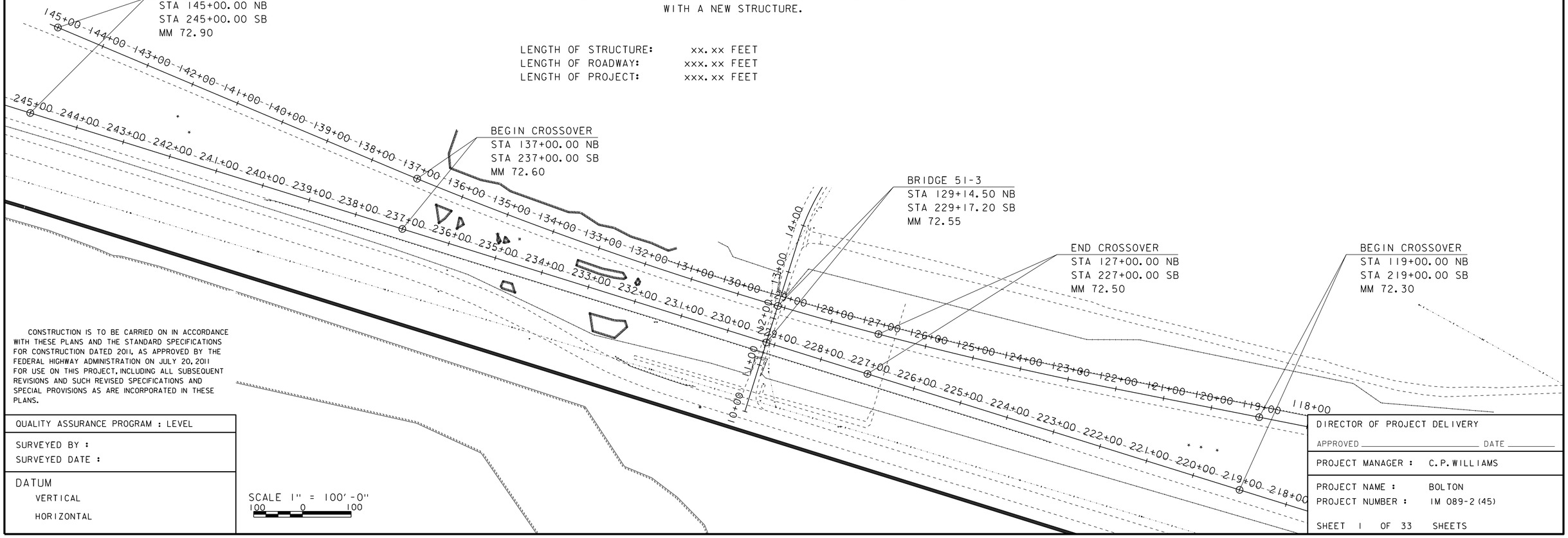
END CROSSOVER
STA 145+00.00 NB
STA 245+00.00 SB
MM 72.90

BEGIN CROSSOVER
STA 137+00.00 NB
STA 237+00.00 SB
MM 72.60

BRIDGE 51-3
STA 129+14.50 NB
STA 229+17.20 SB
MM 72.55

END CROSSOVER
STA 127+00.00 NB
STA 227+00.00 SB
MM 72.50

BEGIN CROSSOVER
STA 119+00.00 NB
STA 219+00.00 SB
MM 72.30



CONSTRUCTION IS TO BE CARRIED ON IN ACCORDANCE WITH THESE PLANS AND THE STANDARD SPECIFICATIONS FOR CONSTRUCTION DATED 2011, AS APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION ON JULY 20, 2011 FOR USE ON THIS PROJECT, INCLUDING ALL SUBSEQUENT REVISIONS AND SUCH REVISED SPECIFICATIONS AND SPECIAL PROVISIONS AS ARE INCORPORATED IN THESE PLANS.

QUALITY ASSURANCE PROGRAM : LEVEL

SURVEYED BY :
SURVEYED DATE :

DATUM
VERTICAL
HORIZONTAL

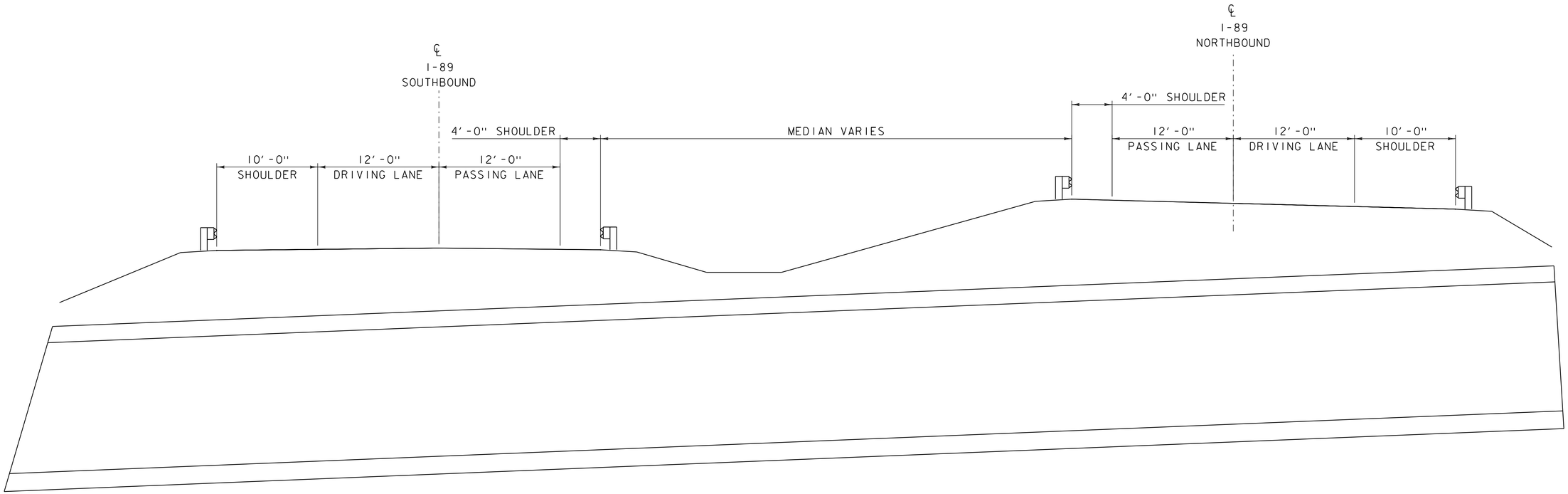
SCALE 1" = 100'-0"
100 0 100

DIRECTOR OF PROJECT DELIVERY
APPROVED _____ DATE _____

PROJECT MANAGER : C.P.WILLIAMS

PROJECT NAME : BOLTON
PROJECT NUMBER : IM 089-2(45)

SHEET 1 OF 33 SHEETS

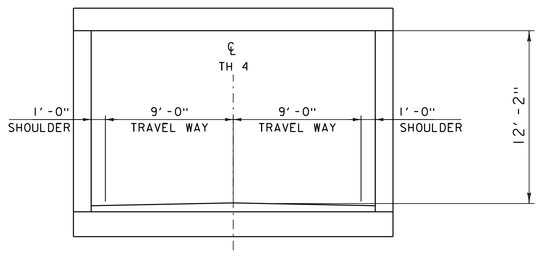


I-89 SOUTHBOUND TYPICAL SECTION

SCALE: 1/4" = 1'-0"

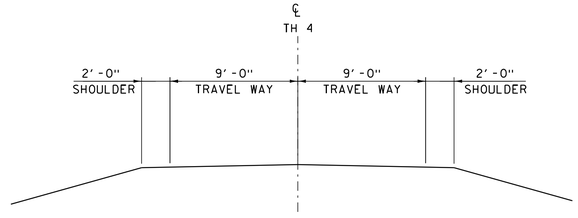
I-89 NORTHBOUND TYPICAL SECTION

SCALE: 1/4" = 1'-0"



TH-4 TYPICAL SECTION THROUGH EXISTING CULVERT

SCALE: 1/4" = 1'-0"



TH-4 TYPICAL ROADWAY SECTION

SCALE: 1/4" = 1'-0"

PROJECT NAME:	BOLTON
PROJECT NUMBER:	IM 089-2(45)
FILE NAME: 13a090/sl3a090typ.dgn	PLOT DATE: 31-MAY-2016
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: L.J.STONE
DESIGNED BY: L.J.STONE	CHECKED BY: ------
TYPICAL SECTIONS EXISTING	SHEET 3 OF 33

I-89 SOUTHBOUND
TO WATERBURY

215+00 216+00 217+00 218+00 219+00 220+00

MATCH LINE
STA 220+50.00 SB

VT STATE PLANE GRID

N

115+00 116+00 117+00 118+00 119+00 120+00

I-89 NORTHBOUND
TO RICHMOND

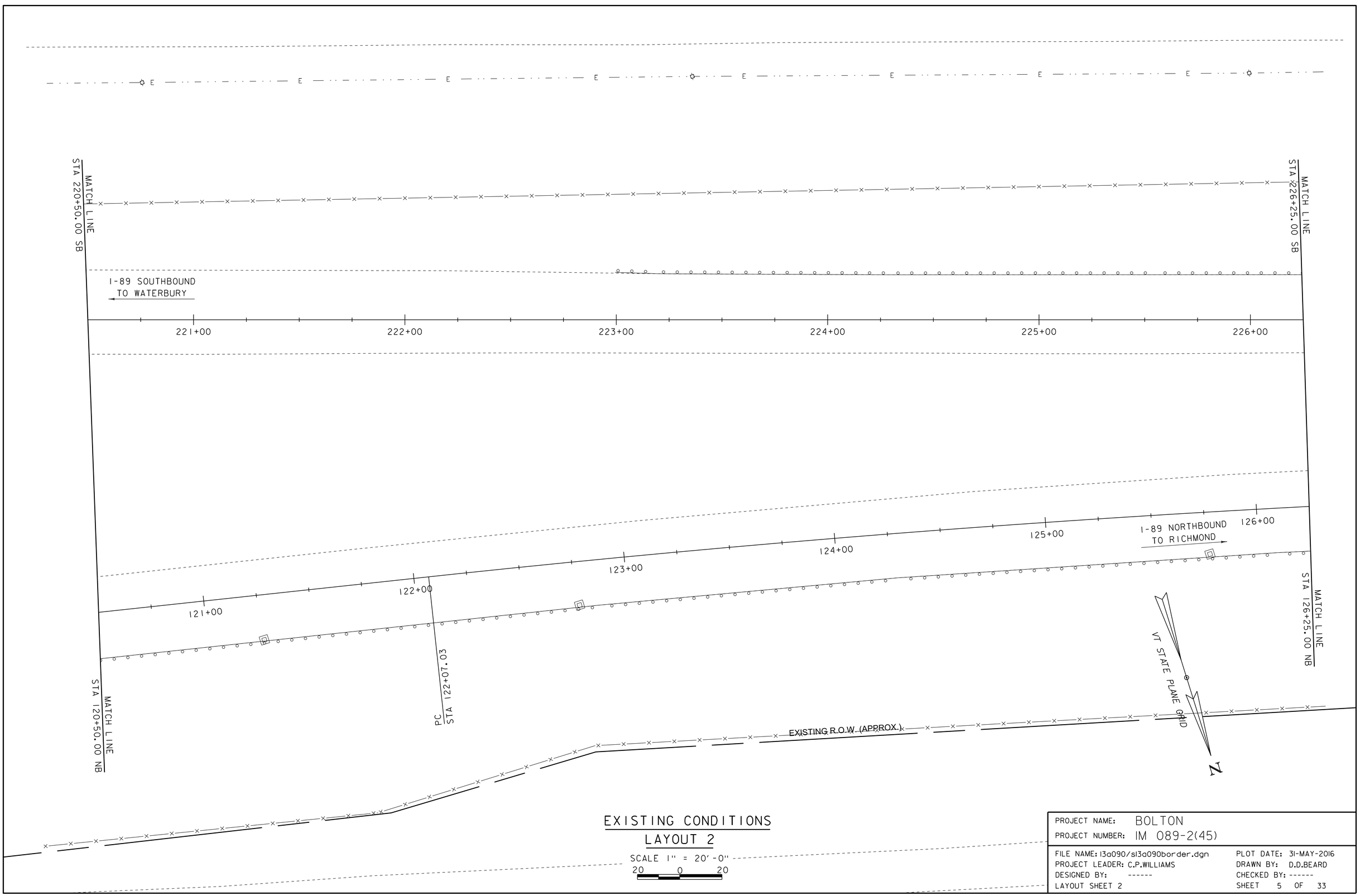
MATCH LINE
STA 120+50.00 NB

EXISTING R.O.W. (APPROX.)

