

# Regional Concerns Meeting

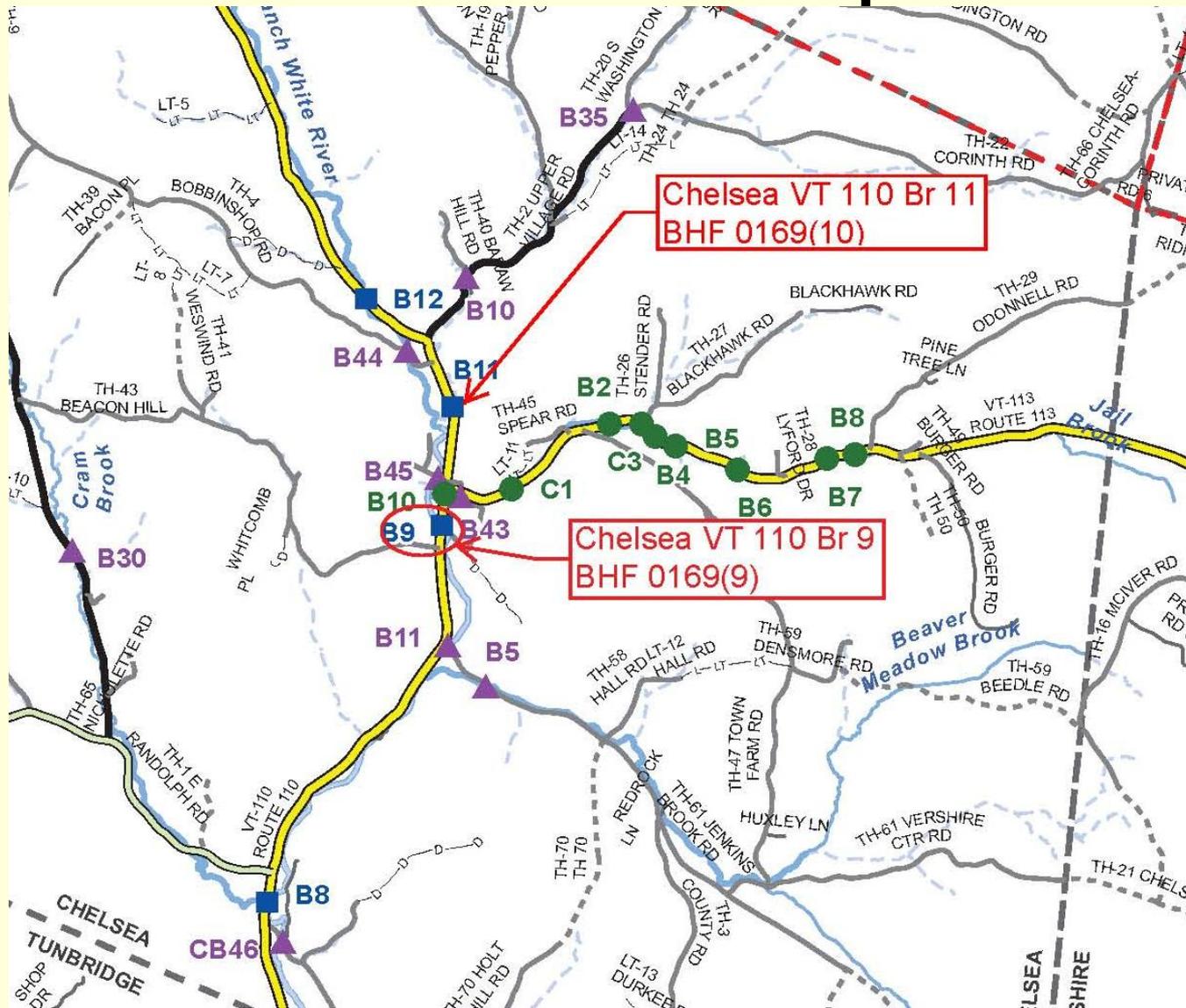
## Chelsea BHF 0169(9) VT 110, Bridge 9

## Chelsea BHF 0169(10) VT 110, Bridge 11



Presented by  
**Christopher P. Williams, P.E.**  
Senior Project Manager  
Structures Section  
Vermont Agency of Transportation  
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# Location Map



# Meeting Outline

- Purpose of the Meeting
- Structures Section re-organization
- Existing bridge deficiencies
- Alternatives considered
- Summary and recommendation-

# Purpose of Meeting

- Present the alternatives that we have considered
- Explain the constraints to the project
- Help you understand our approach to the project
- Provide you with the chance to ask questions.
- Provide you with the chance to voice concerns
- Build consensus for the recommended alternative -

# Accelerated Bridge Program

- Began in January 2012
- Bridges are deteriorating faster than we can fix them
- Accelerated Bridge Construction (ABC) with short-term closures used when appropriate
- Impacts to property and resources is minimized
- Results in project being delivered faster
- Goal of 25% of projects into Accelerated Bridge Program
- Goal of 2 year design phase for ABP (5 years conventional)
- Visit the website at [acceleratedbridge.vermont.gov](http://acceleratedbridge.vermont.gov)

# Project Initiation & Innovation Team

- Part of re-organization in January 2012
- Currently team of 5
- All projects will begin in the PIIT
- Very efficient process
- Look for innovative solutions whenever possible
- Involved until Project Scope is defined
- Hand off to Design Project Manager to continue Project Design phase -

# Phases of Development

Project  
Funded

Project  
Defined

Contract  
Award

Project Definition

Project Design

Construction

Identify resources &  
constraints

Evaluate alternatives

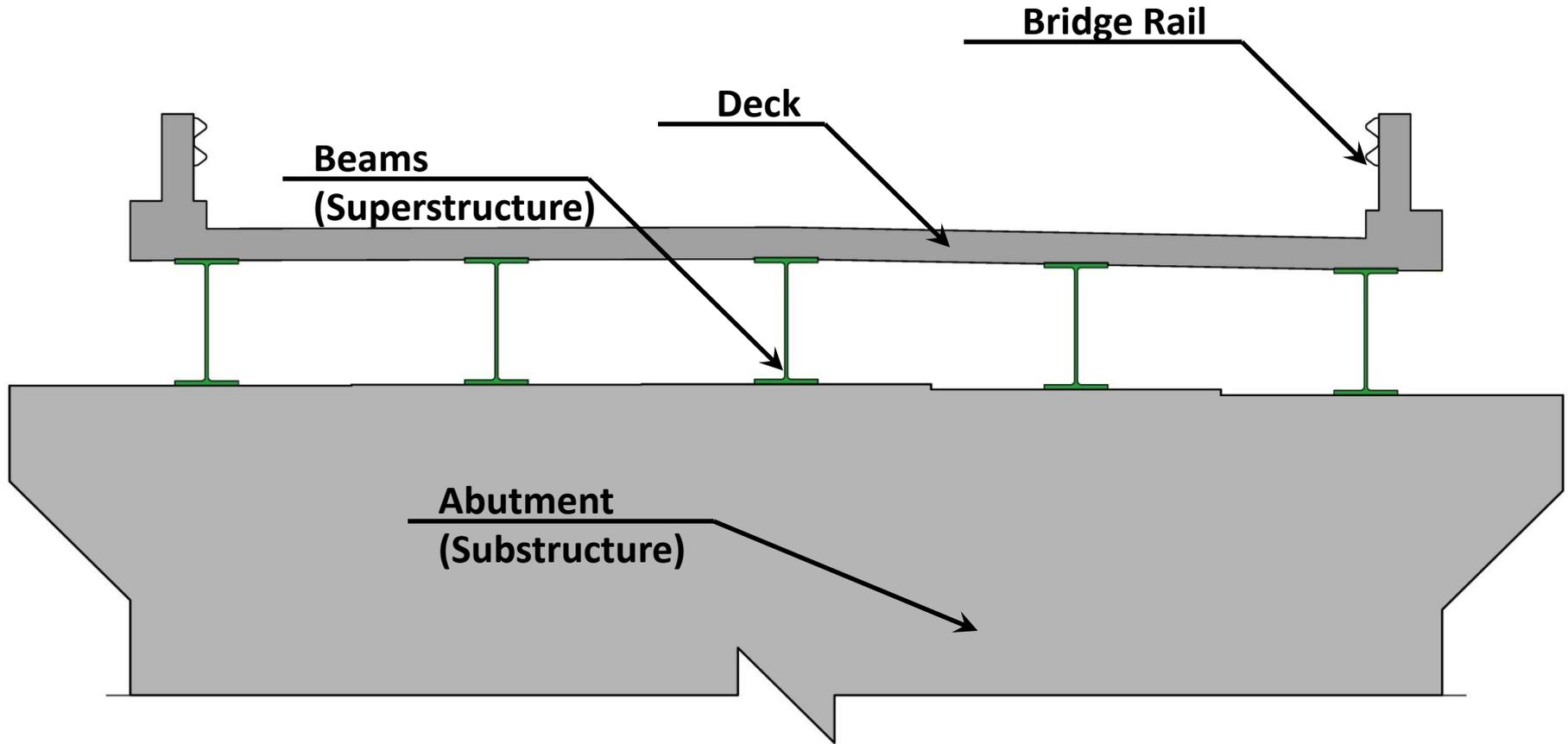
Public Participation

- Quantify areas of impact

- Environmental permits

- Develop plans, estimate and specifications

# Description of Terms Used



**Cross Section of Bridge**

# Project Background

## Common Information

- Posted speed limit = 30 mph
- Owned and maintained by the State (no local funds)
- VT 110 functional classification is Rural Major Collector

# Project Background

## Bridge 9

- Single span Steel-beam bridge
- Span length =84'; Bridge width = 20' (curb-curb)
- 5' sidewalk on west side
- Built in 1936 (77 years old)
- **Priority 25** in the State Bridge Program-

## Bridge 11

- Single span Steel-beam bridge
- Span length =81'; Bridge width = 23' (curb-curb)
- 5' sidewalk on east side
- Built in 1939 (74 years old)
- **Priority 29** in the State Bridge Program-

# Project Background

## Bridge 9 Traffic Data

<b>TRAFFIC DATA</b>	<b>2015</b>	<b>2035</b>
<b>AADT</b>	<b>1,500</b>	<b>1,600</b>
<b>DHV</b>	<b>190</b>	<b>200</b>
<b>ADTT</b>	<b>170</b>	<b>270</b>
<b>%T</b>	<b>0.6</b>	<b>0.9</b>

