

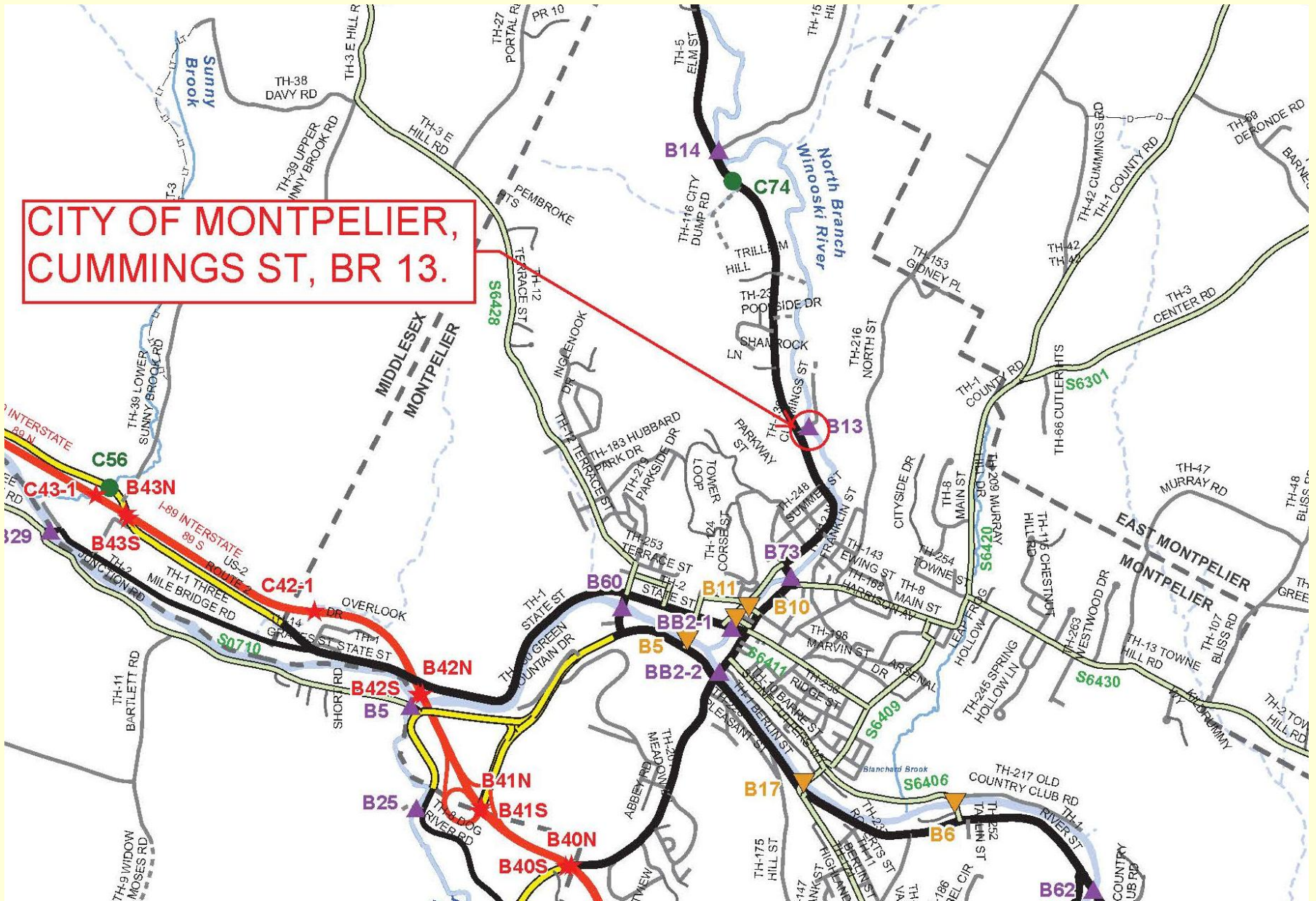
# Montpelier BO 1446(36) Bridge 13 on Cummings Street over the North Branch of the Winooski River Alternatives Presentation



Presented by  
Christopher P. Williams, P.E.  
Senior Project Manager, Structures Section  
Vermont Agency of Transportation  
Chris.Williams@State.VT.US

November 6, 2013

# PROJECT LOCATION



# Meeting Outline

- Purpose of the Meeting
- Existing bridge deficiencies
- Alternatives considered
- Summary and recommendation
- Next Steps