EXISTING CONDITIONS
LAYOUT 1

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

PROJECT NAME:	BOLTON
PROJECT NUMBER:	IM 089-2(45)
FILE NAME: l3a090/sl3a090border.dgn	PLOT DATE: 31-MAY-2016
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
LAYOUT SHEET 1	SHEET 4 OF 33



EXISTING CONDITIONS
LAYOUT 2

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

PROJECT NAME:	BOLTON
PROJECT NUMBER:	IM 089-2(45)
FILE NAME: 13a090/sl3a090border.dgn	PLOT DATE: 31-MAY-2016
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
LAYOUT SHEET 2	SHEET 5 OF 33

NECR

NECR

HISTORIC DIST

EXISTING R.O.W. (APPROX.)

US ROUTE 2
TO WATERBURY

POB
STA 10+00.00

US ROUTE 2
TO RICHMOND

10+00

TH 4
(BOLTON NOTCH ROAD)

11+00

VT STATE PLANE GRID

N

P I
STA 129+88.33

MATCH LINE
STA 226+25.00 SB

MATCH LINE
STA 232+00.00 SB

I-89 SOUTHBOUND
TO WATERBURY

227+00

228+00

229+00

230+00

231+00

232+00

36" X 228' ACCCGMP
FLOW

12+00

127+00

128+00

129+00

130+00

131+00

I-89 NORTHBOUND
TO RICHMOND

132+00

MATCH LINE
STA 126+25.00 NB

MATCH LINE
STA 232+00.00 NB

13+00

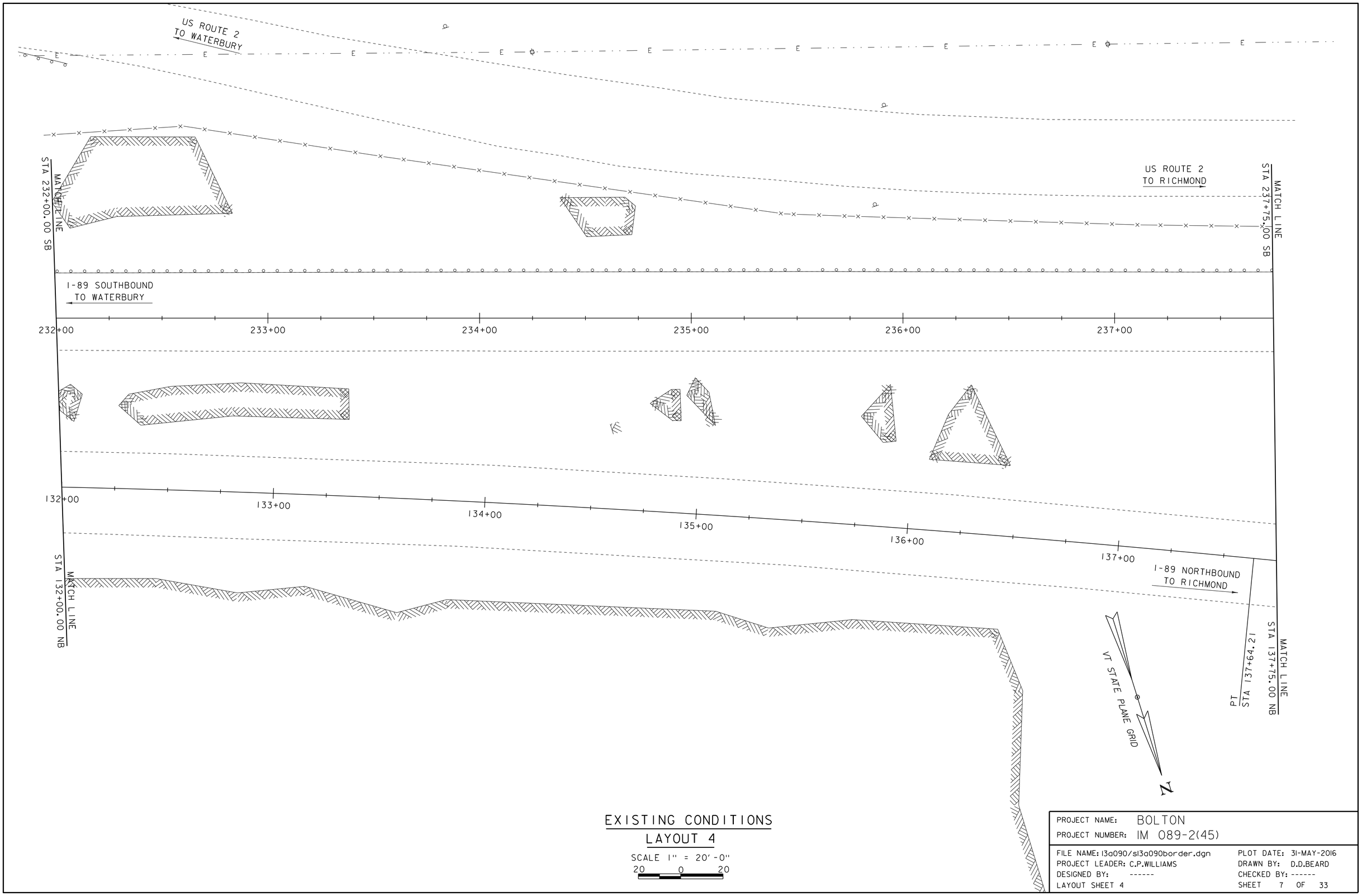
EXISTING R.O.W. (APPROX.)

MATCH LINE
STA 13+25.00
LAYOUT 6

EXISTING CONDITIONS LAYOUT 3

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

PROJECT NAME:	BOLTON
PROJECT NUMBER:	IM 089-2(45)
FILE NAME: I3a090/sI3a090border.dgn	PLOT DATE: 31-MAY-2016
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
LAYOUT SHEET 3	SHEET 6 OF 33



EXISTING CONDITIONS
LAYOUT 4

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

PROJECT NAME:	BOLTON
PROJECT NUMBER:	IM 089-2(45)
FILE NAME: l3a090/sl3a090border.dgn	PLOT DATE: 31-MAY-2016
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
LAYOUT SHEET 4	SHEET 7 OF 33

US ROUTE 2
TO WATERBURY

US ROUTE 2
TO RICHMOND

MATCH L INE
STA 237+75.00 SB

I-89 SOUTHBOUND
TO WATERBURY

238+00 239+00 240+00 241+00 242+00 243+00

VT STATE PLANE GRID

N

138+00 139+00 140+00 141+00 142+00 143+00

MATCH LINE
STA 137+75.00 NB

I-89 NORTHBOUND
TO RICHMOND

EXISTING R.O.W. (APPROX.)

EXISTING CONDITIONS
LAYOUT 5

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

PROJECT NAME:	BOLTON
PROJECT NUMBER:	IM 089-2(45)
FILE NAME: l3a090/sl3a090border.dgn	PLOT DATE: 31-MAY-2016
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
LAYOUT SHEET 5	SHEET 8 OF 33

N

VT STATE PLANE GRID

TH4 EXISTING CURVE
DELTA = 15° 12' 11"
D = 12° 00' 00"
R = 477.46'
T = 63.72'
L = 126.69'
E = 4.23'

MATCH LINE
STA 13+25.00
LAYOUT 3

PI
STA 14+33.37

TH 4
(BOLTON NOTCH ROAD)
TO I-89

14+00

15+00

16+00

17+00

18+00

19+00

TH 4
(BOLTON NOTCH ROAD)
TO UNDERHILL

N 32° 31' 14.85" E

PC
STA 13+69.65

PT
STA 14+96.34

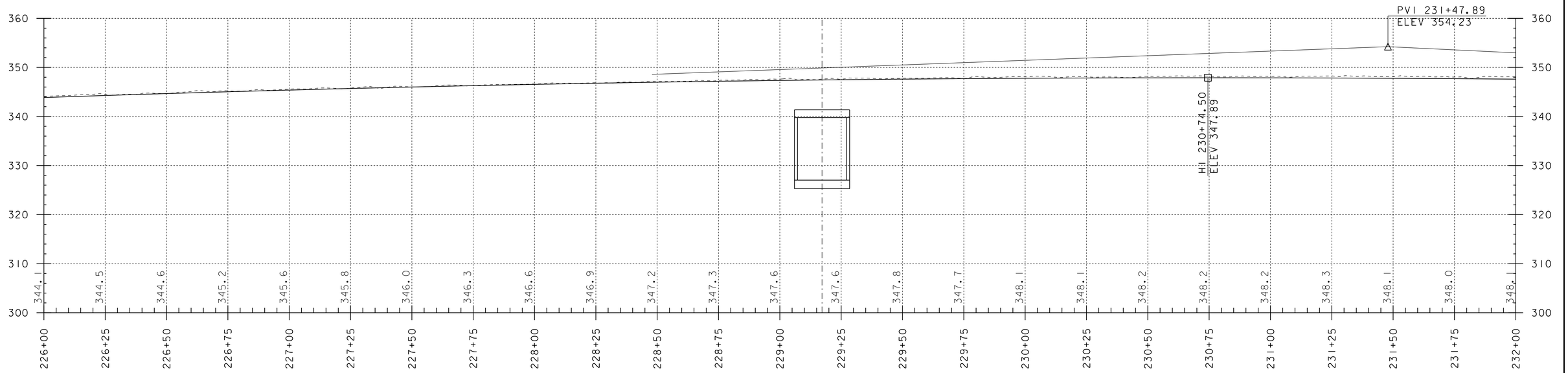
EXISTING CONDITIONS

PRIVATE ROAD
(MOUNTAIN VIEW DRIVE)
NO OUTLET

EXISTING CONDITIONS LAYOUT 6

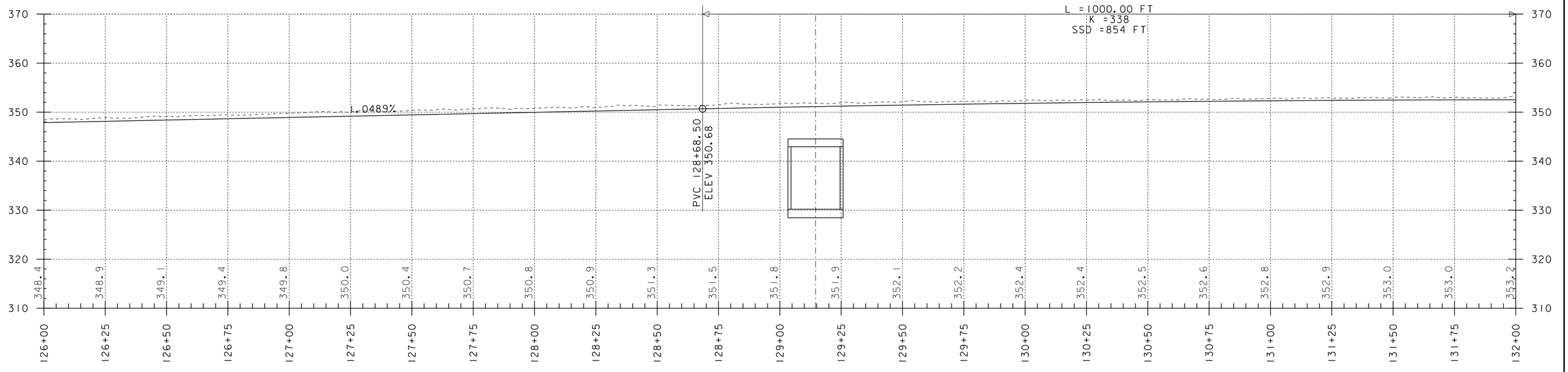
SCALE 1" = 20'-0"
20 0 20

PROJECT NAME:	BOLTON
PROJECT NUMBER:	IM 089-2(45)
FILE NAME: l3a090/sl3a090border.dgn	PLOT DATE: 31-MAY-2016
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
LAYOUT SHEET 6	SHEET 9 OF 33