## Bridge 11 Traffic Data

<b>TRAFFIC DATA</b>	<b>2015</b>	<b>2035</b>
<b>AADT</b>	<b>1,700</b>	<b>1,800</b>
<b>DHV</b>	<b>210</b>	<b>220</b>
<b>ADTT</b>	<b>130</b>	<b>200</b>
<b>%T</b>	<b>7.9</b>	<b>11.9</b>

# EXISTING BRIDGE DEFICIENCIES

## Inspection Report Information (Based on a scale of 9)

	Bridge 9	Bridge 11
Bridge Deck Rating	4 - Poor	4 - Poor
Superstructure Rating	6 - Satisfactory	6 - Satisfactory
Substructure Rating	7 - Good	6 - Satisfactory

### Deficiencies – Both Bridges

- Structural Capacity/Condition of the Bridge Deck
- Bridge width is substandard
- Does not meet hydraulic standards

# Bridge 9

# Looking North



03.13.2012

# Looking South



03.13.2012

# East Fascia



# Looking Upstream



03.13.2012

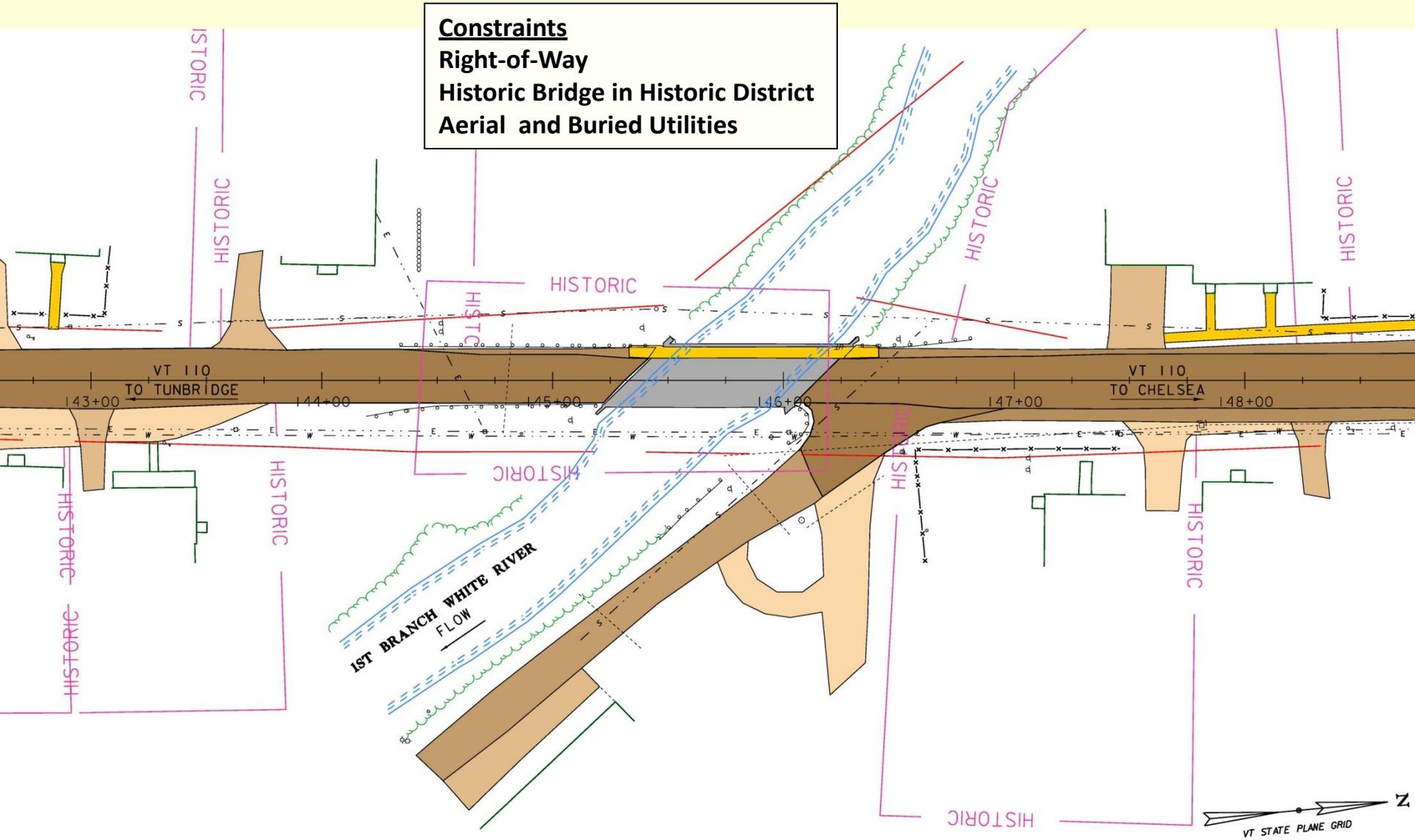
# Looking Downstream



# Underside of Deck



# Layout Showing Constraints

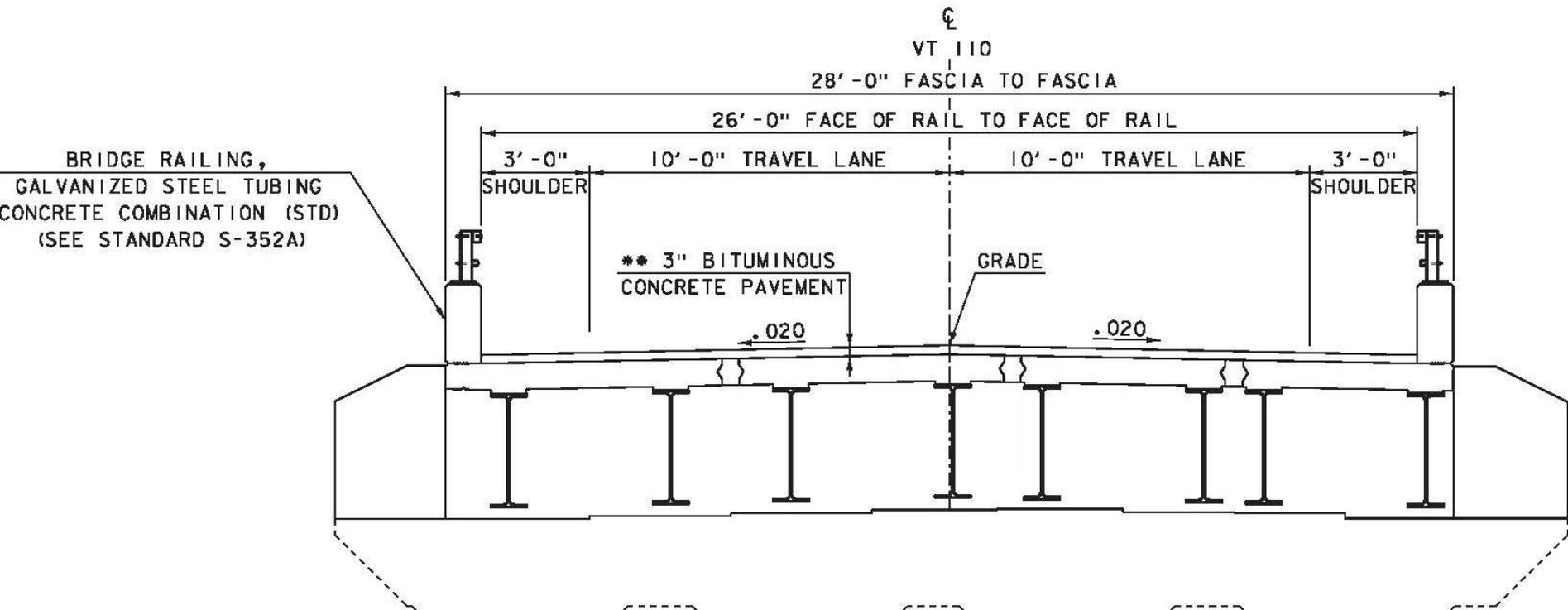


# Alternatives Considered

- Superstructure Replacement
- Full Bridge Replacement

Note that the method to maintain traffic will be addressed separately

# Proposed Bridge Typical (Same for both options)



# Bridge Sidewalk Topic

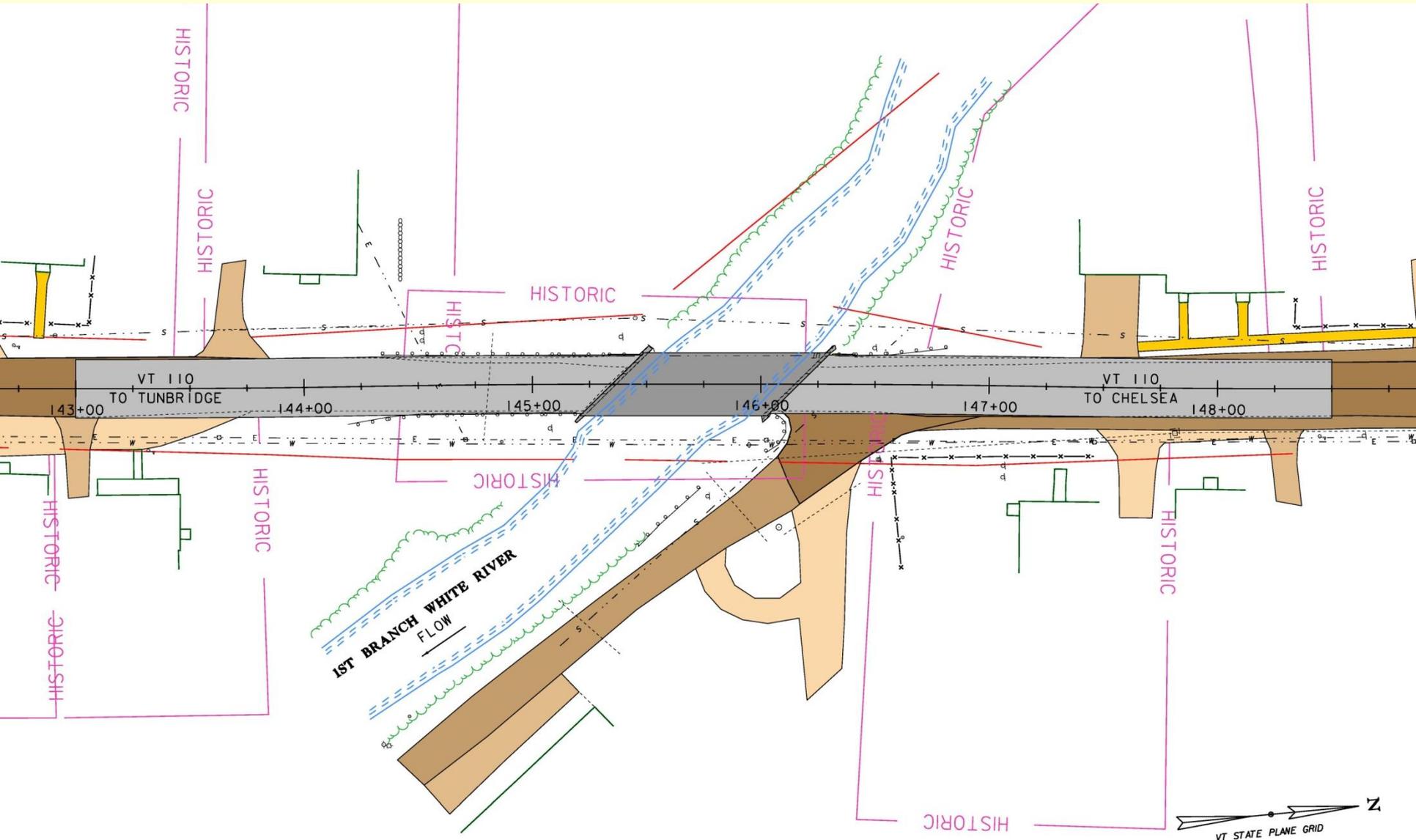
## Rationale for elimination of Bridge Sidewalk