# 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-

# Phases of Development

Project  
Funded

Project  
Defined

Contract  
Award

Project Definition

Project Design

Construction

Identify resources &  
constraints

Evaluate alternatives

Public Participation

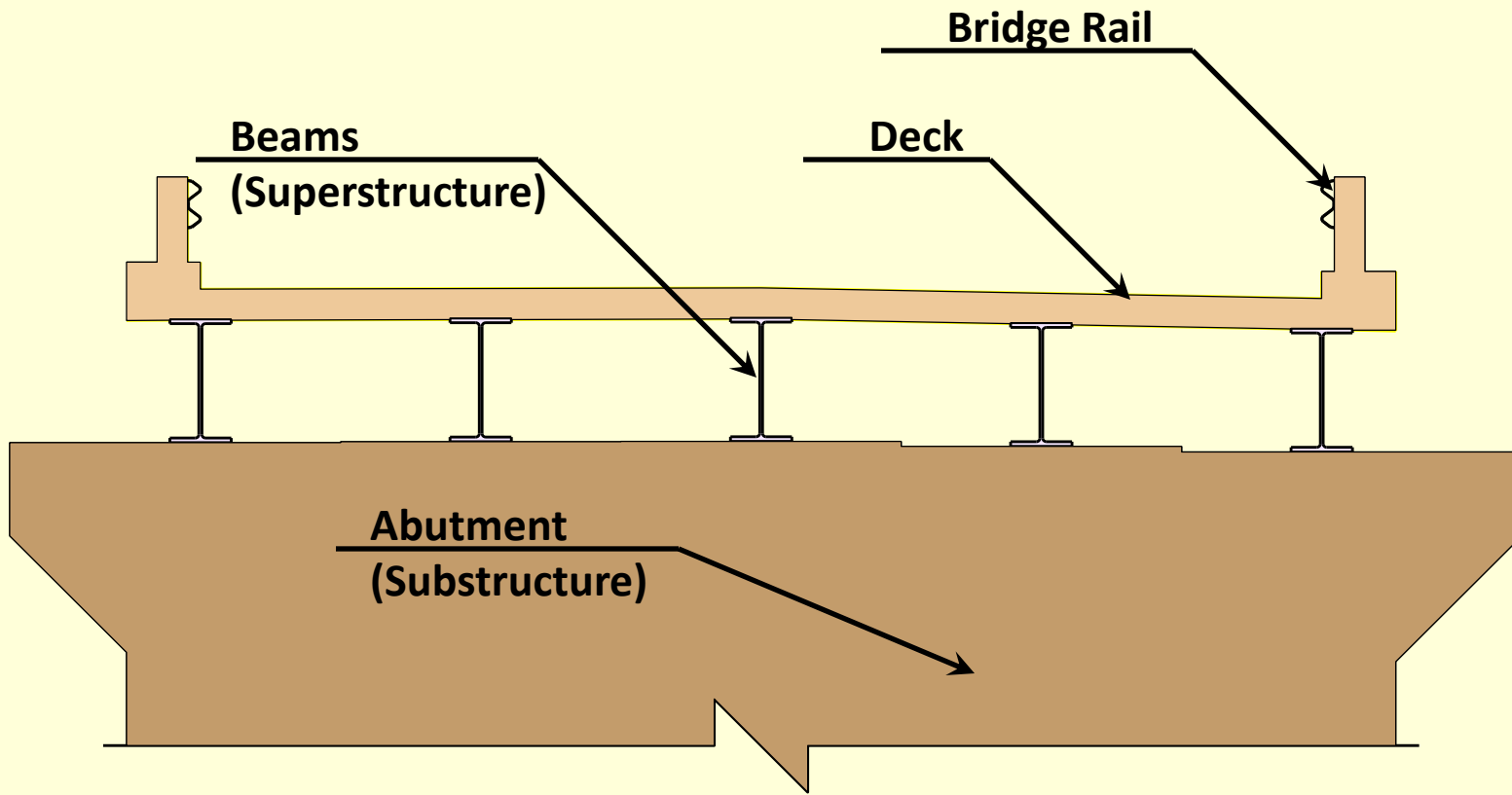
Build Consensus

- Quantify areas of impact

- Environmental permits

- Develop plans, estimate and specifications

# Description of Terms Used



# Project Background

- The structure is owned and maintained by the City
- Cummings Street is an Urban Local street
- Posted Speed = 25 mph (Design Speed)
- Existing bridge is a single span steel beam w/ concrete deck
- Span length = 64 feet
- Bridge Width = 17 feet (curb-curb)
- The bridge was built in 1928 (85 years old)

# Traffic Data

	<b>“Current Year” 2016</b>	<b>“Design Year” 2036</b>
<b>Average Annual Daily Traffic</b>	<b>220</b>	<b>240</b>
<b>Design Hourly Volume</b>	<b>50</b>	<b>55</b>
<b>Average Daily Truck Traffic</b>	<b>10</b>	<b>15</b>
<b>%Trucks</b>	<b>1.6</b>	<b>2.0</b>



# EXISTING BRIDGE DEFICIENCIES

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

Bridge Deck Rating	4 Poor
Superstructure Rating	5 Fair
Substructure Rating	6 Satisfactory

## Rating Definitions

9 Excellent
8 Very Good
7 Good
6 Satisfactory
5 Fair
4 Poor
3 Serious
2 Critical
1 Imminent Failure

## Deficiencies

- The bridge is structurally deficient with a poor deck rating
- The roadway and bridge are too narrow for the roadway classification, design speed and anticipated pedestrian use
- The approach railings are substandard
- The vertical alignment (crest vertical curve) is substandard