I-89 SOUTHBOUND EXISTING PROFILE

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



I-89 NORTHBOUND EXISTING PROFILE

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

NOTE:

GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: BOLTON
PROJECT NUMBER: IM 089-2(45)

FILE NAME: I3a090/sI3a090profile.dgn
PROJECT LEADER: C.P.WILLIAMS
DESIGNED BY: ------
INTERSTATE PROFILE SHEET

PLOT DATE: 31-MAY-2016
DRAWN BY: D.D.BEARD
CHECKED BY: ------

℄
US ROUTE 2

L =200.00 FT
K =15
SSD =110 FT

PVI 10+14.00
ELEV 325.73

L =75.00 FT
K =7
SSD =67 FT

℄
INTERSTATE 89
SOUTHBOUND

℄
INTERSTATE 89
NORTHBOUND

PVC 10+15.50
ELEV 325.63

LO 10+61.94
ELEV 324.11

PVT 10+90.50
ELEV 324.69

PVC 13+44.33
ELEV 334.92

PVT 15+44.33
ELEV 356.02

-6.5570%

4.0328%

17.0625%

PVI 14+44.33
ELEV 338.96

PVI 10+53.00
ELEV 323.17

410 400 390 380 370 360 350 340 330 320 310

326.0 325.3 324.7 324.5 325.2 346.6 347.6 345.2 349.6 352.0 350.8 332.5 333.0 333.7 334.6 336.0 337.7 339.8 342.7 345.9 349.3 353.1 357.0 361.0 365.5

10+00 10+25 10+50 10+75 11+00 11+25 11+50 11+75 12+00 12+25 12+50 12+75 13+00 13+25 13+50 13+75 14+00 14+25 14+50 14+75 15+00 15+25 15+50 15+75 16+00

TOWN HIGHWAY 4 EXISTING PROFILE

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

NOTE:

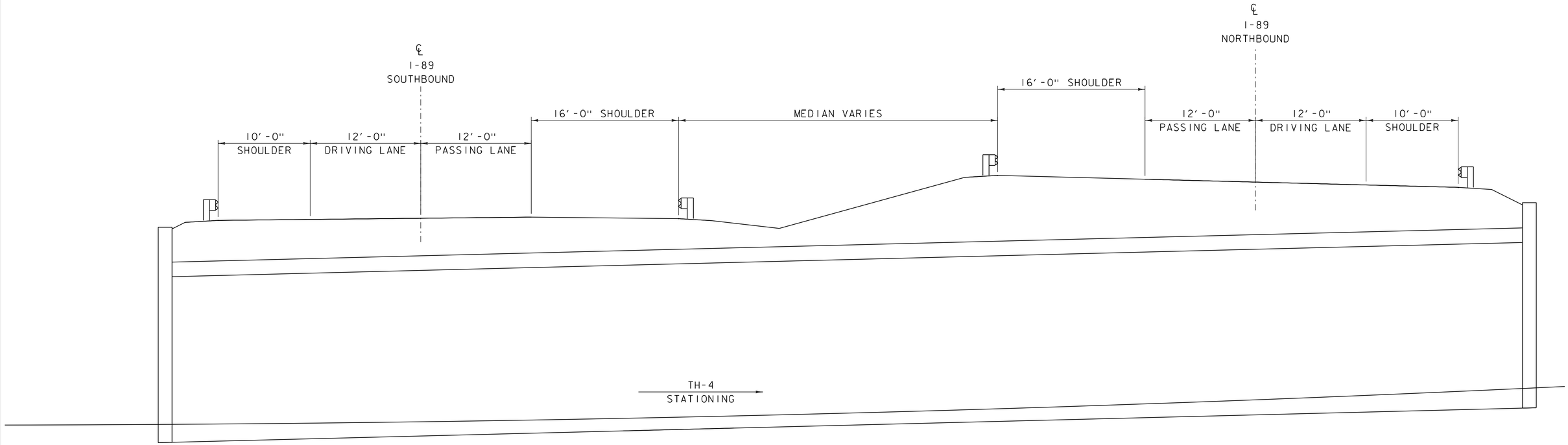
GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: BOLTON
PROJECT NUMBER: IM 089-2(45)

FILE NAME: 13a090/sl3a090profile.dgn
PROJECT LEADER: C.P.WILLIAMS
DESIGNED BY: ------
TOWN HIGHWAY 4 PROFILE SHEET

PLOT DATE: 31-MAY-2016
DRAWN BY: D.D.BEARD
CHECKED BY: ------
SHEET 11 OF 33

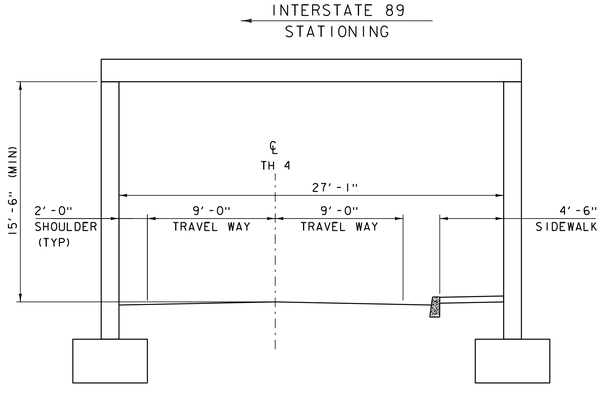


I-89 SOUTHBOUND TYPICAL SECTION

SCALE: 1/4" = 1'-0"

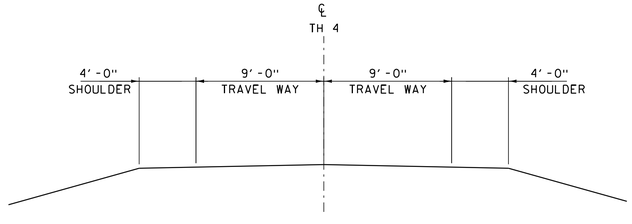
I-89 NORTHBOUND TYPICAL SECTION

SCALE: 1/4" = 1'-0"



TH-4 TYPICAL SECTION THROUGH NEW CULVERT

SCALE: 1/4" = 1'-0"



TH-4 TYPICAL ROADWAY SECTION

SCALE: 1/4" = 1'-0"

PROJECT NAME: BOLTON	
PROJECT NUMBER: IM 089-2(45)	
FILE NAME: 13a090/sl3a090typ.dgn	PLOT DATE: 31-MAY-2016
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: L.J.STONE
DESIGNED BY: L.J.STONE	CHECKED BY: ------
TYPICAL SECTIONS ALTERNATIVE 2	SHEET 12 OF 33

US ROUTE 2
TO WATERBURY

POB
STA 10+00.00

US ROUTE 2
TO RICHMOND

BEGIN APPROACH
STA 10+14.00
MATCH EXISTING

END APPROACH
BEGIN PROJECT
STA 10+75.00

TH 4
(BOLTON NOTCH ROAD)

10+00

11+00

PI
STA 129+88.33

I-89 SOUTHBOUND
TO WATERBURY

I-89 SOUTHBOUND
TO WATERBURY

227+00 228+00 229+00 230+00 231+00 232+00

N 17° 19' 03.84" E

12+00

127+00 128+00 129+00 130+00 131+00 132+00

I-89 NORTHBOUND
TO RICHMOND

END PROJEC
BEGIN APPR
STA 132+00.

13+00

END PROJECT
BEGIN APPROACH
STA 13+00.00

EXISTING R.O.W. (APPROX.)

VT STATE PLANE GRID

N

END APPROACH
STA 14+00.00
MATCH EXISTING

TH 4
(BOLTON NOTCH ROAD)
TO I-89

PC
STA 13+69.65

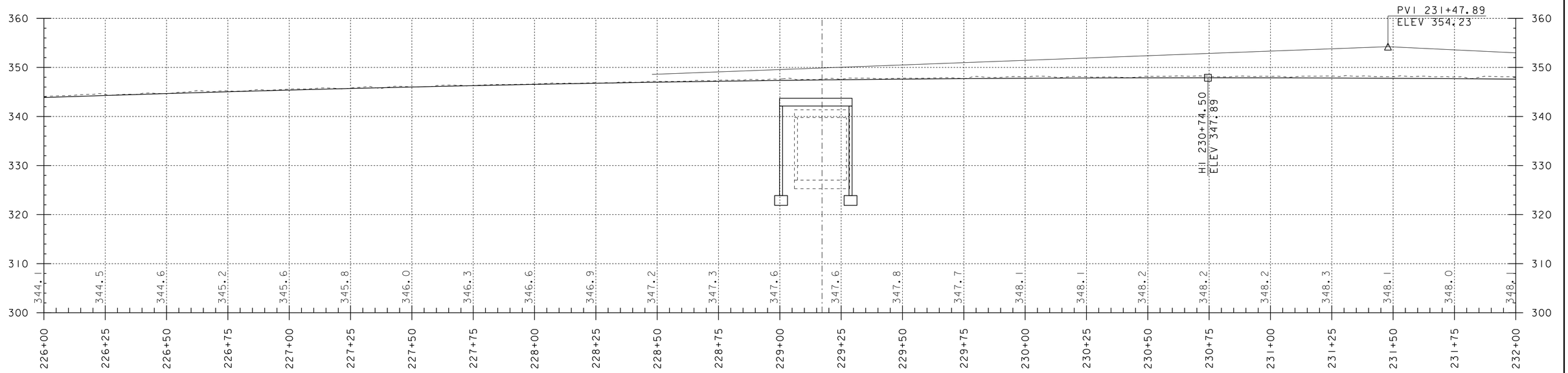
PRIVATE ROAD
(MOUNTAIN VIEW DRIVE)
NO OUTLET

14+00

ALTERNATIVE 2 LAYOUT

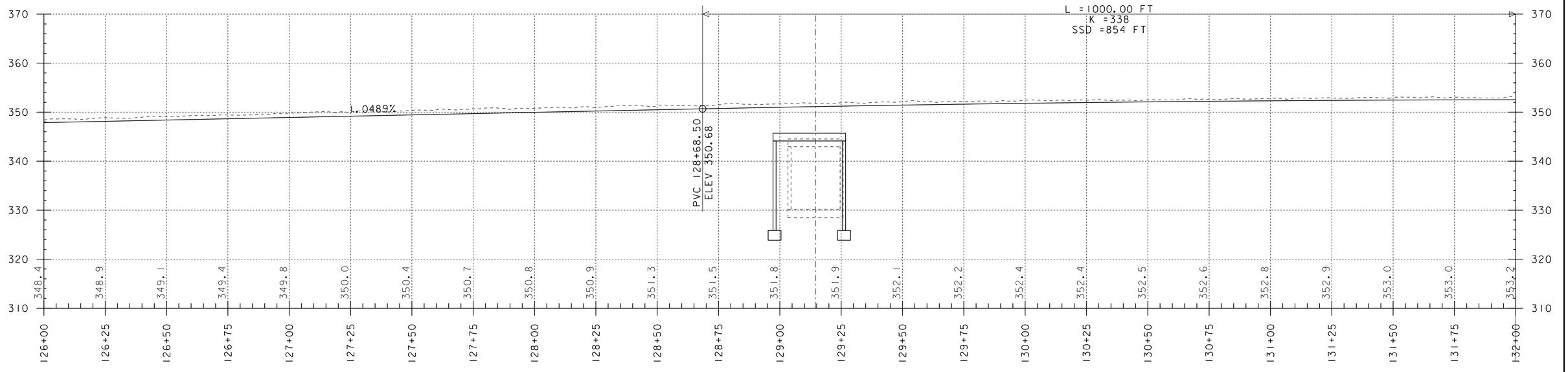
SCALE 1" = 20'-0"
20 0 20

PROJECT NAME:	BOLTON
PROJECT NUMBER:	IM 089-2(45)
FILE NAME: 13a090/alt1.dgn	PLOT DATE: 31-MAY-2016
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: L.J.STONE
DESIGNED BY: ------	CHECKED BY: ------
LAYOUT SHEET - ALTERNATIVE 2	SHEET 13 OF 33