- Proposed 3' shoulders are appropriate for shared use
- Bridge sidewalks not maintained by State and would require Maintenance agreement w/ Town
- No sidewalks leading to and from bridge
- Crosswalks needed for bridge sidewalk on one side only-

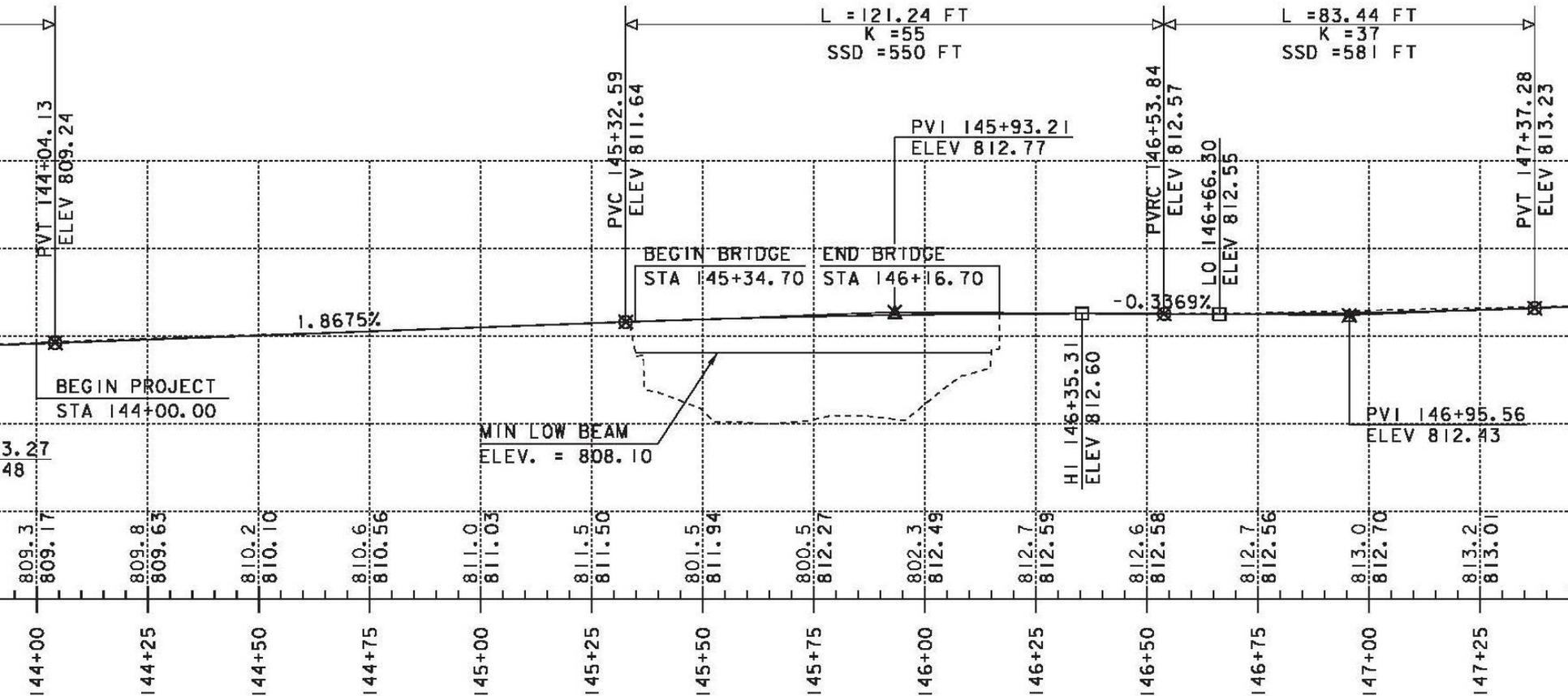
# Superstructure Replacement

- Use 10' lanes and 3' shoulders (26' rail-rail width)
- Keep existing abutments
- Eliminate existing sidewalk and use shoulders for peds
- Shift centerline of road 2' upstream
- Maintain vertical grade of road
- Structural deficiencies would be addressed
- No improvement to hydraulic capacity
- Predicted 40-50 year life expectancy-

# Layout – Superstructure Replacement



# Profile – Superstructure Replacement



VT RT 110 PROFILE  
PROPOSED ALIGNMENT 2' UPSTREAM

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

# Full Bridge Replacement

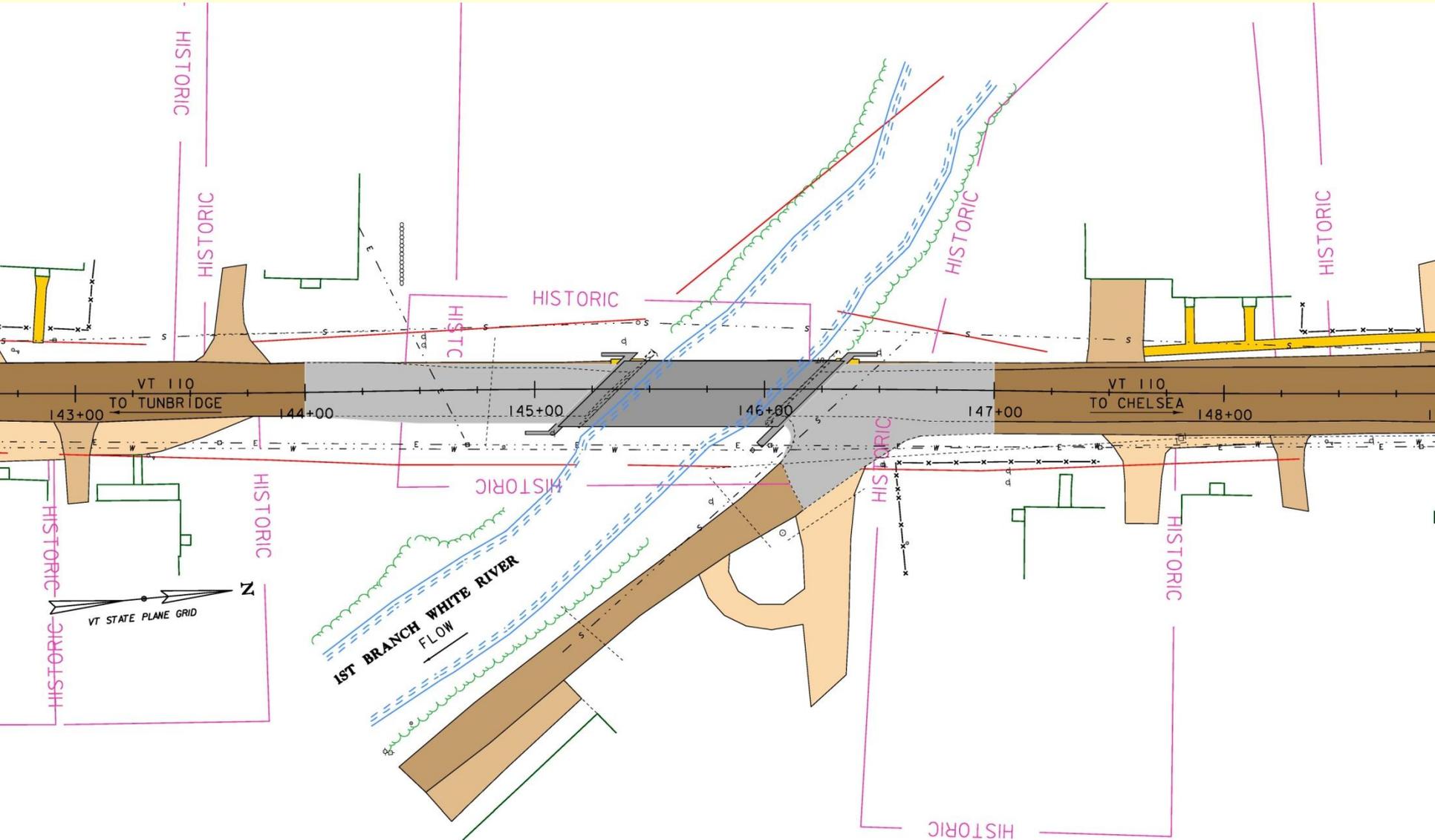
- Use 10' lanes and 3' shoulders (26' rail-rail width)
- Increase span to approximately 92 feet
- Eliminate existing sidewalk and use shoulders for peds
- Maintain existing centerline of road
- Maintain vertical grade of road
- Slight improvement to hydraulic capacity \*
- Predicted 80 year life expectancy-

# Hydraulic Requirements

## Proposed Hydraulic Opening

- Meeting standard would require raising roadway by 5' and would create “dam” in road
- Meeting standard would severely impact Historic District
- Minimal raising of grade produces only minimal increase in hydraulic capacity
- Proposed bridge matches bank full width of stream
- Roadway to south will still overtop during floods
- Proposed bridge improves hydraulics and balances issues