# Looking East over Bridge



# Looking west over Bridge



## Bottom of Deck showing Deterioration



# Girder deterioration and water main



# Abutment deterioration at Beam Support



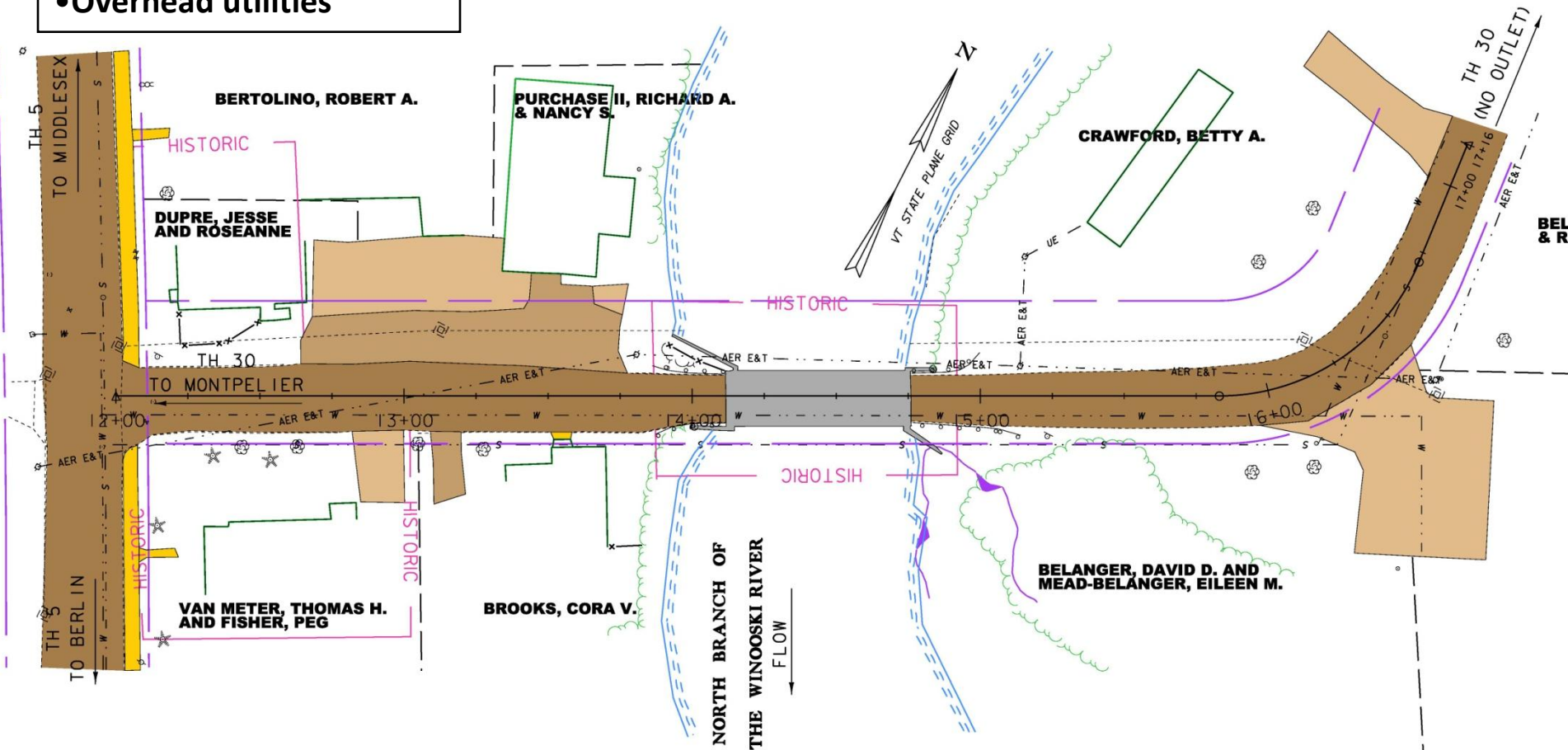
# Looking downstream @ waterway constriction