I-89 SOUTHBOUND ALTERNATIVE 2 PROFILE

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



I-89 NORTHBOUND ALTERNATIVE 2 PROFILE

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

NOTE:

GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: BOLTON
PROJECT NUMBER: IM 089-2(45)

FILE NAME: 13a090/sl3a090profile.dgn
PROJECT LEADER: C.P.WILLIAMS
DESIGNED BY: ------
INTERSTATE PROFILE SHEET

PLOT DATE: 31-MAY-2016
DRAWN BY: L.J.STONE
CHECKED BY: ------
SHEET 14 OF 33

℄
US ROUTE 2

L =300.00 FT
K =37
HSD =202 FT

℄
INTERSTATE 89
SOUTHBOUND

℄
INTERSTATE 89
NORTHBOUND

15'-9" (MIN) VERTICAL CLEARANCE

PVI 10+13.87
ELEV 325.74

-0.5903%

PVC 10+75.00
ELEV 325.38

LO 10+96.77
ELEV 325.31

PVT 13+75.00
ELEV 335.81

7.5441%

PVI 14+00.00
ELEV 337.69

PVI 12+50.00
ELEV 324.49

410
400
390
380
370
360
350
340
330
320
310

326.0
325.3 325.67
324.7 325.52
324.5 325.38
325.2 325.31
346.6 325.42
347.6 325.70
345.2 326.14
349.6 326.76
352.0 327.54
350.8 328.50
332.5 329.62
333.0 330.91
333.7 332.37
334.6 334.01
336.0 335.81
337.7 337.69
339.8
342.7
345.9
349.3
353.1
357.0
361.0
365.5

10+00 10+25 10+50 10+75 11+00 11+25 11+50 11+75 12+00 12+25 12+50 12+75 13+00 13+25 13+50 13+75 14+00 14+25 14+50 14+75 15+00 15+25 15+50 15+75 16+00

TOWN HIGHWAY 4 ALTERNATIVE 2 PROFILE

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

NOTE:

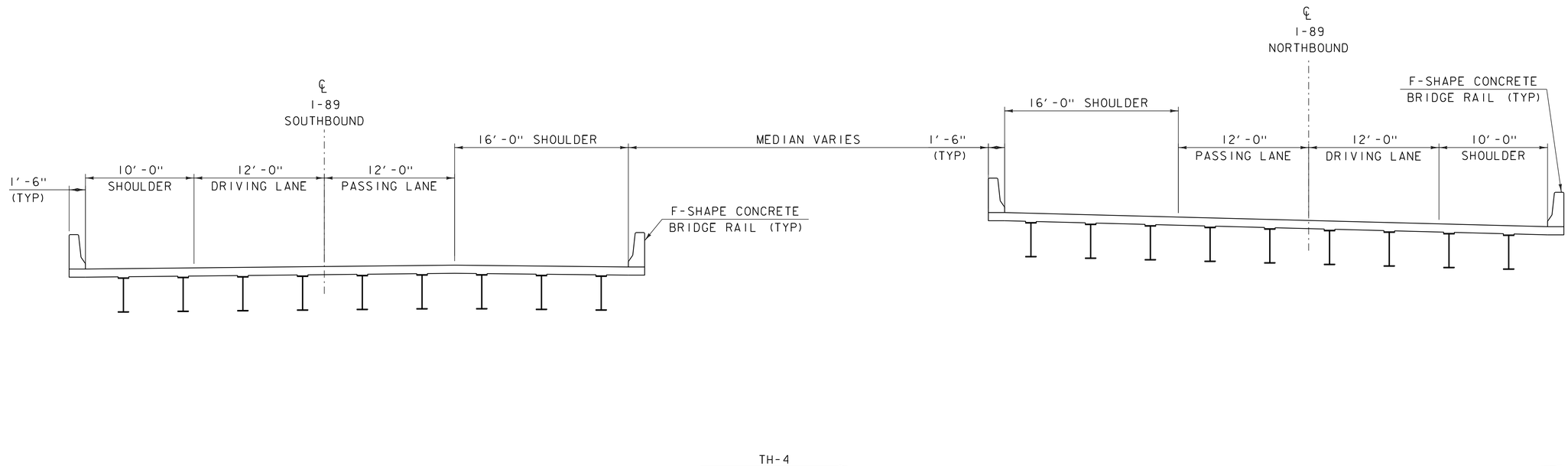
GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: BOLTON
PROJECT NUMBER: IM 089-2(45)

FILE NAME: 13a090/sl3a090profile.dgn
PROJECT LEADER: C.P.WILLIAMS
DESIGNED BY: ------
TOWN HIGHWAY 4 PROFILE SHEET

PLOT DATE: 31-MAY-2016
DRAWN BY: L.J.STONE
CHECKED BY: ------
SHEET 15 OF 33

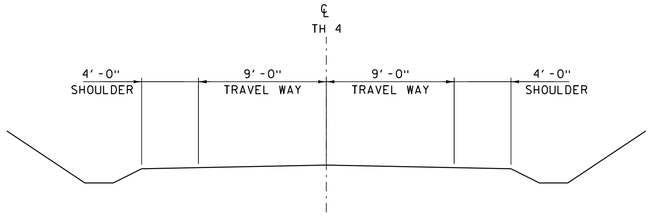


I-89 SOUTHBOUND TYPICAL SECTION

SCALE: 1/4" = 1'-0"

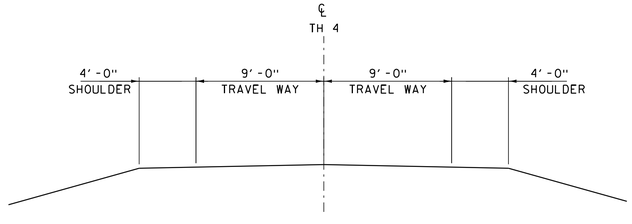
I-89 NORTHBOUND TYPICAL SECTION

SCALE: 1/4" = 1'-0"



TH-4 TYPICAL SECTION UNDER NEW BRIDGE

SCALE: 1/4" = 1'-0"



TH-4 TYPICAL ROADWAY SECTION

SCALE: 1/4" = 1'-0"

PROJECT NAME: BOLTON	
PROJECT NUMBER: IM 089-2(45)	
FILE NAME: 13a090/sl3a090typ.dgn	PLOT DATE: 31-MAY-2016
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: L.J.STONE
DESIGNED BY: L.J.STONE	CHECKED BY: ------
TYPICAL SECTIONS ALTERNATIVE 3	SHEET 16 OF 33

US ROUTE 2
TO WATERBURY

POB
STA 10+00.00

US ROUTE 2
TO RICHMOND

BEGIN APPROACH
STA 10+14.00
MATCH EXISTING

END APPROACH
BEGIN PROJECT
STA 10+75.00

TH 4
(BOLTON NOTCH ROAD)

I-89 SOUTHBOUND
TO WATERBURY

PI
STA 129+88.33

I-89 SOUTHBOUND
TO WATERBURY

227+00 228+00 229+00 230+00 231+00 232+00

N 17° 03' 84" E

127+00 128+00 129+00 130+00 131+00 132+00

I-89 NORTHBOUND
TO RICHMOND

END PROJEC
BEGIN APPR
STA 132+00.

END PROJECT
BEGIN APPROACH
STA 13+00.00

EXISTING R.O.W. (APPROX.)

