PUBLIC INVOLVEMENT MEETING

Barre City Vermont – February 22nd, 2024

Bridge 308 on the Washington County Railroad, Montpelier & Barre Division

VTrans Project: Barre City WACR(22)

Jacobs

VTrans Working to Get You There
VERMONT AGENCY OF TRANSPORTATION

Participants

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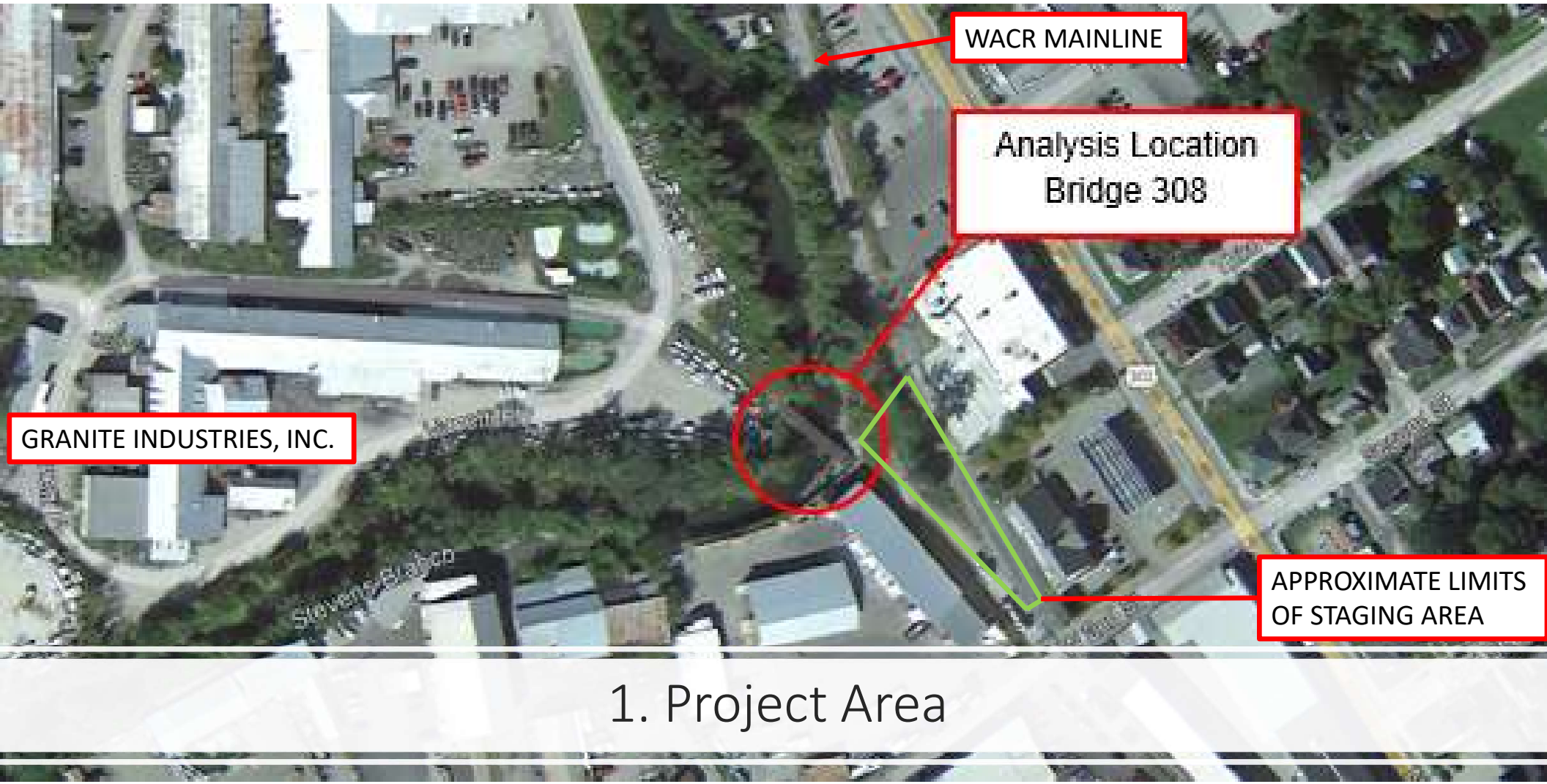
John Wilson, PE - Jacobs Project Manager