# Layout Showing Constraints

Constraints present

- Right of Way
- Wetlands
- Historic bridge
- 4" Water Main
- Overhead utilities





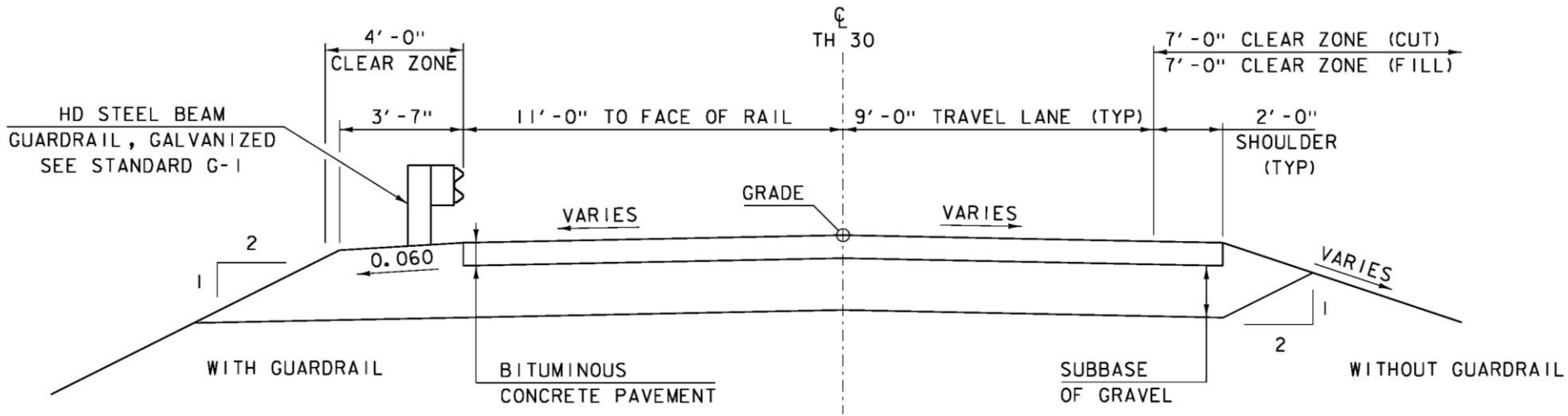
# Alternatives Discussion

## Alternatives considered

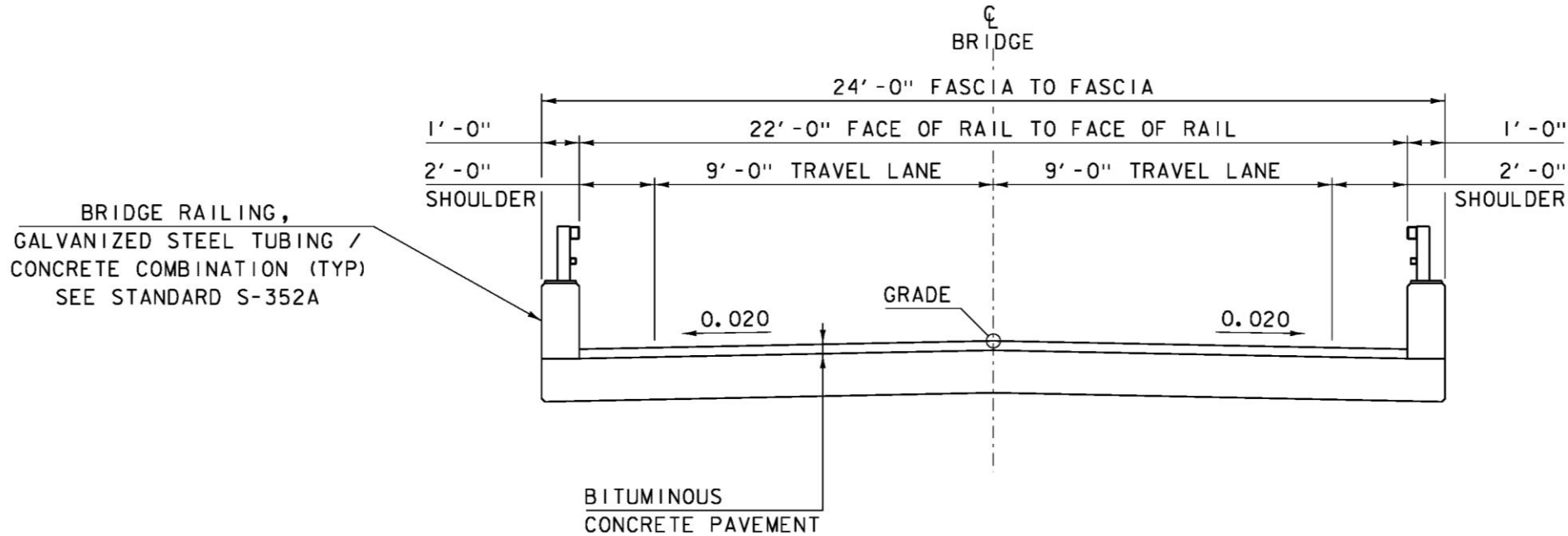
- Deck Replacement
- Superstructure Replacement
- Complete Bridge Replacement

Note: The method to maintain traffic during construction will be considered separately later in the presentation

# Roadway Typical



# Bridge Typical



# Deck Replacement Details

- Replace deck with new deck of proper width (22')
- Clean, repair and paint existing steel beams
- Minor substructure repair
- Rebuild northwest and northeast wingwalls
- Maintain existing horizontal and vertical alignments

## Comments:

- Old abutments in satisfactory condition are retained
- Old beams are retained
- No improvement to crest vertical curve
- Channel constriction at bridge

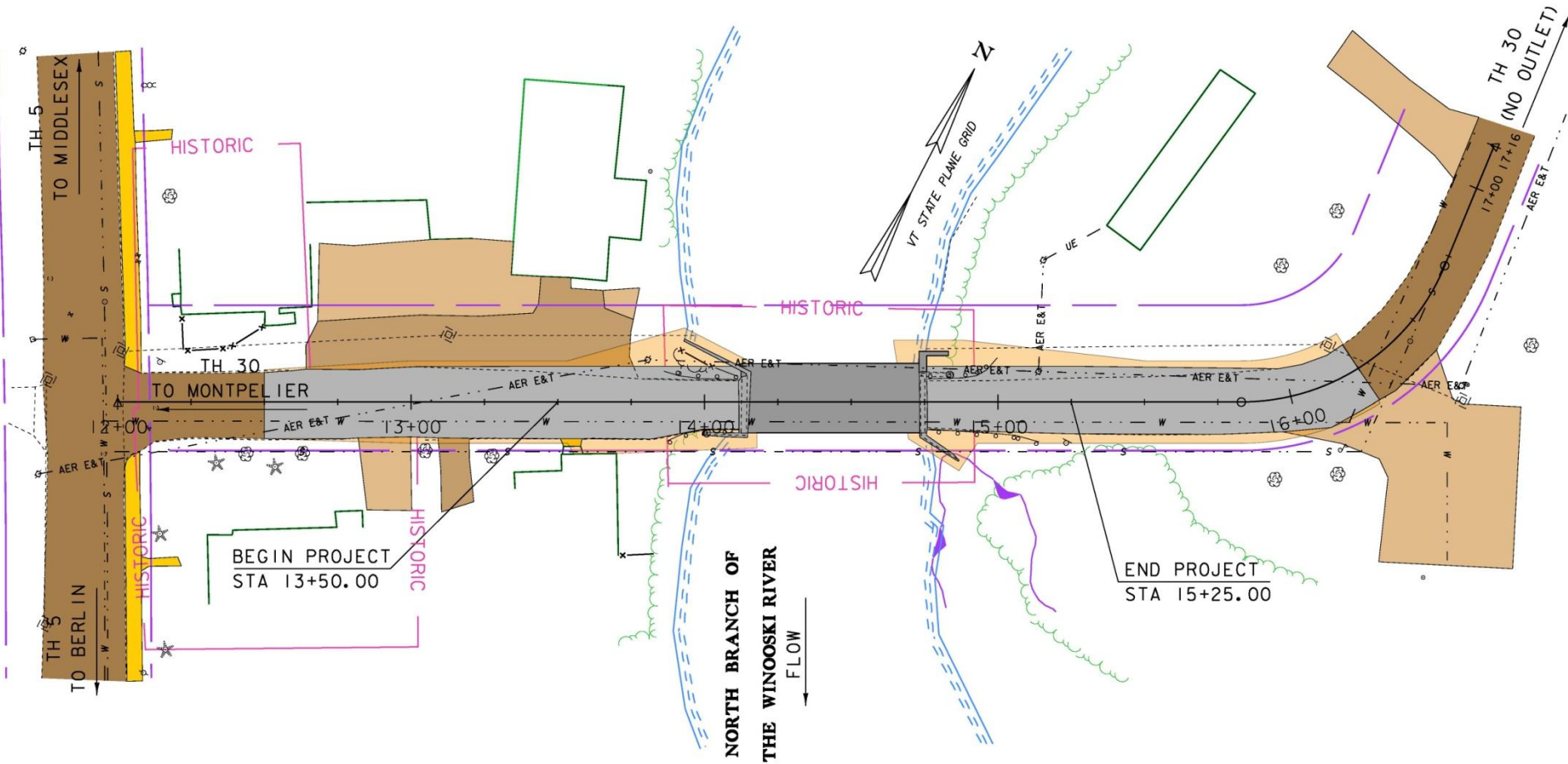
# **Superstructure Replacement Details**