END APPROACH
STA 14+00.00
MATCH EXISTING

TH 4
(BOLTON NOTCH ROAD)
TO I-89

PC
STA 13+69.65

PRIVATE ROAD
(MOUNTAIN VIEW DRIVE)
NO OUTLET

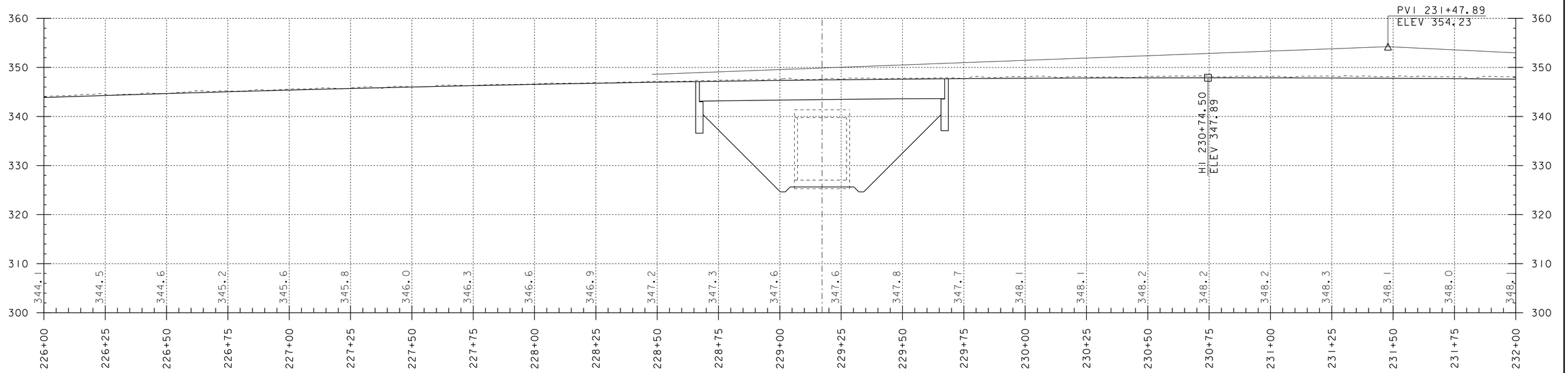
VT STATE PLANE GRID

N

ALTERNATIVE 3 LAYOUT

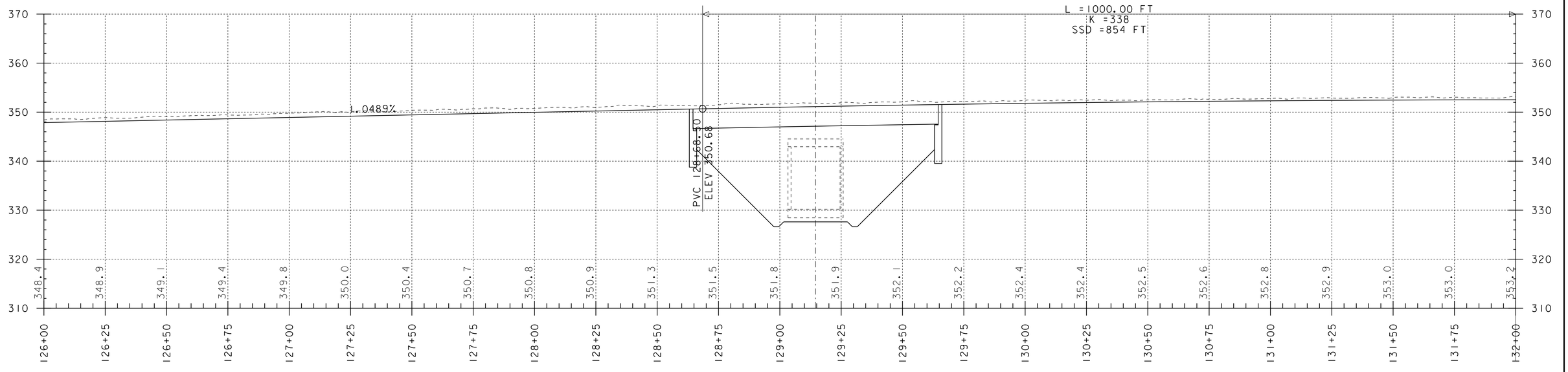
SCALE 1" = 20'-0"
20 0 20

PROJECT NAME:	BOLTON
PROJECT NUMBER:	IM 089-2(45)
FILE NAME: 13a090/alt2.dgn	PLOT DATE: 31-MAY-2016
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: L.J.STONE
DESIGNED BY: ------	CHECKED BY: ------
LAYOUT SHEET - ALTERNATIVE 3	SHEET 17 OF 33



I-89 SOUTHBOUND ALTERNATIVE 3 PROFILE

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



I-89 NORTHBOUND ALTERNATIVE 3 PROFILE

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

NOTE:

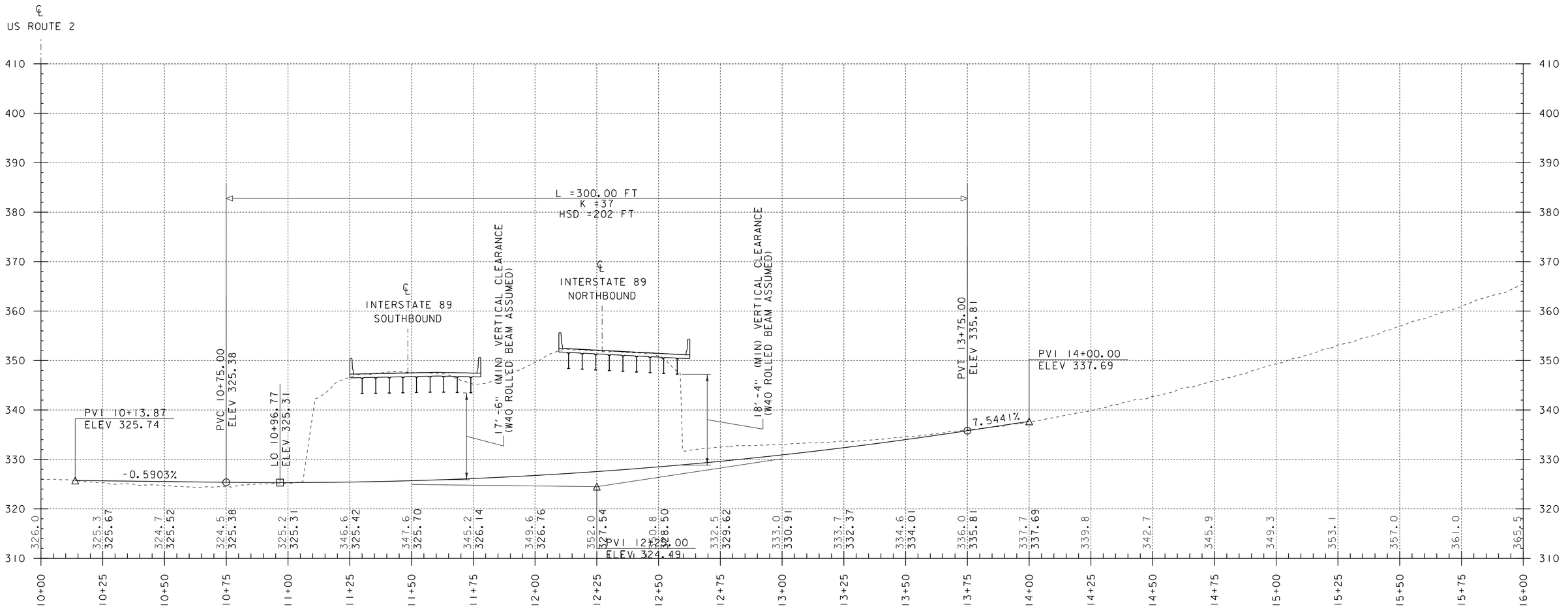
GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: BOLTON
PROJECT NUMBER: IM 089-2(45)

FILE NAME: I3a090/sI3a090profile.dgn
PROJECT LEADER: C.P.WILLIAMS
DESIGNED BY: ------
INTERSTATE PROFILE SHEET

PLOT DATE: 31-MAY-2016
DRAWN BY: L.J.STONE
CHECKED BY: ------



TOWN HIGHWAY 4 ALTERNATIVE 3 PROFILE

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

NOTE:

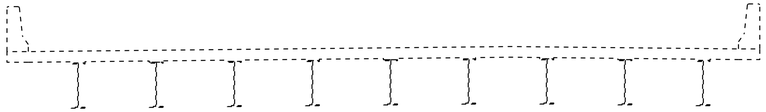
GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: BOLTON
PROJECT NUMBER: IM 089-2(45)

FILE NAME: 13a090/sl3a090profile.dgn
PROJECT LEADER: C.P.WILLIAMS
DESIGNED BY: ------
TOWN HIGHWAY 4 PROFILE SHEET

PLOT DATE: 31-MAY-2016
DRAWN BY: L.J.STONE
CHECKED BY: ------



I-89 NEW CONSTRUCTION SOUTHBOUND BRIDGE

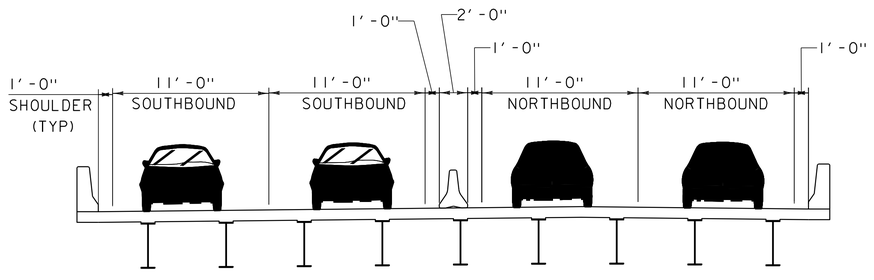
TYPICAL SECTION

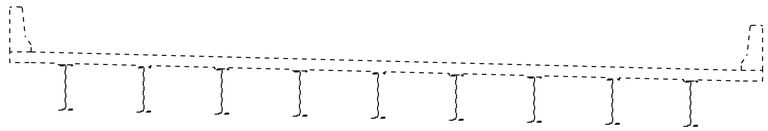
SCALE: 1/4" = 1'-0"

I-89 TRAFFIC MAINTAINED ON EXISTING NORTHBOUND BRIDGE

TYPICAL SECTION

SCALE: 1/4" = 1'-0"

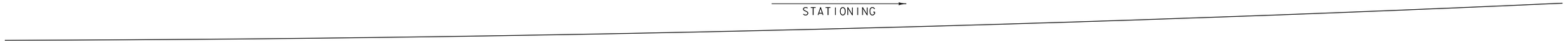




I-89 NEW CONSTRUCTION NORTHBOUND BRIDGE

TYPICAL SECTION

SCALE: 1/4" = 1'-0"

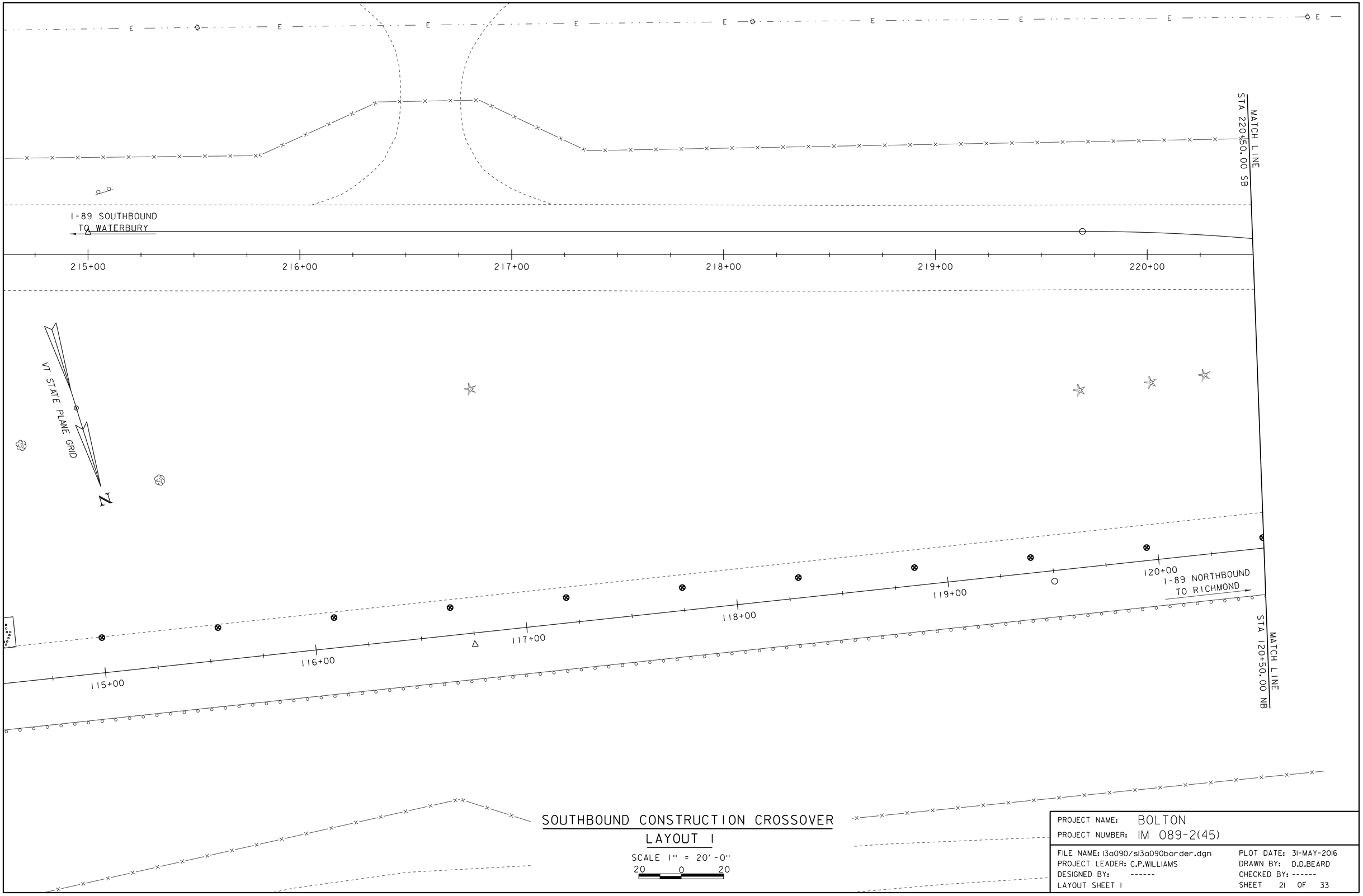


I-89 TRAFFIC MAINTAINED ON NEW SOUTHBOUND BRIDGE

TYPICAL SECTION

SCALE: 1/4" = 1'-0"