# Layout – Full Replacement



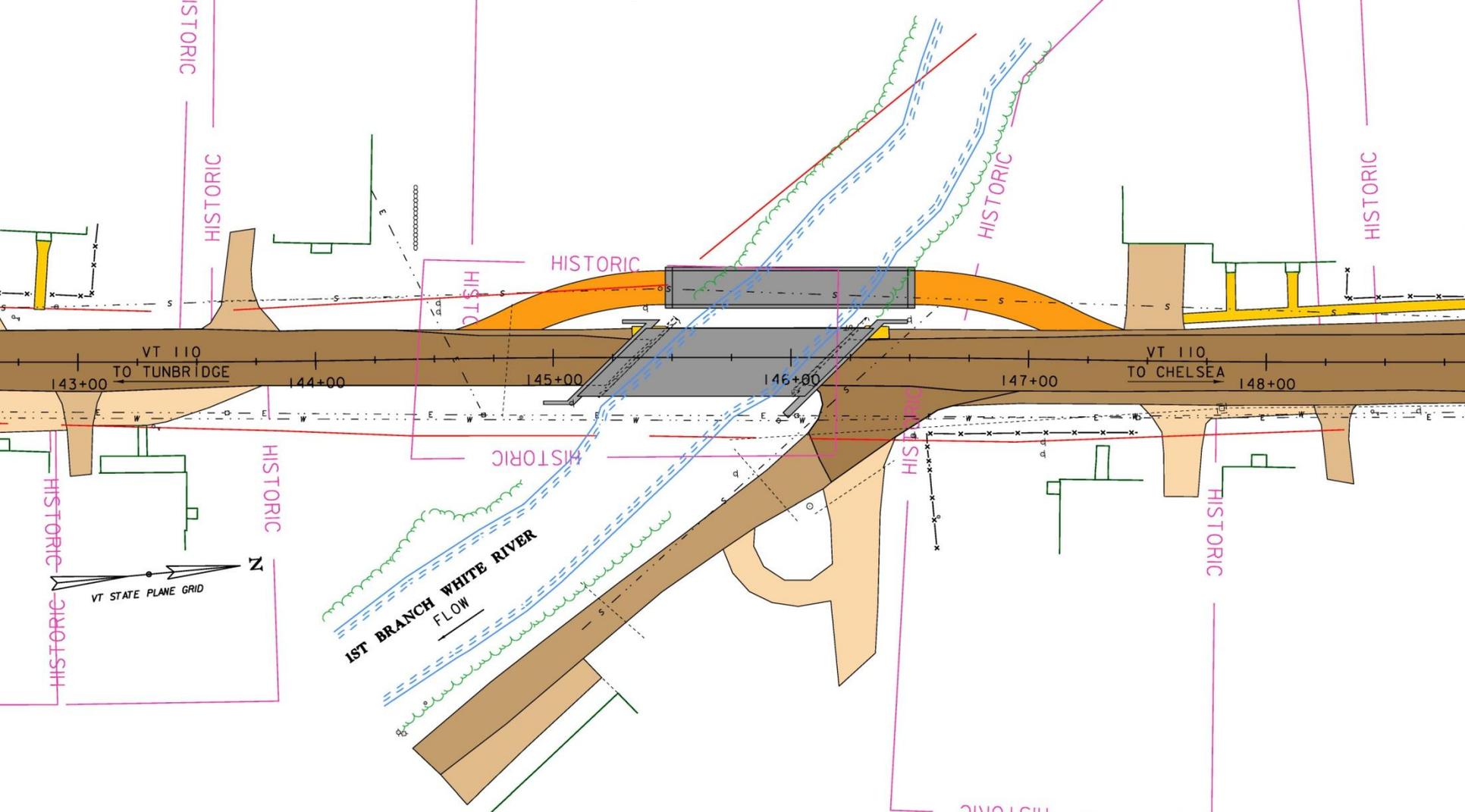
# Methods to Maintain Traffic

- Temporary Bridge
- Accelerated Bridge Construction with Off-site Detour
- Phased Construction

# One-Way Temporary Bridge Option

- Construct temporary bridge to maintain traffic
- One-Way alternating traffic with lights required
- Queue lengths and queue times can be inconvenient
- Access to side drives/buildings needs to be considered
- Very long construction duration
- Right-Of-Way acquisition is necessary
- Environmental impacts are increased
- Property owner impacts are increased
- Project Delivery time increased
- Project Costs increased
- Only considered for full replacement option-

# One-Way Temporary Bridge w/ Lights Upstream



# ABC with Bridge Closure Option

- Bridge 9 to be closed during new construction
- Allow 24/7 construction during bridge closure
- Contract incentives/dis-incentives to encourage contractor
- Community would have input on time of closure (between June 1 and September 1)
- Detour would be on State highways
- Public Outreach to provide advance notice for planning
- Local bypass routes would not be considered detour route -

# Off Site Detour Option

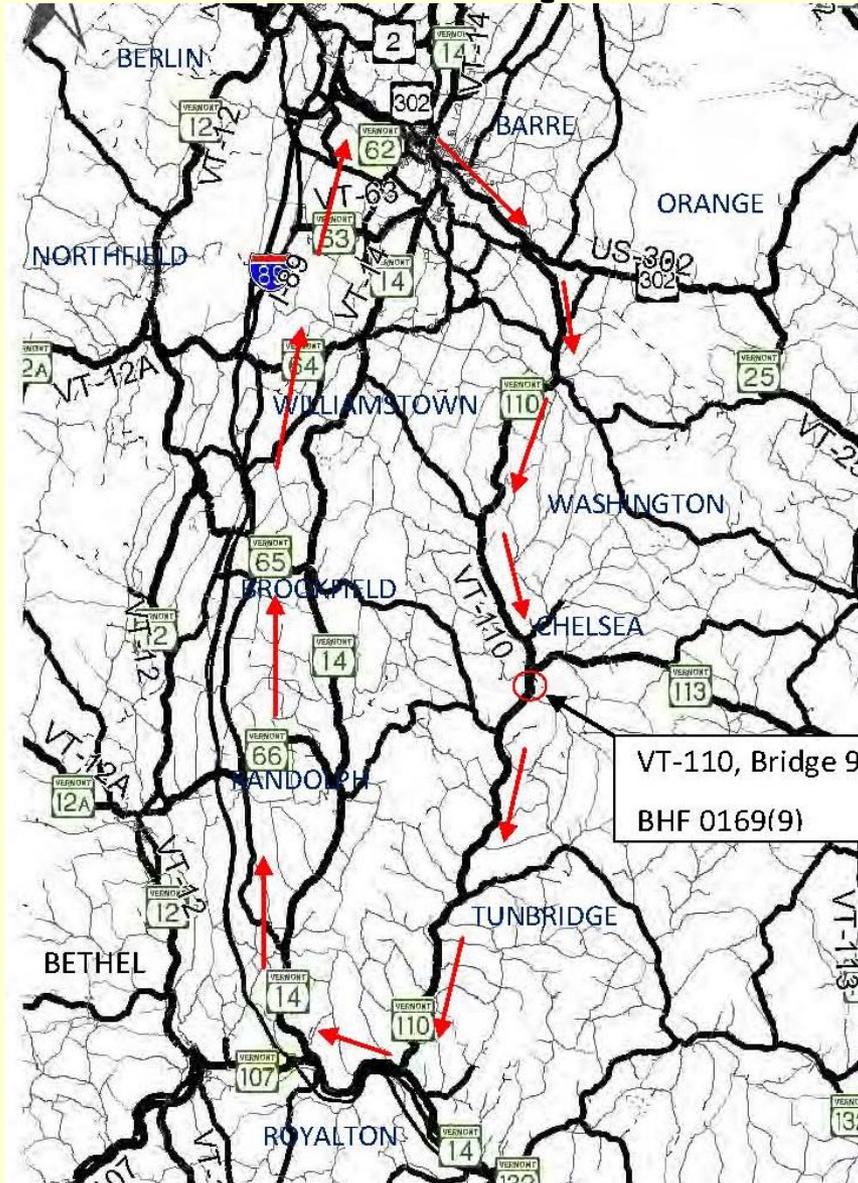
## Mileage Summary

A-B Thru = 27 miles  
A-B Detour = 41 miles  
Added Miles = 14 miles  
End-End Dist. = 68 miles

## Major Factors

Traffic Volume = 1,500  
Added Miles = 14 miles  
Duration = See Matrix

Note that there are local roads that could be used during a bridge closure but they would not be designated detour routes but considered local bypass routes



# Local Bypass Details

- Local bypass routes would not be considered detour route
- State would not add signing on local roads
- Could be used for emergency response as appropriate
- When and where appropriate, we can compensate Town to mitigate impacts due to increased traffic for:
  - Providing police presence to deter speeding
  - Providing DMV presence to enforce weight limits
  - Dust control
  - Road maintenance costs -

# Phased Construction (Conventional)

- Phase 1 – Channel one lane of traffic onto half of existing bridge and build half of new bridge
- Phase 2 – Channel one lane of traffic onto portion of new bridge and build remainder of new bridge
- One-Way alternating traffic with lights
- Queue lengths and queue times can be inconvenient
- Access to side drives/buildings needs to be considered
- Relatively long construction duration
- Workers & motorists in close proximity – safety concerns
- Can usually be done without ROW acquisition-

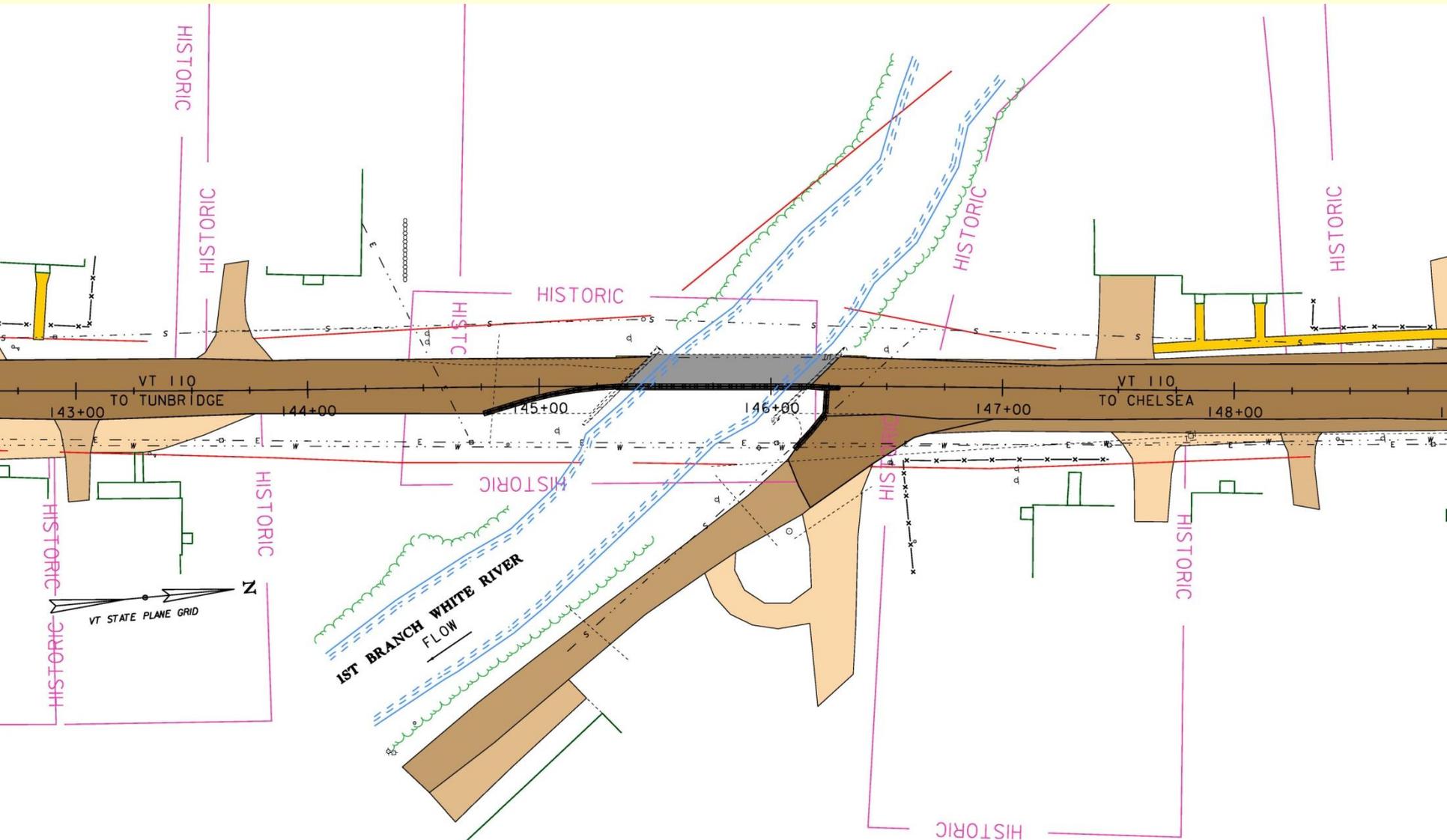
# Phased Construction (Conventional) Problems