- **Replace deck with new deck of proper width (22')**
- **Replace steel beams**
- **Lower bridge seats to improve crest vertical curve**
- **Minor substructure repair**
- **Rebuild northwest and northeast wingwalls**
- **Maintain existing horizontal alignment**

## **Comments:**

- **Old abutments in satisfactory condition are retained**
- **Channel constriction at bridge**

# Layout for Rehabilitation



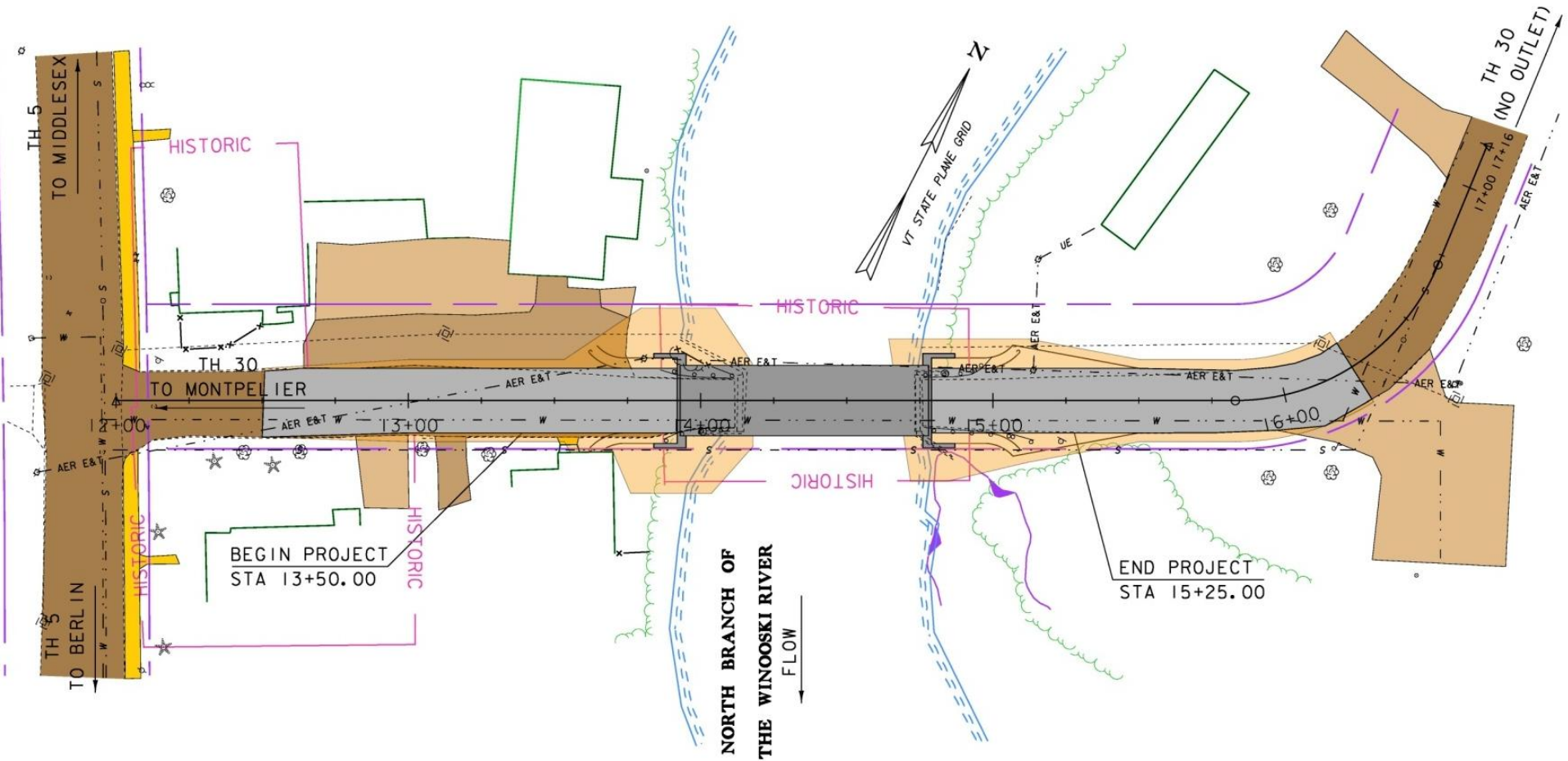
# **Complete Replacement Details**

- **New deck of proper width (22')**
- **New steel beams**
- **Increase span to 85'**
- **Maintain existing horizontal alignment**
- **Slight improvement to vertical alignment**