PROJECT NAME: BOLTON	
PROJECT NUMBER: IM 089-2(45)	
FILE NAME: 13a090/sl3a090typ.dgn	PLOT DATE: 31-MAY-2016
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: L.J.STONE
DESIGNED BY: L.J.STONE	CHECKED BY: ------
TYPICAL SECTIONS CROSSOVER	SHEET 20 OF 33



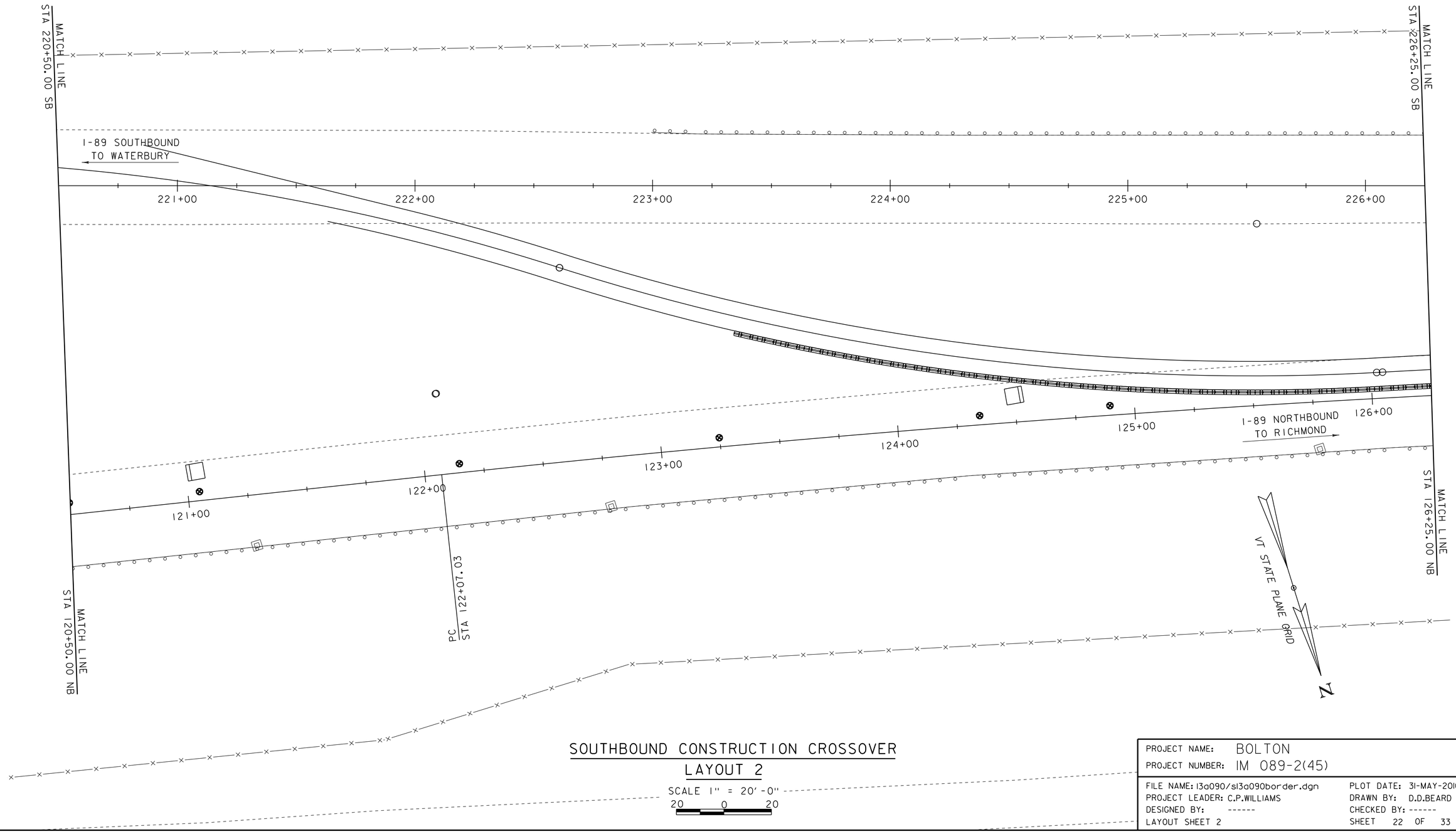
SOUTHBOUND CONSTRUCTION CROSSOVER

LAYOUT 1

SCALE 1" = 20'-0"

20 0 20

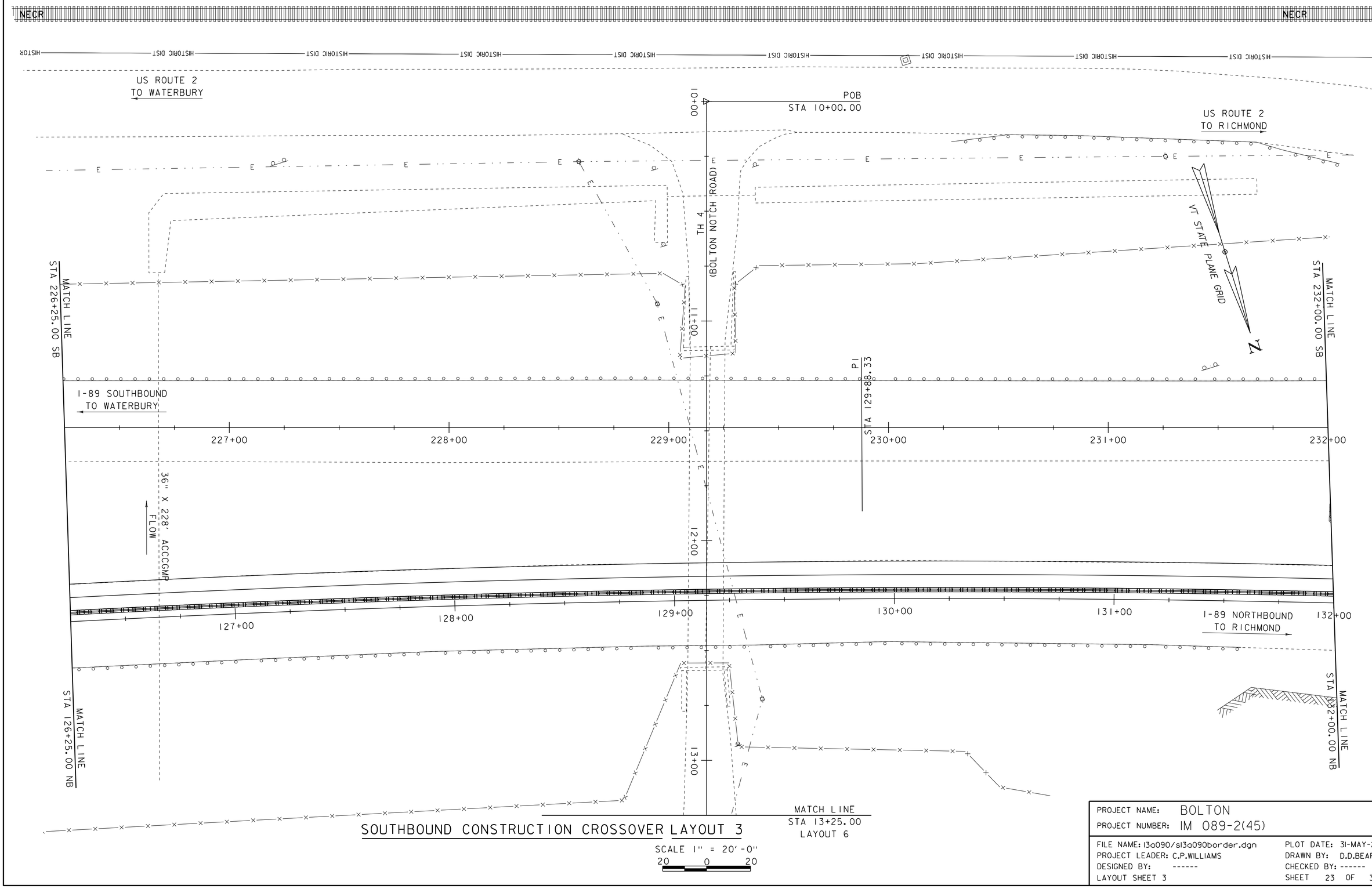
PROJECT NAME:	BOLTON
PROJECT NUMBER:	IM 089-2(45)
FILE NAME: 13a090/sl3a090border.dgn	PLOT DATE: 31-MAY-2016
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
LAYOUT SHEET 1	SHEET 21 OF 33



SOUTHBOUND CONSTRUCTION CROSSOVER
LAYOUT 2

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

PROJECT NAME:	BOLTON
PROJECT NUMBER:	IM 089-2(45)
FILE NAME: l3a090/sl3a090border.dgn	PLOT DATE: 31-MAY-2016
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
LAYOUT SHEET 2	SHEET 22 OF 33