- Existing bridge is not wide enough
- Can't maintain traffic on half of existing bridge and build new portion wide enough for 2<sup>nd</sup> phase
- Possible solution would be to install temporary bridge to use as 2<sup>nd</sup> phase
- This would require an additional phase (3 phases)
- Construction duration would be very long and complicated
- Looking for innovative method to minimize construction duration and therefore community impacts-

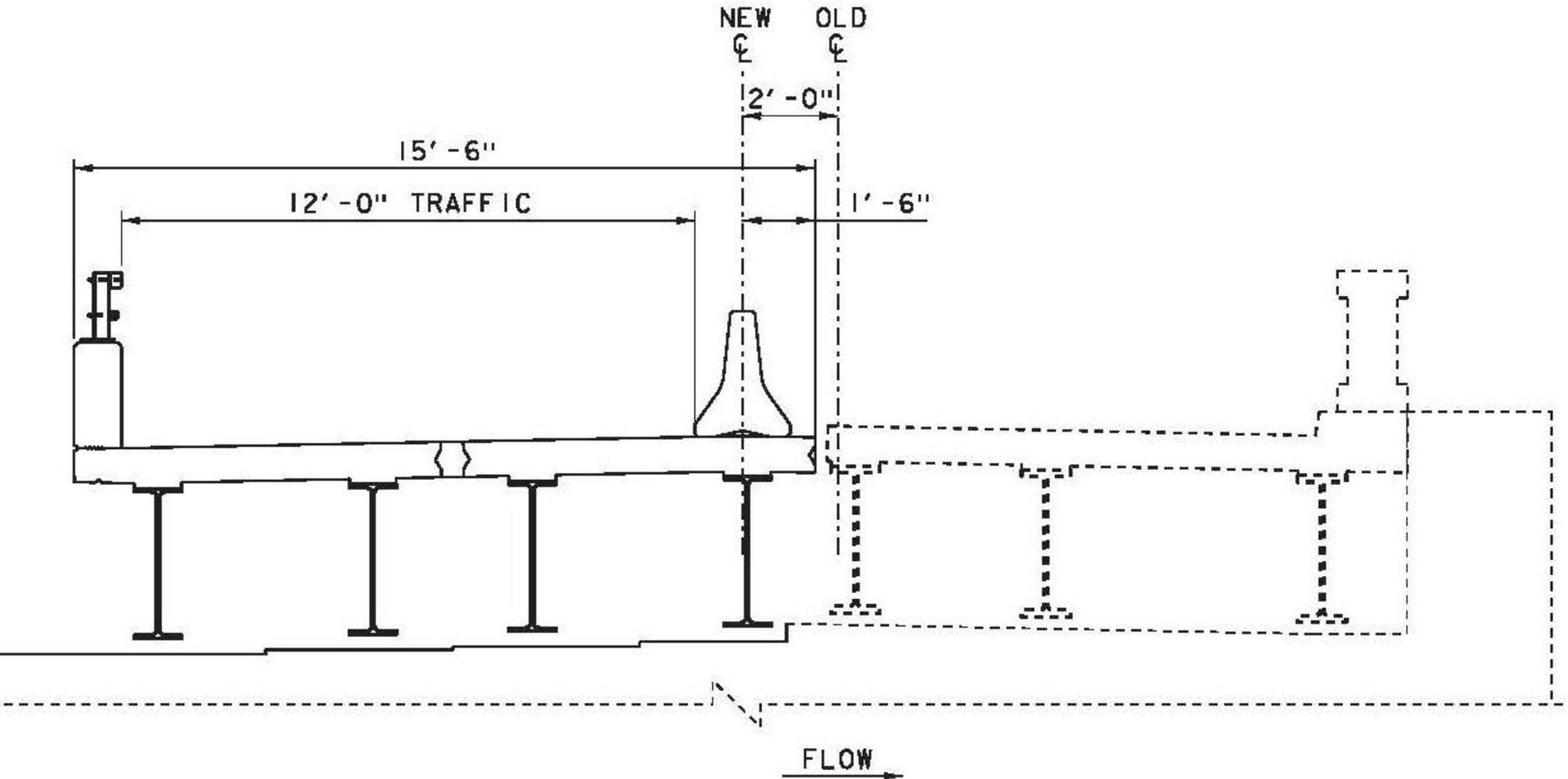
# Phased Construction (Hybrid Approach)

- Combine ultra-short closure with phased construction
- Phase 1 – Close bridge for 3 days and build half of new bridge and channel one lane of traffic onto it
- Eliminates one phase and makes phasing possible
- Significant reduction in mobility impacts
- Reduces construction duration-

# Phase 1 – Build half of new deck



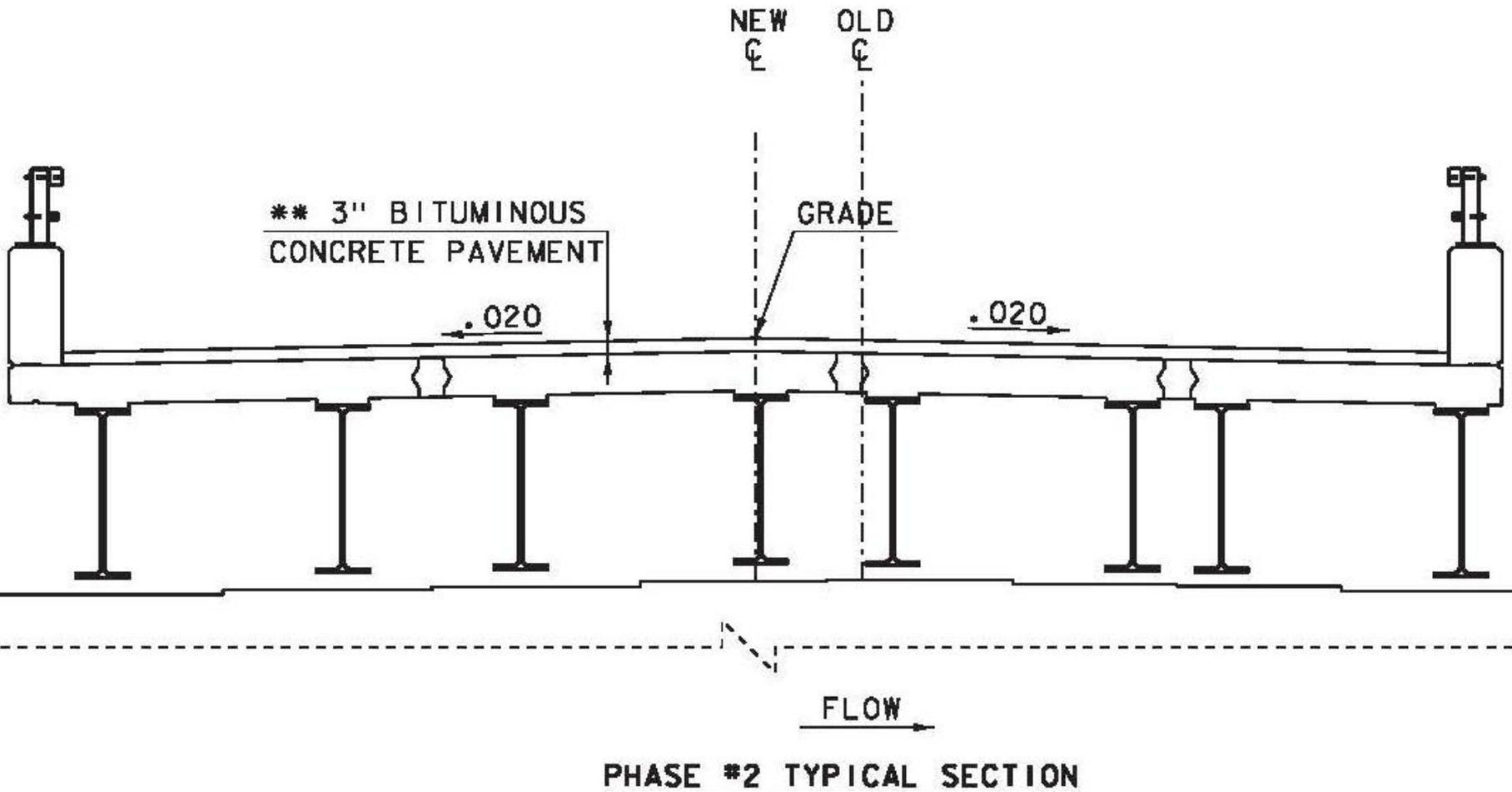
# Phase 1 – Typical Section



## PHASE #1 TYPICAL SECTION

BRIDGE WILL BE CLOSED PRIOR TO THIS PHASE

# Completed Bridge



# Alternatives Matrix – Bridge 9

	Super Replacement w/ Phased Hybrid		Complete Replacement w/ Phased Hybrid	Complete Replacement w/ Temp Bridge
Maintenance of Traffic	\$90,000		\$90,000	\$150,000
Construction w/ CE + Contingencies	\$1,013,400		\$1,574,000	\$1,650,300
Preliminary Engineering	\$253,000		\$394,000	\$412,000
Right of Way	\$0		\$0	\$105,000
<b>Total Cost</b>	<b>\$1,266,400</b>		<b>\$1,968,000</b>	<b>\$2,167,300</b>
<b>Design Life</b>	<b>40 years</b>		<b>80 years</b>	<b>80 years</b>
Project Development Duration	2 years		2 years	> 4 years
Construction Duration	6 months		12 months	24 months
Road Closure Duration	3 days		3 weeks	None

## **Conclusion and Recommendation – Bridge 9**

Superstructure replacement while maintaining traffic using a phased hybrid of short-term closure and off-site detour.