## **Comments:**

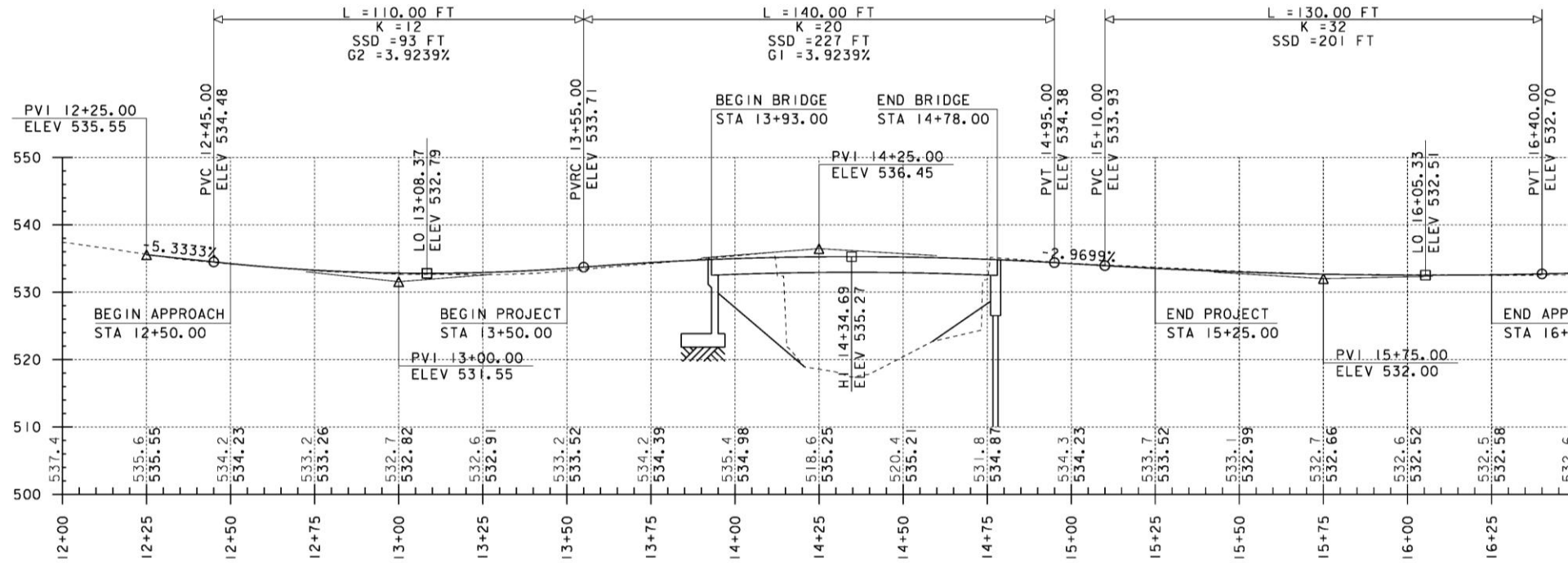
- **All features will meet standards**
- **80 year fix**