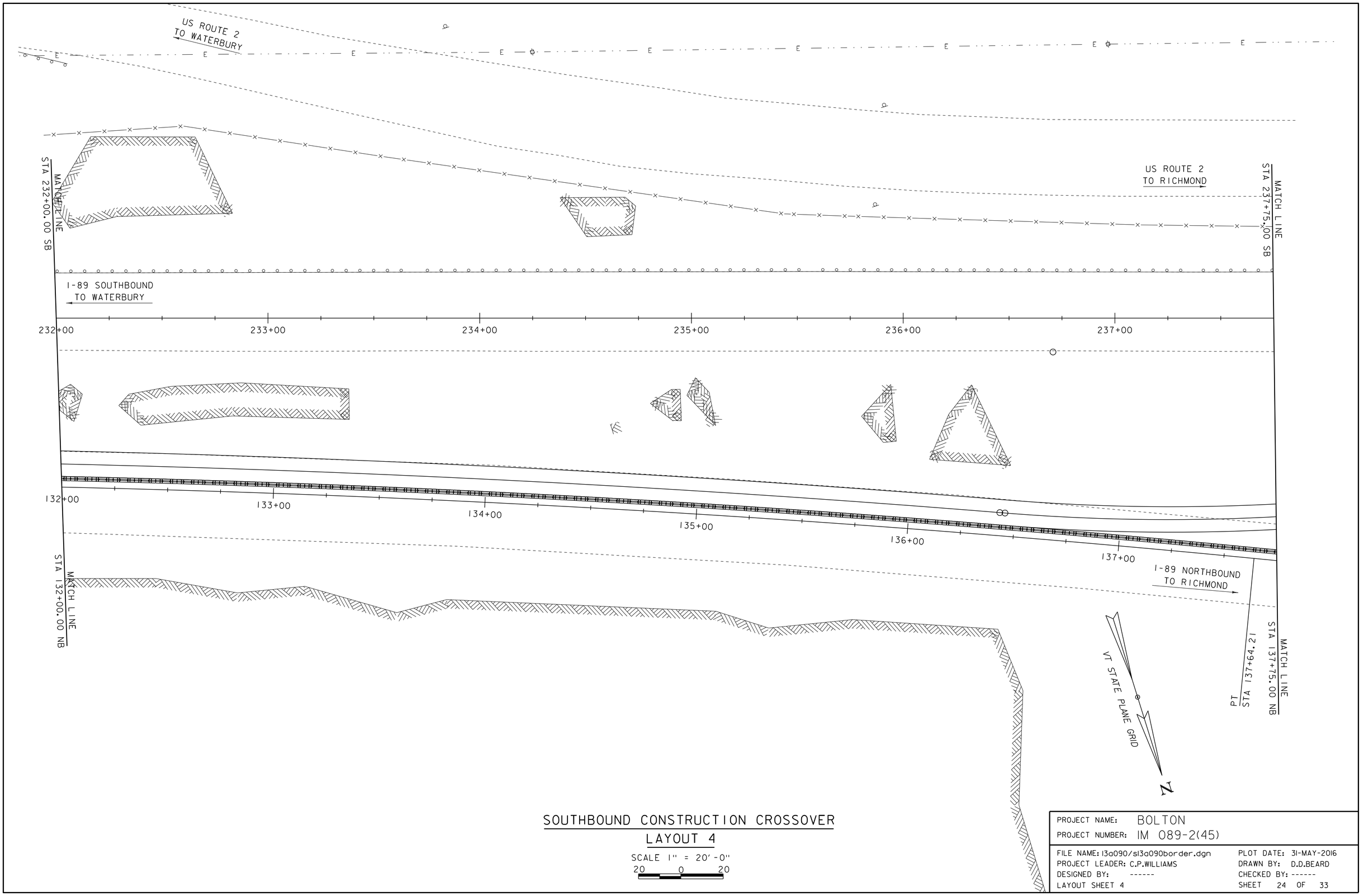


SOUTHBOUND CONSTRUCTION CROSSOVER LAYOUT 3

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME:	BOLTON
PROJECT NUMBER:	IM 089-2(45)
FILE NAME: I3a090/sI3a090border.dgn	PLOT DATE: 31-MAY-2016
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
LAYOUT SHEET 3	SHEET 23 OF 33



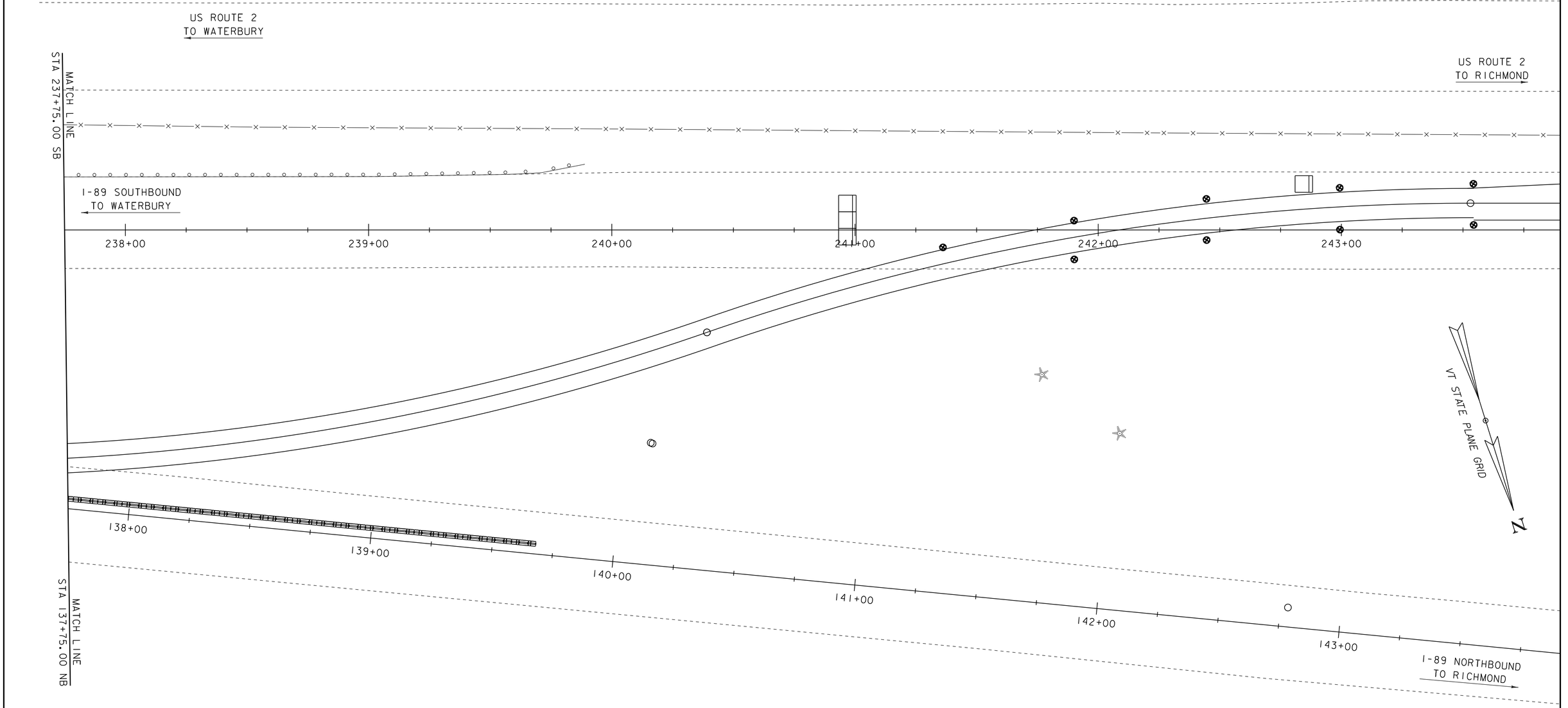
SOUTHBOUND CONSTRUCTION CROSSOVER

LAYOUT 4

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME:	BOLTON
PROJECT NUMBER:	IM 089-2(45)
FILE NAME: l3a090/sl3a090border.dgn	PLOT DATE: 31-MAY-2016
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
LAYOUT SHEET 4	SHEET 24 OF 33



SOUTHBOUND CONSTRUCTION CROSSOVER

LAYOUT 5

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME:	BOLTON
PROJECT NUMBER:	IM 089-2(45)

FILE NAME: I3a090/sI3a090border.dgn	PLOT DATE: 31-MAY-2016
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
LAYOUT SHEET 5	SHEET 25 OF 33

POB
STA -0+00.04

I-89 SOUTHBOUND
TO WATERBURY

0+00
1+00
2+00
3+00
4+00
5+00

MATCH LINE
STA 220+50.00 SB

PC
STA 4+69.37

VT STATE PLANE GRID

N

POB
STA 0+00.00

PC
STA 2+75.19

0+00
1+00
2+00
3+00

I-89 NORTHBOUND
TO RICHMOND

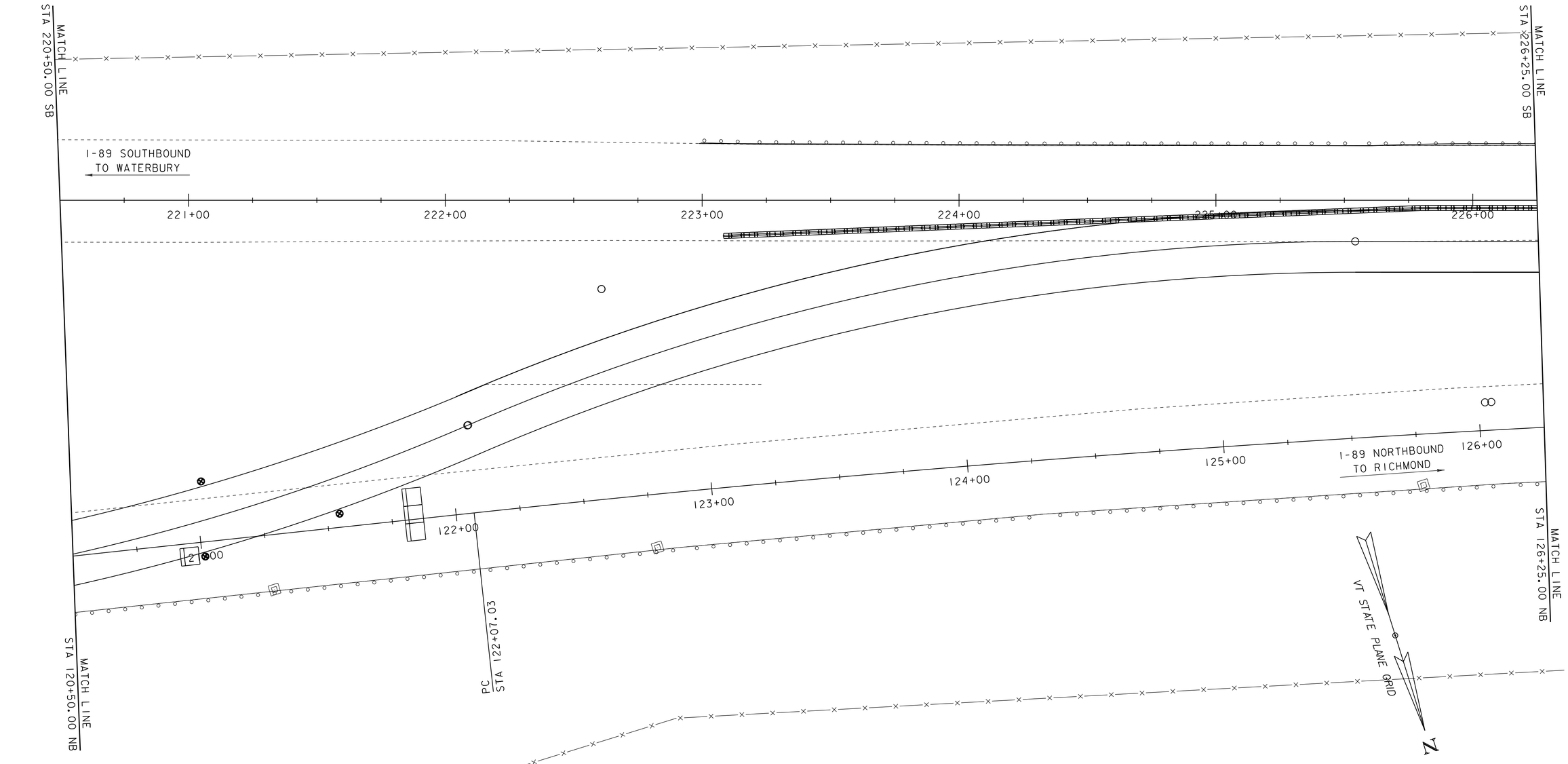
MATCH LINE
STA 120+50.00 NB

NORTHBOUND CONSTRUCTION CROSSOVER

LAYOUT 1

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

PROJECT NAME:	BOLTON
PROJECT NUMBER:	IM 089-2(45)
FILE NAME: 13a090/sl3a090border.dgn	PLOT DATE: 31-MAY-2016
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
LAYOUT SHEET 1	SHEET 26 OF 33



NORTHBOUND CONSTRUCTION CROSSOVER

LAYOUT 2

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME:	BOLTON
PROJECT NUMBER:	IM 089-2(45)
FILE NAME: l3a090/sl3a090border.dgn	PLOT DATE: 31-MAY-2016
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
LAYOUT SHEET 2	SHEET 27 OF 33

NECR

NECR

HISTORIC DIST

US ROUTE 2
TO WATERBURY

POB
STA 10+00.00

US ROUTE 2
TO RICHMOND

TH 4
(BOLTON NOTCH ROAD)