Agenda

1. **PROJECT AREA**
2. **OVERVIEW OF PROJECT SCOPE OF WORK**
3. **EXISTING CONDITIONS**
4. **ENVIRONMENTAL RESOURCES**
5. **RIGHT-OF-WAY**
6. **SITE UTILITIES**
7. **OVERVIEW OF BRIDGE ALTERNATIVES**
8. **HYDRAULIC ANALYSIS**
9. **CONCLUSIONS**
10. **DISCUSSION OF NEXT STEPS AND SCHEDULE**
11. **PUBLIC INPUT/QUESTIONS**



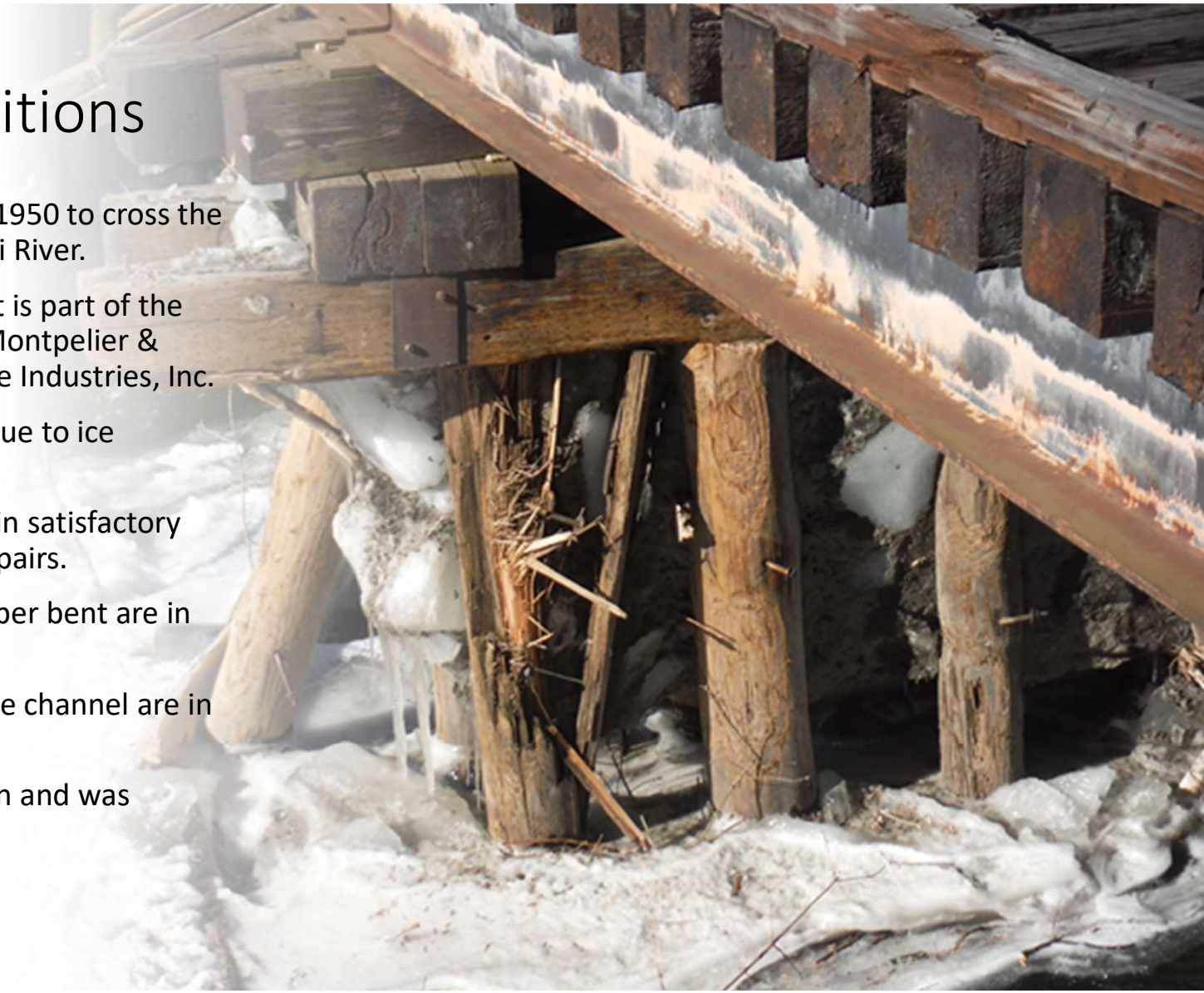
1. Project Area

2. Overview of Project Scope of Work

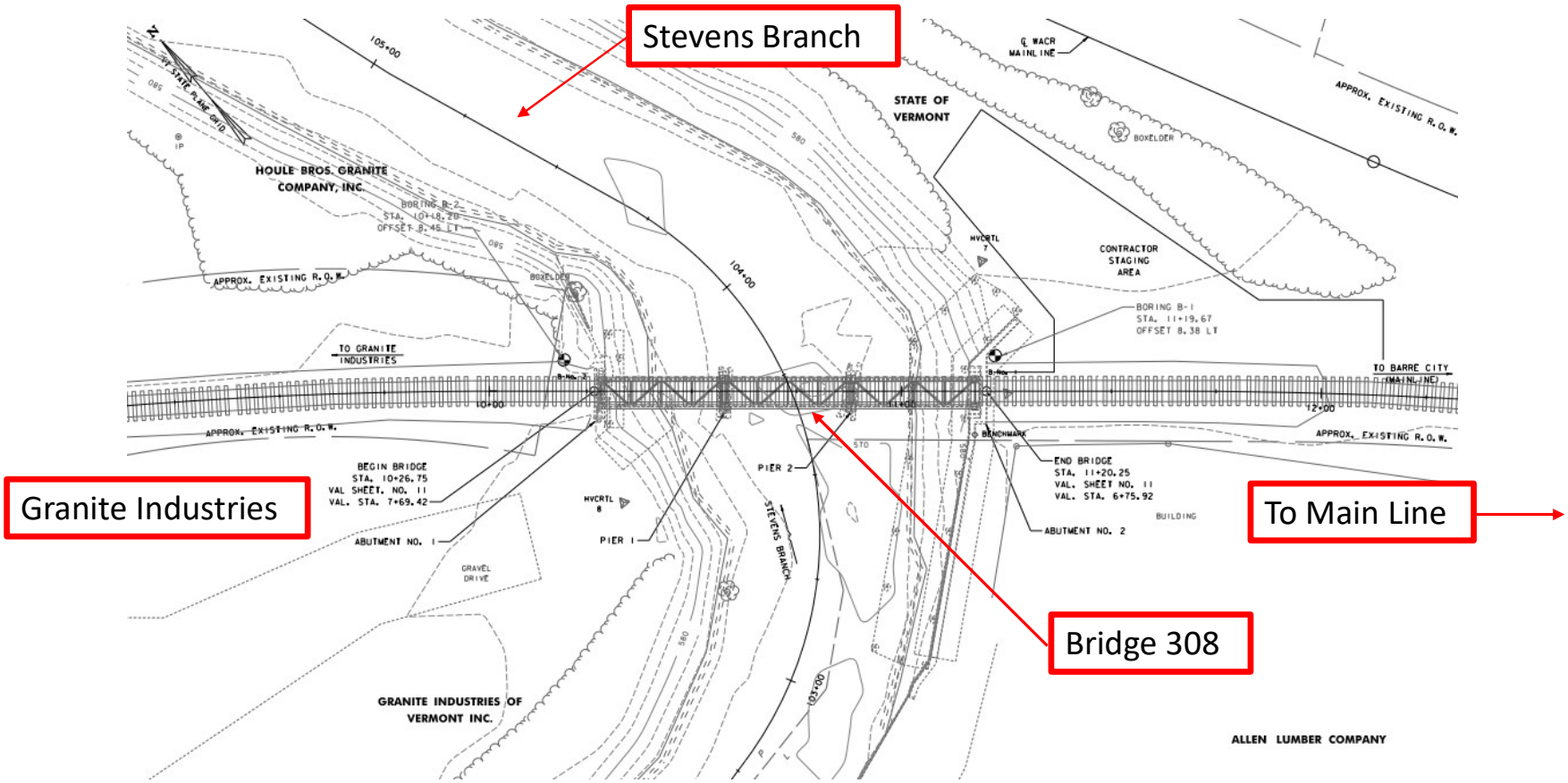
- The Vermont Agency of Transportation has received a FEMA Building Resilient Infrastructure and Communities (BRIC) Grant to study the alternatives available at this bridge location.
- Review existing hydraulic data and obtain additional data such as survey and resource evaluation.
- Complete hydrologic study to determine peak flow rates for several flooding events ranging from 2-year to 500-year.
- Complete hydraulic modeling within the immediate vicinity of the bridge to compare/evaluate effects of proposed bridge alternatives.
- Alternatives containing a pier in the river were modeled with “debris” to resemble the affects of debris, ice and logs.
- Hydraulic modeling of Stevens Branch beyond the limits of this bridge is outside the scope of this project.
- Determine specifics of the proposed bridge alternatives sufficient to create hydraulic modeling.
- Complete hydraulic analysis of each proposed bridge alternative and compare/evaluate to existing conditions.
- Provide cost estimates for each of the proposed alternatives.
- Conduct Local Concerns Meeting and Public Involvement Meeting.
- Determine preferred alternative and complete a FEMA Benefit Cost Analysis and submit Alternatives Analysis Report.