# Replacement Layout

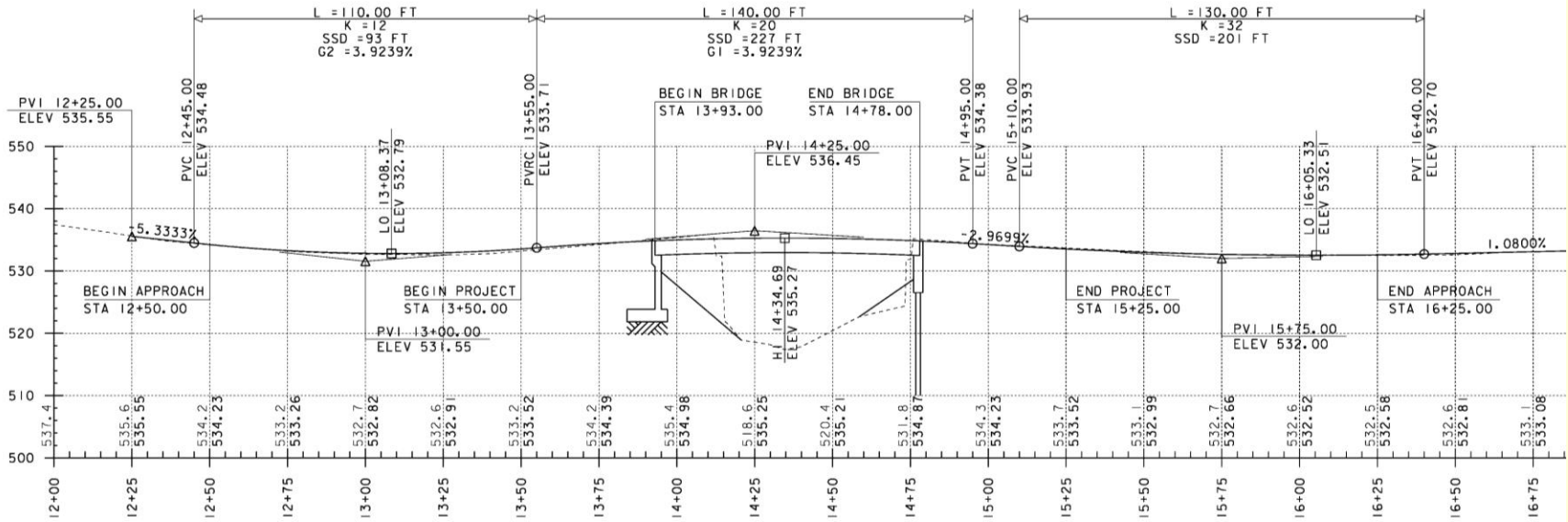




# Profile for Bridge Replacement



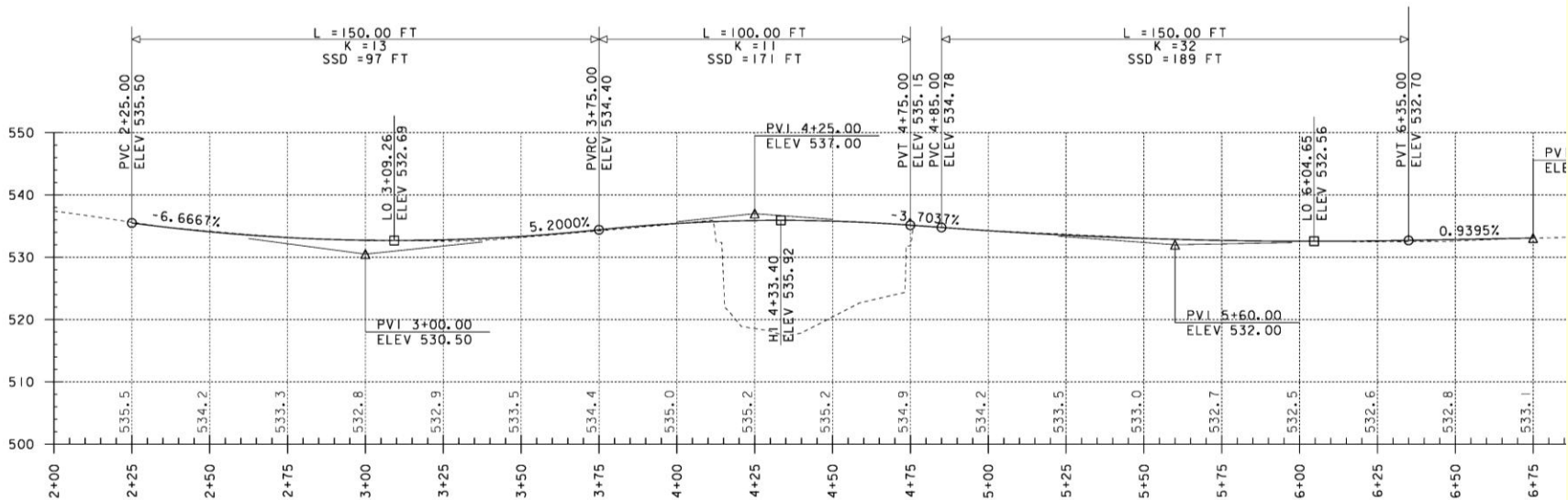
# Profile Comparison



## TH 30 PROPOSED PROFILE

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

CONCEPTUAL ABUTMENTS SHOWN.  
BORINGS HAVE NOT BEEN TAKEN AND  
ABUTMENTS HAVE NOT BEEN DESIGNED.



# Methods to Maintain Traffic

Three general methods available:

- Phased Construction
- Short-term bridge closure with ABC
- Temporary Bridge

# Phased Construction

- Maintain one lane of traffic on portion of existing bridge while constructing a portion of the new bridge
- Existing bridge is too narrow for this method unless horizontal alignment is changed since 14'-6" minimum width required for each phase
- Changing horizontal alignment can not be justified due to cost, impacts to property owners and environment
- This method ruled out and not considered further

# Short-term bridge closure and ABC

- Bridge 13 can not be closed without providing alternate access to the properties east of the bridge since Cummings Street is a dead end road
- Two alternate access routes were studied as shown in the following slide
- This method ruled out due to drastic changes in land use and transportation connections and not considered further