VT STATE PLANE GRID

MATCH LINE
STA 226+25.00 SB

MATCH LINE
STA 232+00.00 SB

PI
STA 129+88.33

I-89 SOUTHBOUND
TO WATERBURY

36" X 228' ACCCGMP
FLOW

I-89 NORTHBOUND
TO RICHMOND

MATCH LINE
STA 126+25.00 NB

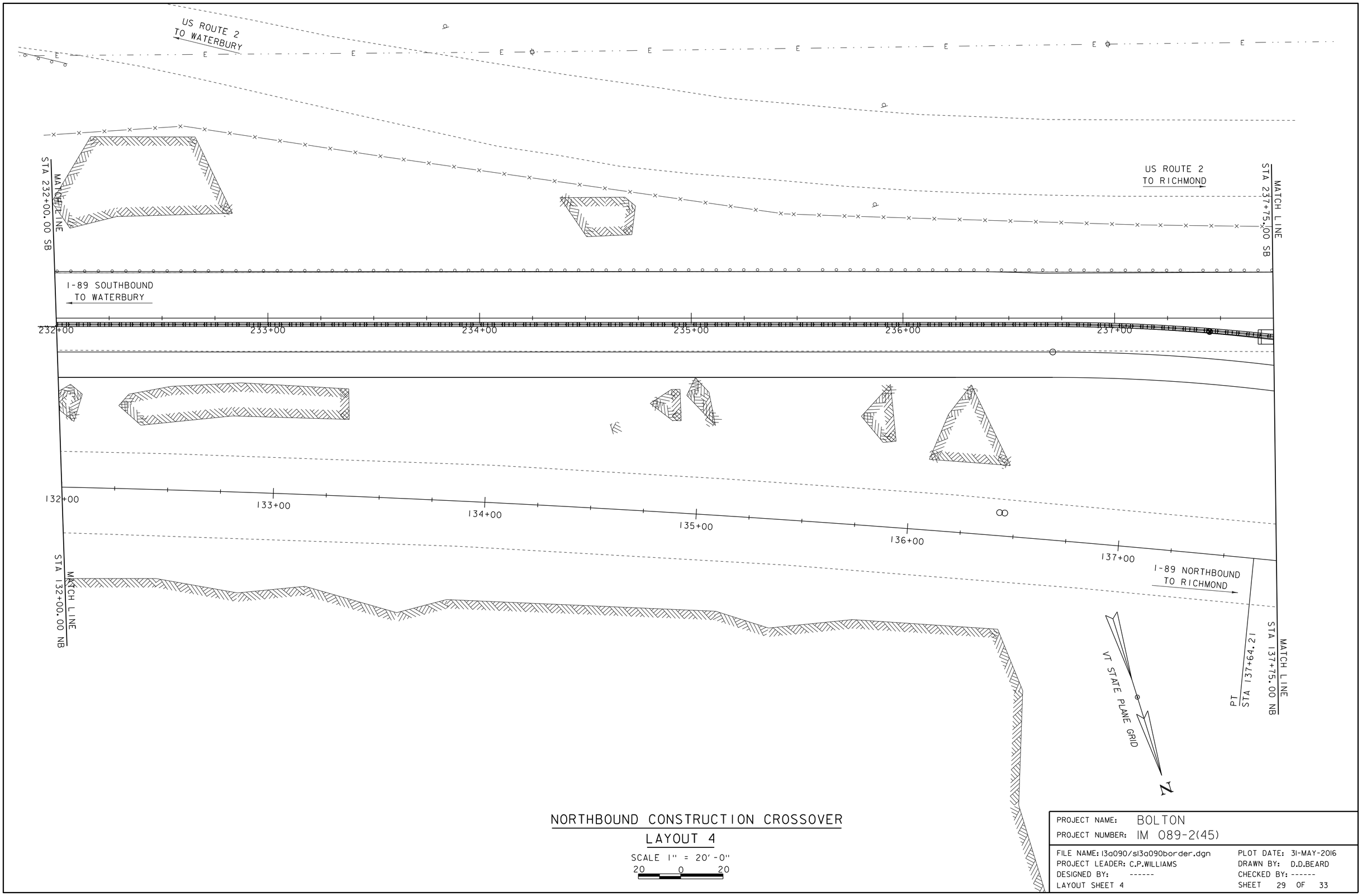
MATCH LINE
STA 132+00.00 NB

MATCH LINE
STA 13+25.00
LAYOUT 6

NORTHBOUND CONSTRUCTION CROSSOVER LAYOUT 3

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

PROJECT NAME:	BOLTON
PROJECT NUMBER:	IM 089-2(45)
FILE NAME: I3a090/sI3a090border.dgn	PLOT DATE: 31-MAY-2016
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
LAYOUT SHEET 3	SHEET 28 OF 33



NORTHBOUND CONSTRUCTION CROSSOVER

LAYOUT 4

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME:	BOLTON
PROJECT NUMBER:	IM 089-2(45)
FILE NAME: l3a090/sl3a090border.dgn	PLOT DATE: 31-MAY-2016
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
LAYOUT SHEET 4	SHEET 29 OF 33

US ROUTE 2
TO WATERBURY

US ROUTE 2
TO RICHMOND

MATCH L INE
STA 237+75.00 SB

I-89 SOUTHBOUND
TO WATERBURY

238+00
239+00
240+00
241+00
242+00
243+00

VT STATE PLANE GRID

N

138+00
139+00
140+00
141+00
142+00
143+00

I-89 NORTHBOUND
TO RICHMOND

MATCH L INE
STA 137+75.00 NB

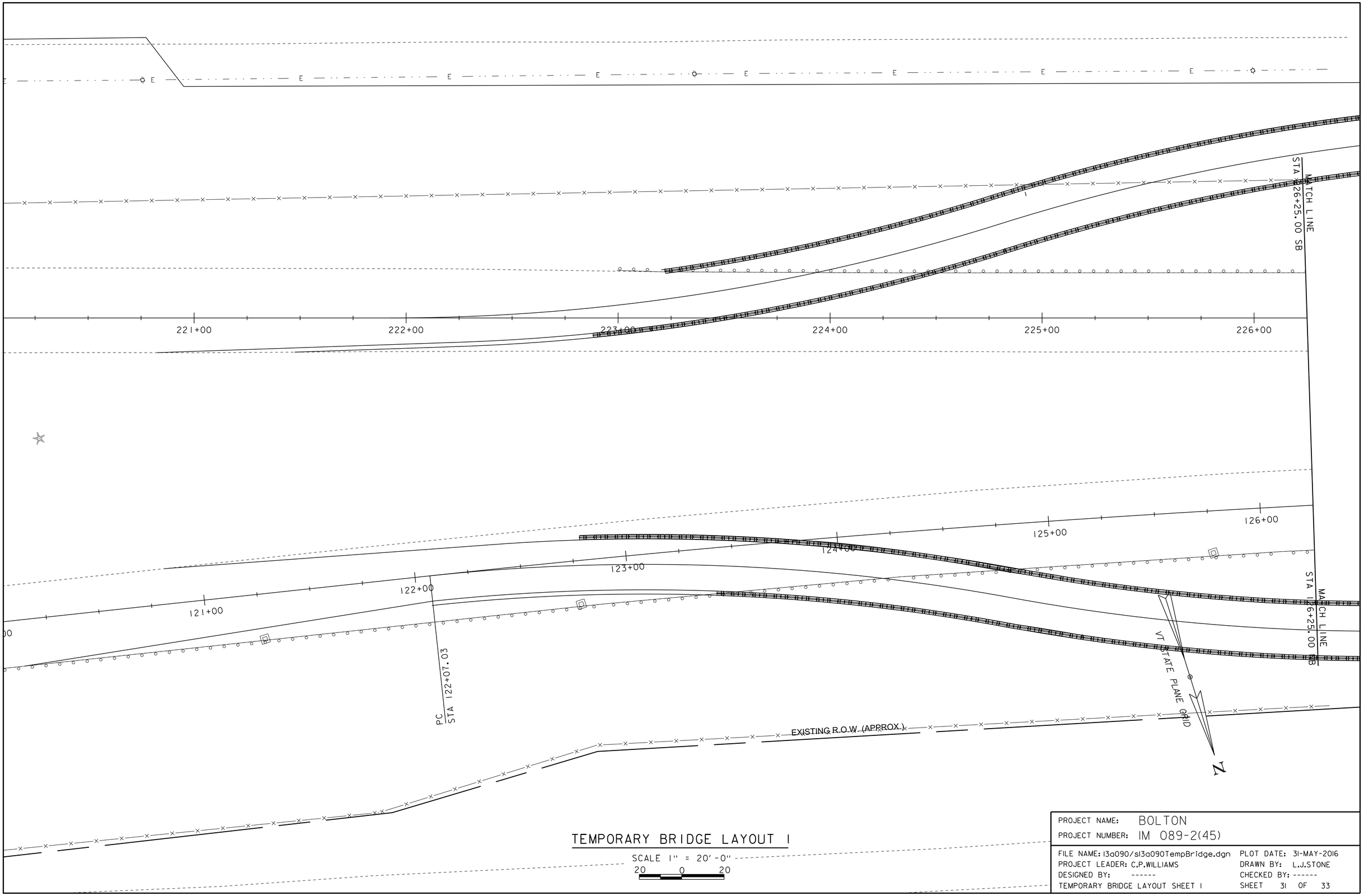
NORTHBOUND CONSTRUCTION CROSSOVER

LAYOUT 5

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

PROJECT NAME:	BOLTON
PROJECT NUMBER:	IM 089-2(45)

FILE NAME: l3a090/sl3a090border.dgn	PLOT DATE: 31-MAY-2016
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
LAYOUT SHEET 5	SHEET 30 OF 33



TEMPORARY BRIDGE LAYOUT 1

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME: BOLTON	
PROJECT NUMBER: IM 089-2(45)	
FILE NAME: 13a090/sl3a090TempBridge.dgn	PLOT DATE: 31-MAY-2016
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: L.J.STONE
DESIGNED BY: ------	CHECKED BY: ------
TEMPORARY BRIDGE LAYOUT SHEET 1	SHEET 31 OF 33

EXISTING R.O.W. (APPROX.)

VT STATE PLANE GRID

N

POB
STA 10+00.00

10+00

11+00

12+00

13+00

PI
STA 129+88.33

MATCH LINE
STA 226+25.00 SB

MATCH LINE
STA 232+00.00 SB

227+00 228+00 229+00 230+00 231+00 232+00

127+00 128+00 129+00 130+00 131+00 132+00

MATCH LINE
STA 126+25.00 SB

MATCH LINE
STA 232+00.00 SB

EXISTING R.O.W. (APPROX.)

TEMPORARY BRIDGE LAYOUT 2

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

PROJECT NAME: BOLTON	
PROJECT NUMBER: IM 089-2(45)	
FILE NAME: l3a090/sl3a090TempBridge.dgn	PLOT DATE: 31-MAY-2016
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: L.J.STONE
DESIGNED BY: ------	CHECKED BY: ------
TEMPORARY BRIDGE LAYOUT SHEET 2	SHEET 32 OF 33

VT STATE PLANE GRID

N

STA 232+00.00 SB

MATCH LINE

232+00

233+00

234+00

235+00

236+00

237+00

238+00

132+00

133+00

134+00

135+00

136+00

137+00

138+00

STA 132+00.00 SB

MATCH LINE

PT
STA 137+64.21

VT STATE PLANE GRID

N

TEMPORARY BRIDGE LAYOUT 3

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME:	BOLTON
PROJECT NUMBER:	IM 089-2(45)
FILE NAME: I3a090/sI3a090TempBridge.dgn	PLOT DATE: 31-MAY-2016
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: L.J.STONE
DESIGNED BY: ------	CHECKED BY: ------
TEMPORARY BRIDGE LAYOUT SHEET 3	SHEET 33 OF 33