The primary reasons for this recommendation are:

- Addresses structural deficiencies
- Takes advantage of remaining life in substructures
- Minimizes property owner impacts
- Minimizes community impacts
- Reasonably Long term (40 year) solution
- Minimizes project delivery duration-

# Questions on Bridge 9



# Bridge 11

# Looking North



# Looking South

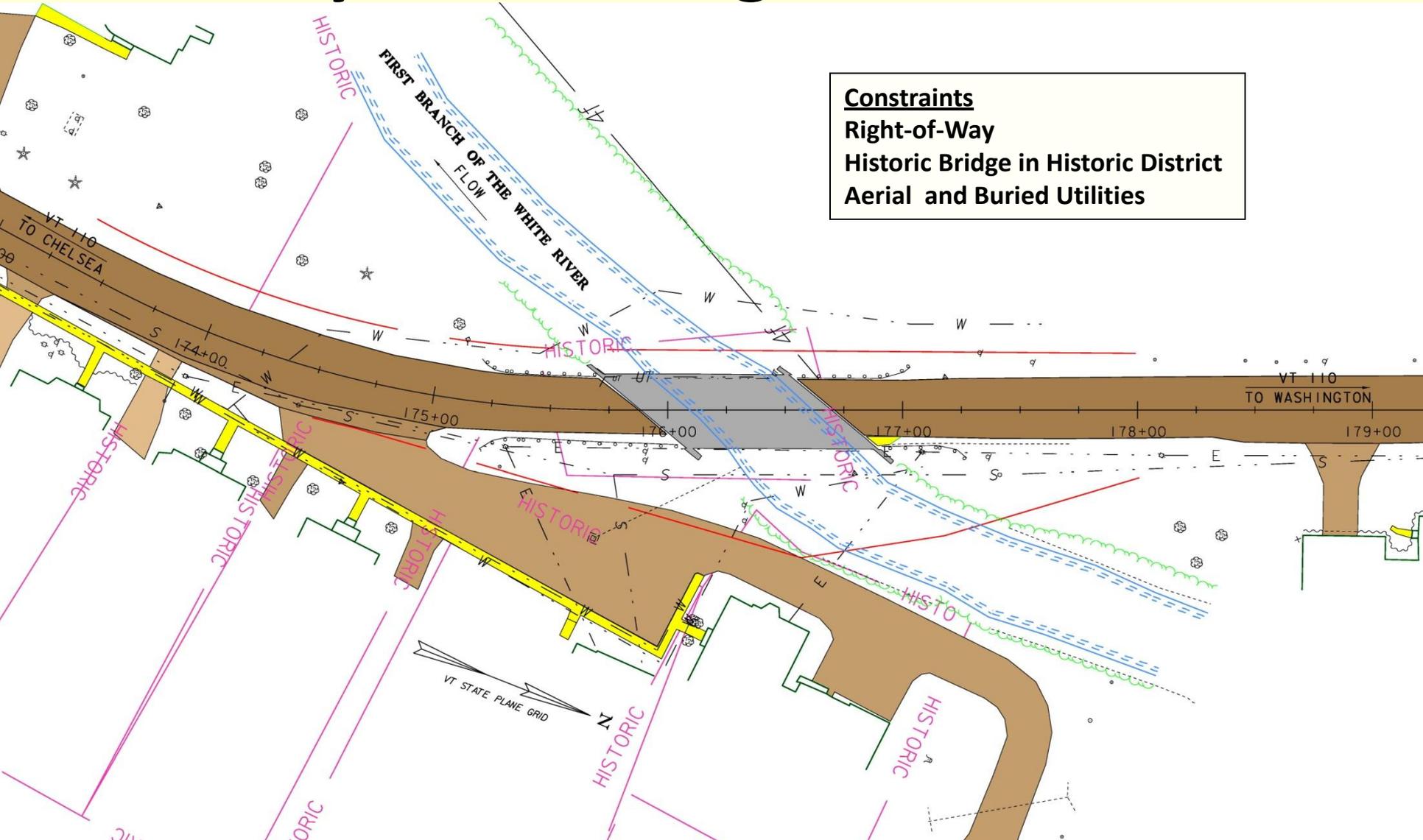


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# Underside of Deck



# Layout Showing Constraints

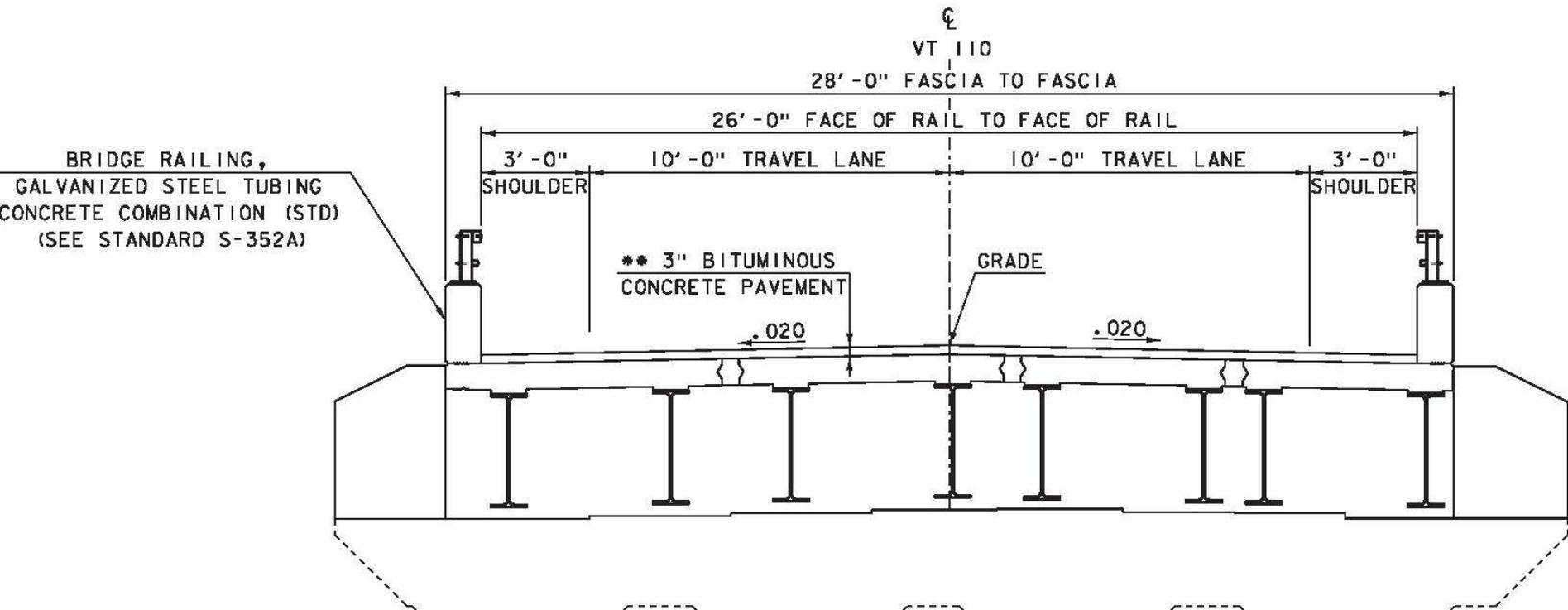