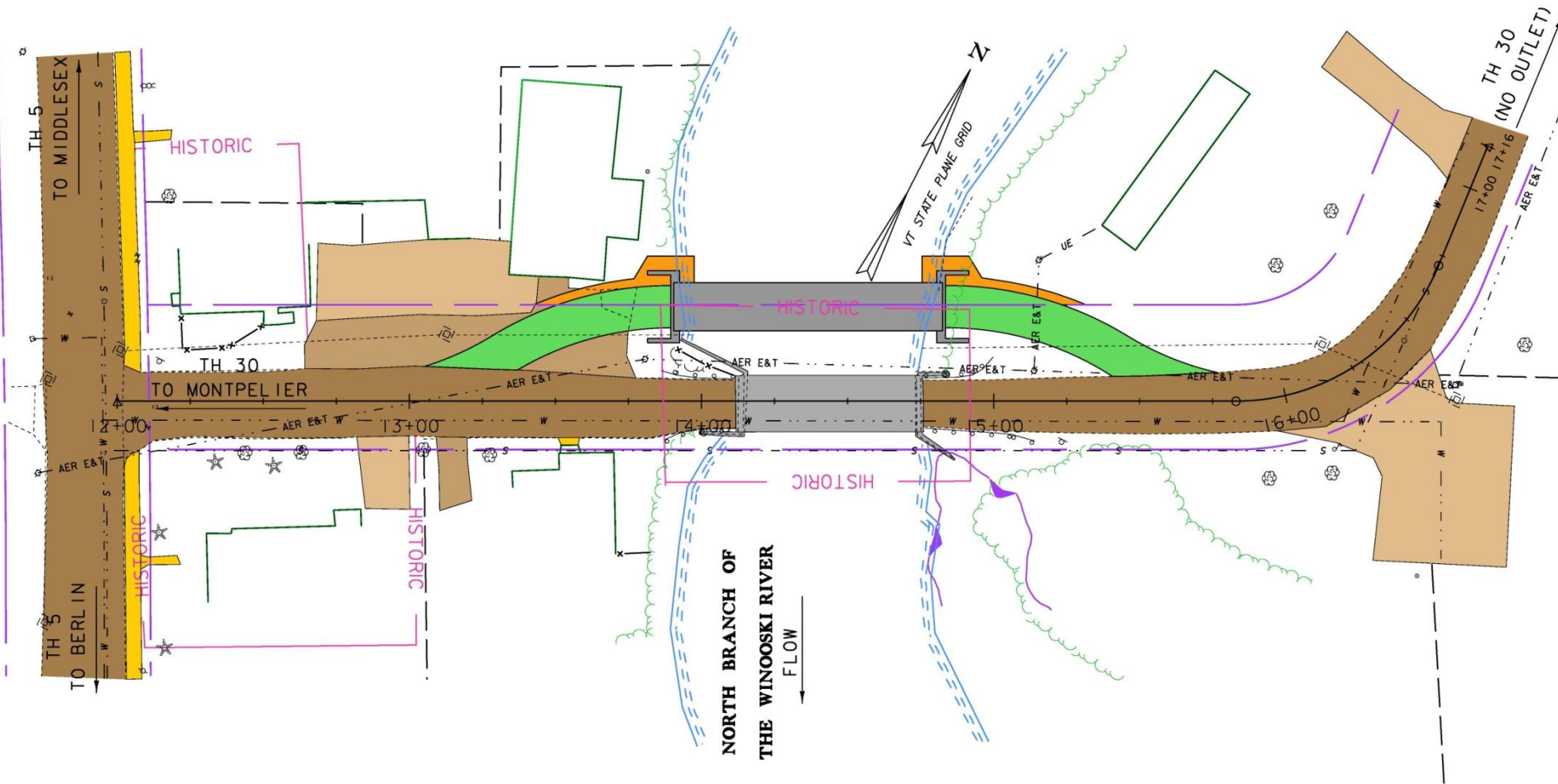
# Alternate Access Routes Considered



# Temporary Bridge

- One-lane bridge with alternating traffic (no lights)
- Traffic congestion and/or conflicts w/ one-lane
- Environmental & Property Impacts
- Long project development process
- High cost of development and construction
- This is the only feasible option and will be used with the alternatives considered

# One-Lane Temporary Bridge





# Alternatives Matrix

	Deck Replacement w/ Temp Bridge	Superstructure Replacement w/ Temp Bridge	Complete Replacement w/ Temp Bridge
Temporary Bridge	\$150,000	\$150,000	\$150,000
Construction w/ CE + Contingencies	\$750,100	\$825,500	\$1,255,000
Preliminary Engineering	\$155,800	\$171,500	\$251,000
Right of Way	\$74,000	\$74,000	\$74,000
<b>Total Project Cost</b>	<b>\$979,900</b>	<b>\$1,071,000</b>	<b>\$1,580,000</b>
<b>City Share</b>	<b>\$48,995 (5%)</b>	<b>\$53,550 (5%)</b>	<b>\$158,000 (10%)</b>
Design Life	30 Years	40 Years	80 Years
Project Development Duration	4 years	4 years	4 years
Construction Duration	18 months	18 months	18 months
Closure Duration	None	None	None

# Conclusion and Recommendation

VAOT recommends a complete bridge replacement with traffic maintained on a one-lane temporary bridge

Comments on recommendation

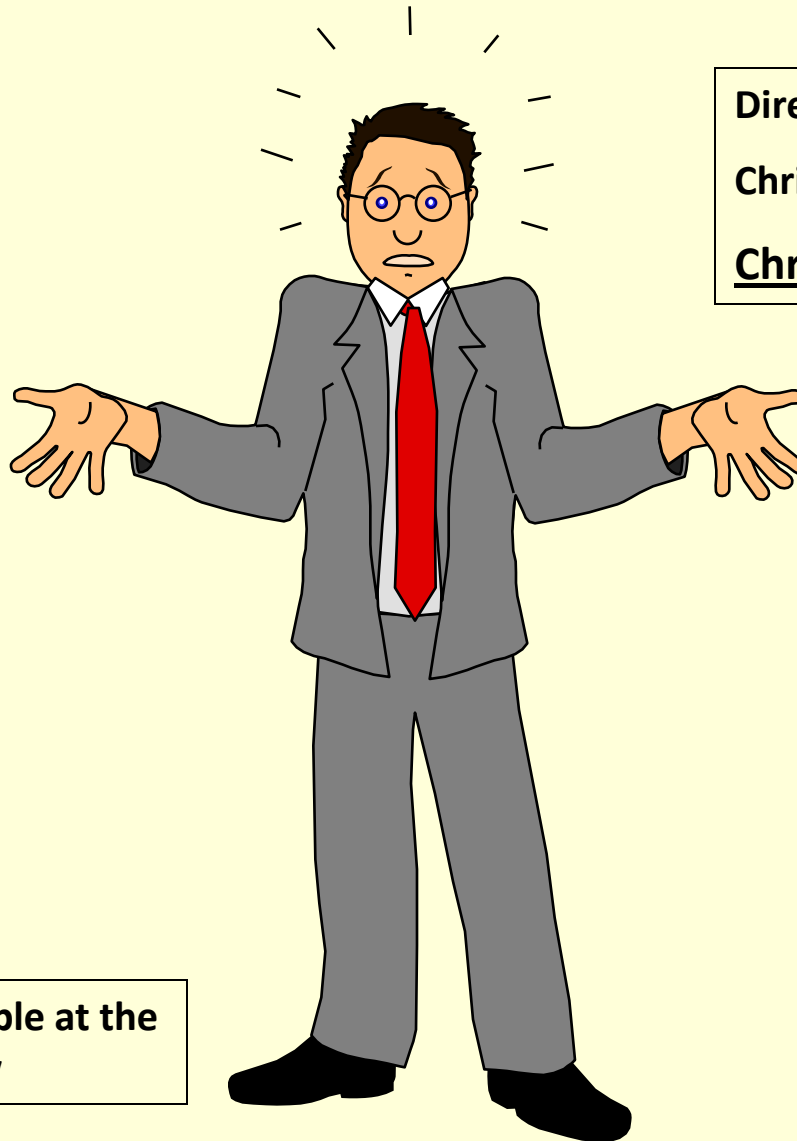
- All deficiencies addressed
- Long term 80 year fix
- Cost and time to acquire temporary bridge will be better spent on longer duration fix

## Next Steps

This is a list of a few important activities expected in the near future and is not a complete list of activities.

- Wait to hear Town response to recommendation
- Develop Conceptual Plans and submit for review
- Request another public meeting
- Hold meeting to present Conceptual Plans
- Discuss if Town wants to take responsibility for any of the Right-of-Way activities to expedite the project

# Questions



Direct any questions to:

Christopher P. Williams, P.E.

[Chris.Williams@State.VT.US](mailto:Chris.Williams@State.VT.US)

This presentation is available at the  
web address shown below

<https://outside.vermont.gov/agency/vtrans/external/Projects/Structures/13J082>