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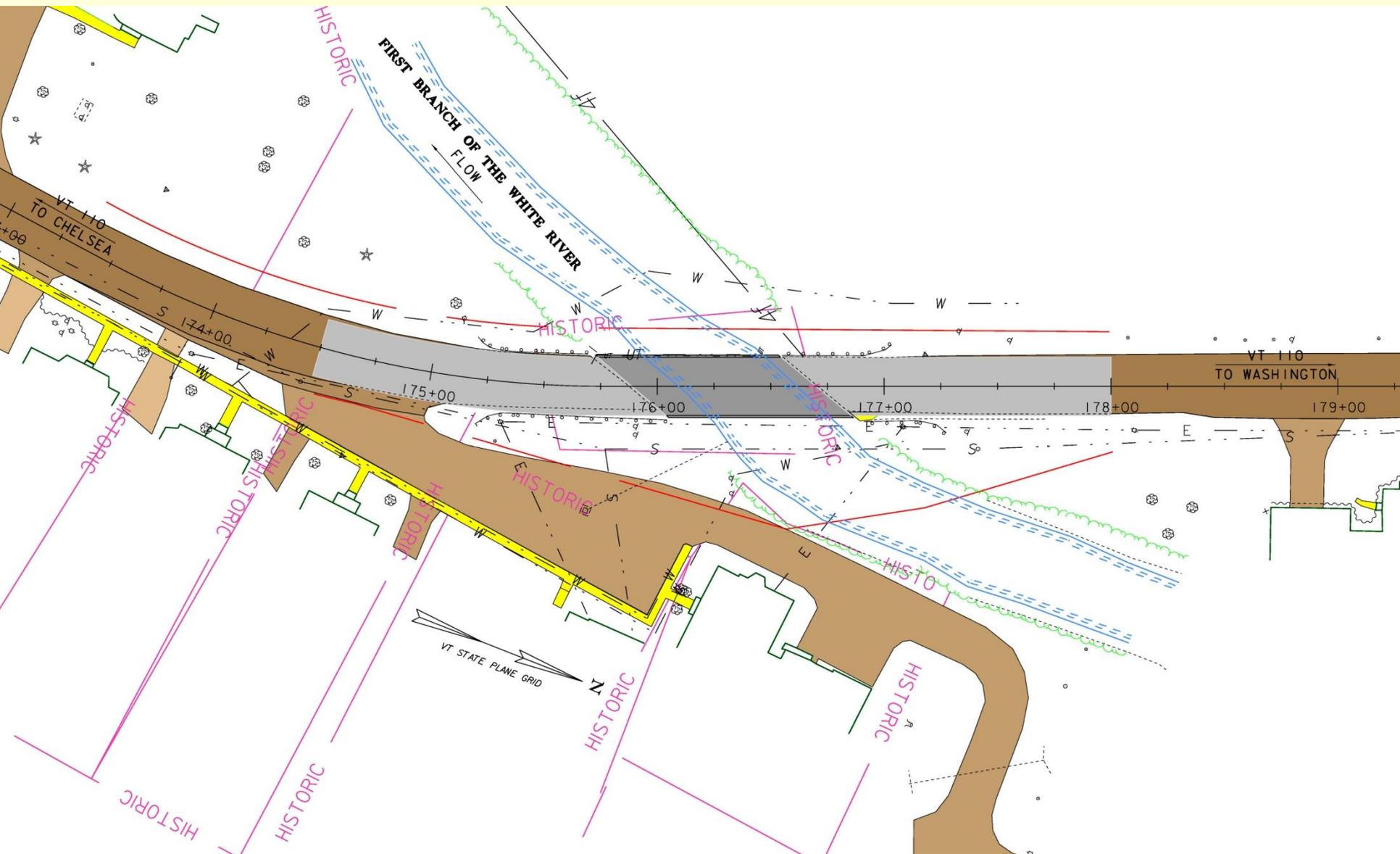
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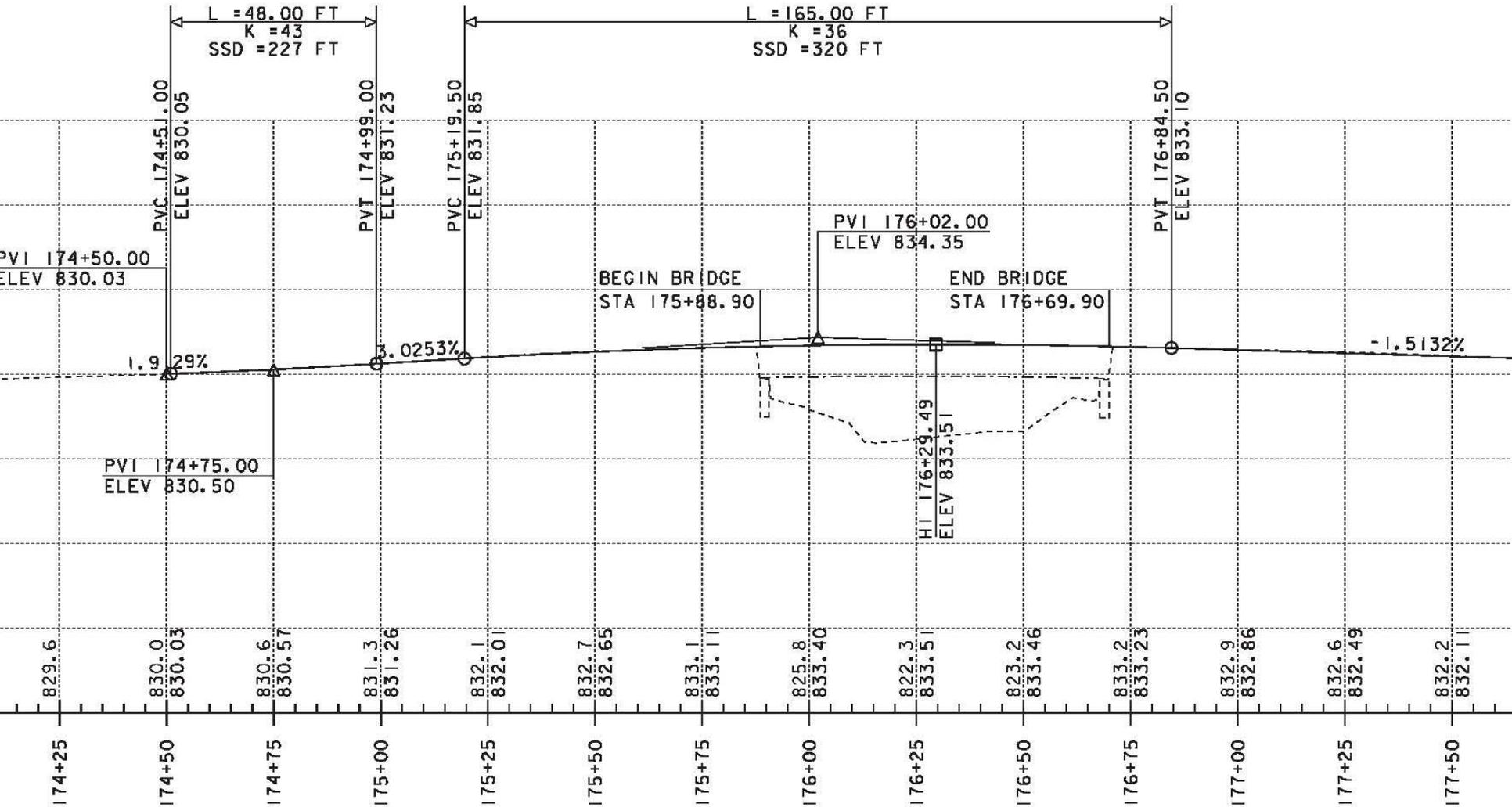
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VT RT 110 PROFILE

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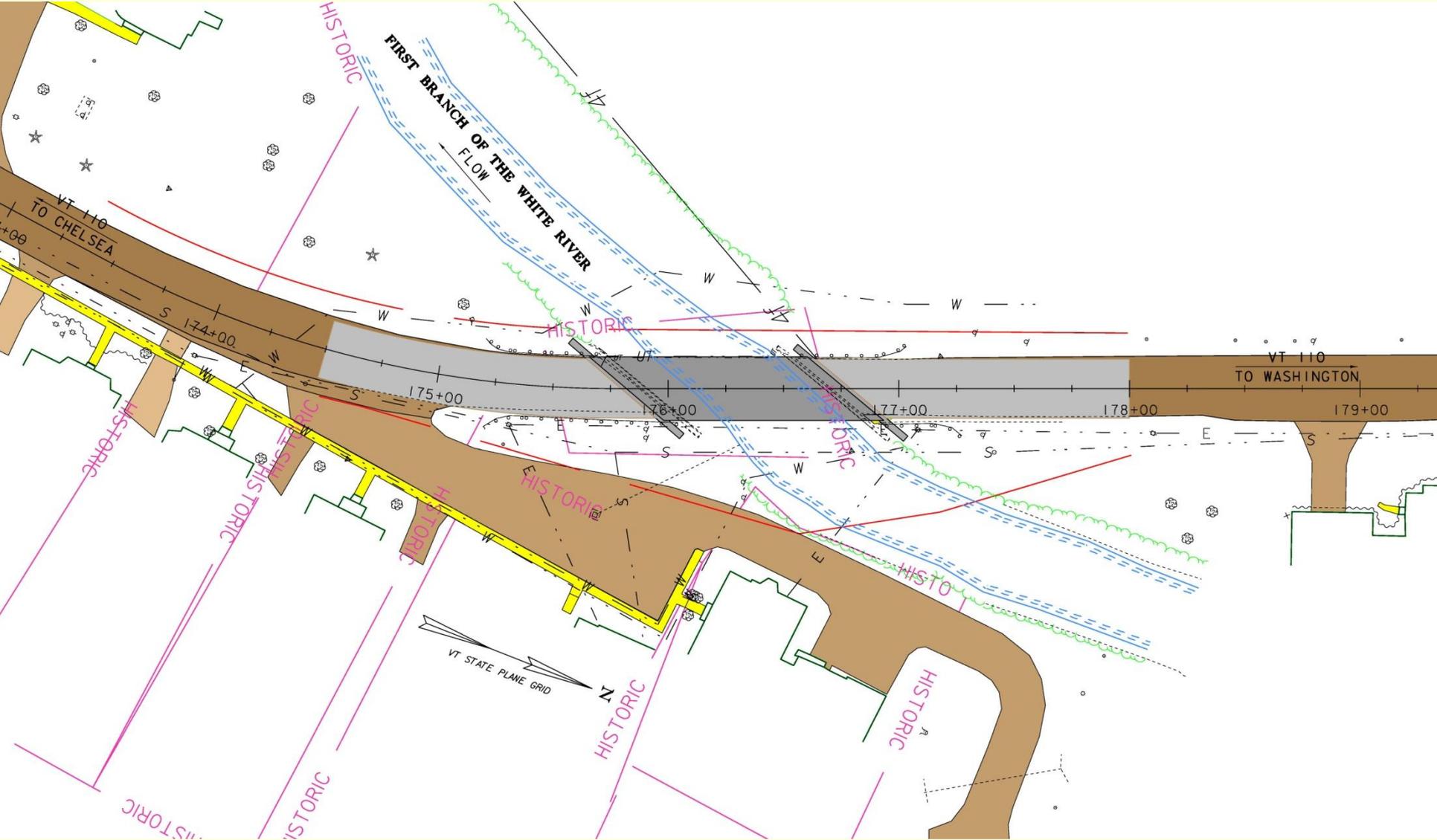
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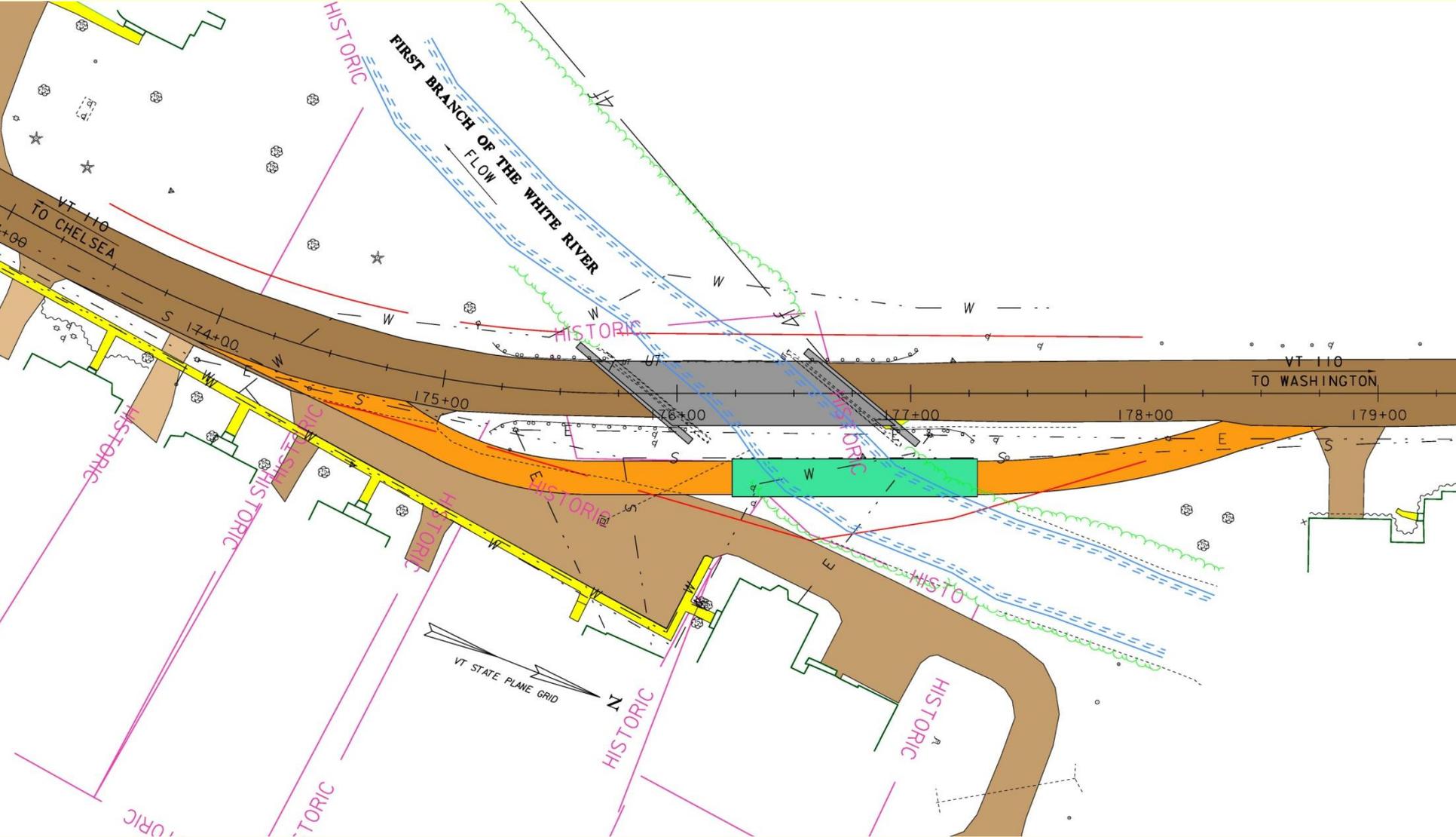
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# One-Way Temporary Bridge w/ Lights Upstream



# ABC with Bridge Closure Option

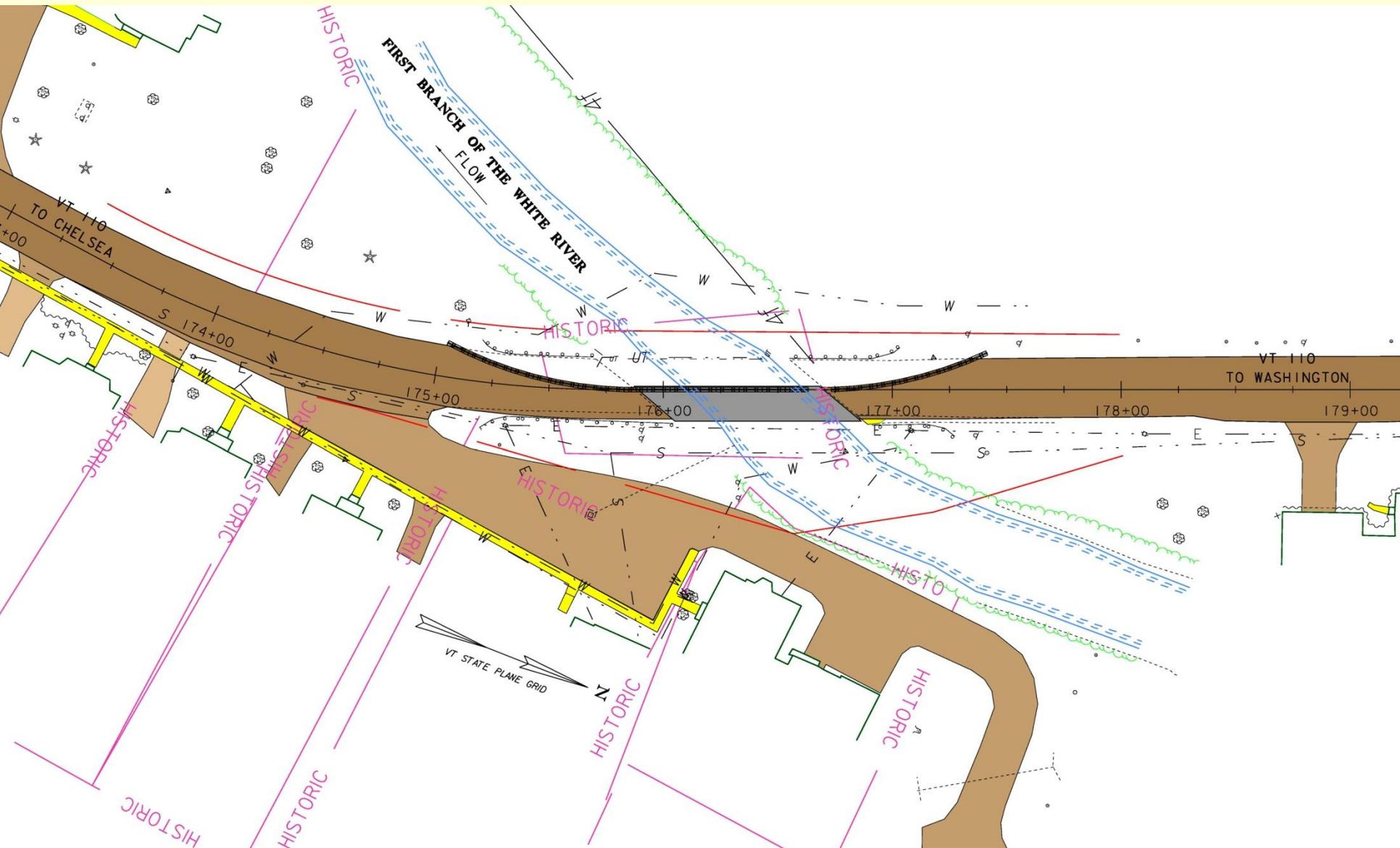
See Bridge 9 for details on this option

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# Phase 1 – Build half of new deck



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Construction w/ CE + Contingencies	\$993,700		\$1,729,800	\$1,812,500
Preliminary Engineering	\$248,400		\$399,200	\$418,000
Right of Way	\$0		\$0	\$115,900
<b>Total Cost</b>	<b>\$1,242,100</b>		<b>\$2,129,000</b>	<b>\$2,346,400</b>
<b>Design Life</b>	<b>40 years</b>		<b>80 years</b>	<b>80 years</b>
Project Development Duration	2 years		2 years	> 4 years
Construction Duration	3 months		8 months	18 months
Road Closure Duration	3 days		3 weeks	None

## **Conclusion and Recommendation – Bridge 11**

Superstructure replacement while maintaining traffic using a phased hybrid of short-term closure and off-site detour.

The primary reasons for this recommendation are:

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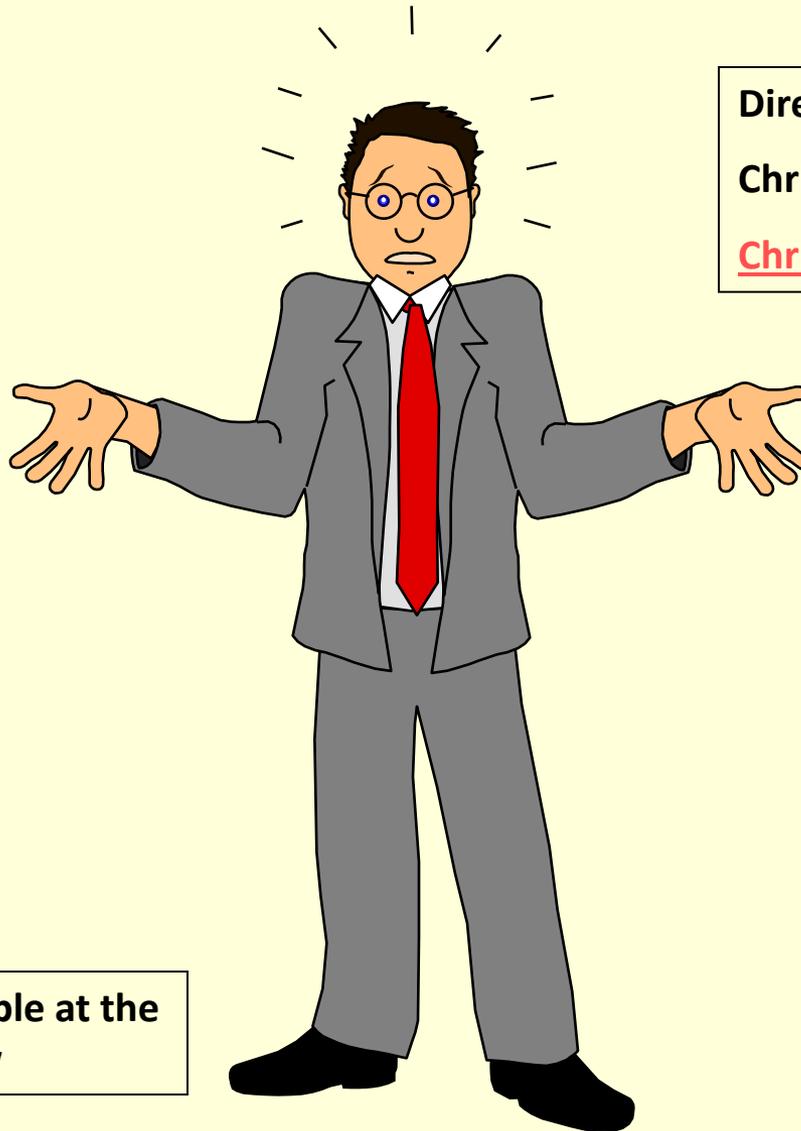
# Questions on Bridge 11



## **A Look Ahead to the Next Steps**

- Evaluate and consider comments received at this meeting
- Proceed based on recommended alternative unless adequate justification for reconsidering alternatives
- Combining projects into one construction contract will be considered as projects are developed independently
- Develop Conceptual plans and distribute for comment
- Reach Project Defined milestone and begin Design phase

# Questions



Direct any questions to:

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This presentation is available at the  
web address shown below

<https://outside.vermont.gov/agency/vtrans/external/Projects/Structures/12C150>