3. Existing Conditions

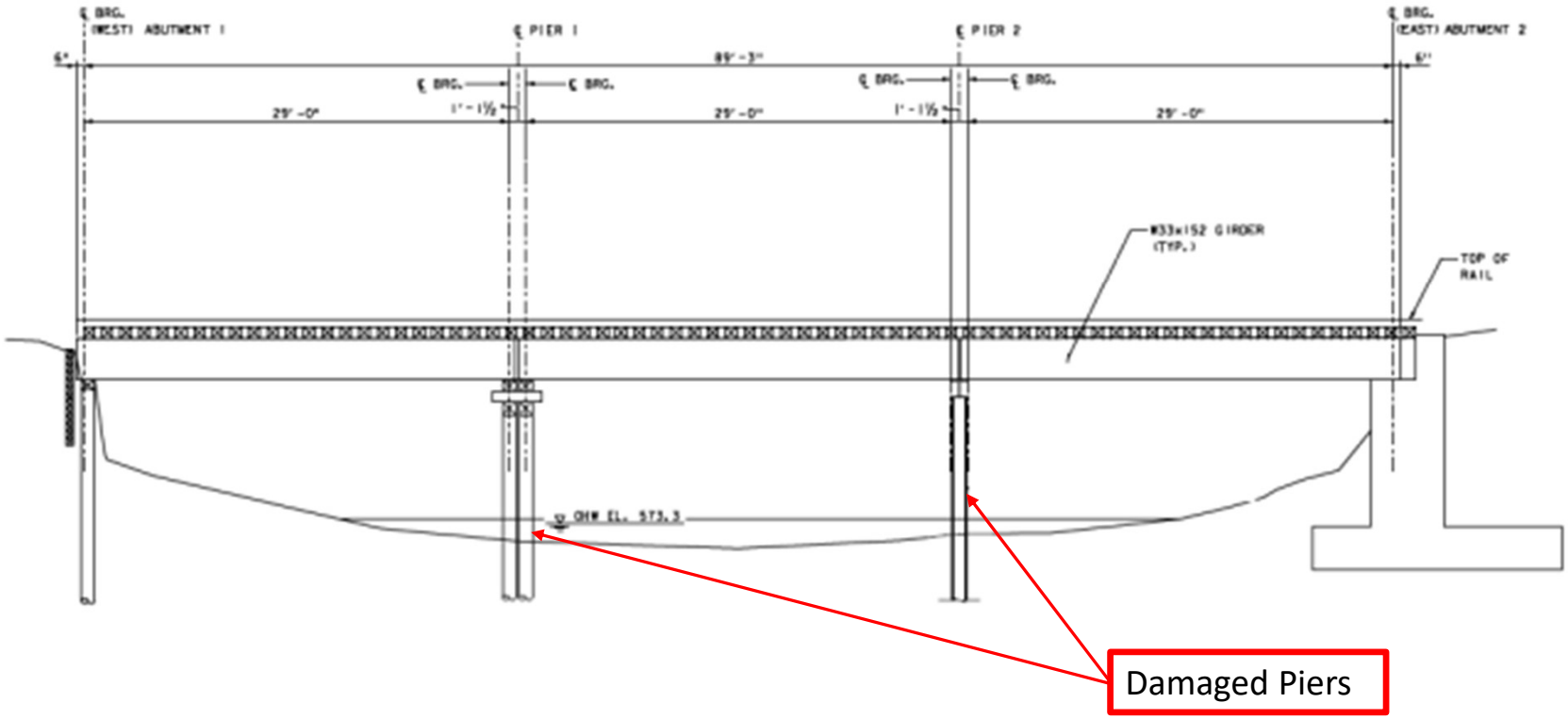
- Bridge 308 was constructed in 1950 to cross the Stevens Branch of the Winooski River.
- The bridge is on a spur line that is part of the Washington County Railroad, Montpelier & Barre Division to service Granite Industries, Inc.
- The bridge is currently closed due to ice damage to the piers.
- The superstructure girders are in satisfactory condition and require minor repairs.
- Abutment 1 block wall and timber bent are in satisfactory condition.
- The two timber bents within the channel are in serious condition.
- Abutment 2 is in good condition and was recently replaced in 2013.



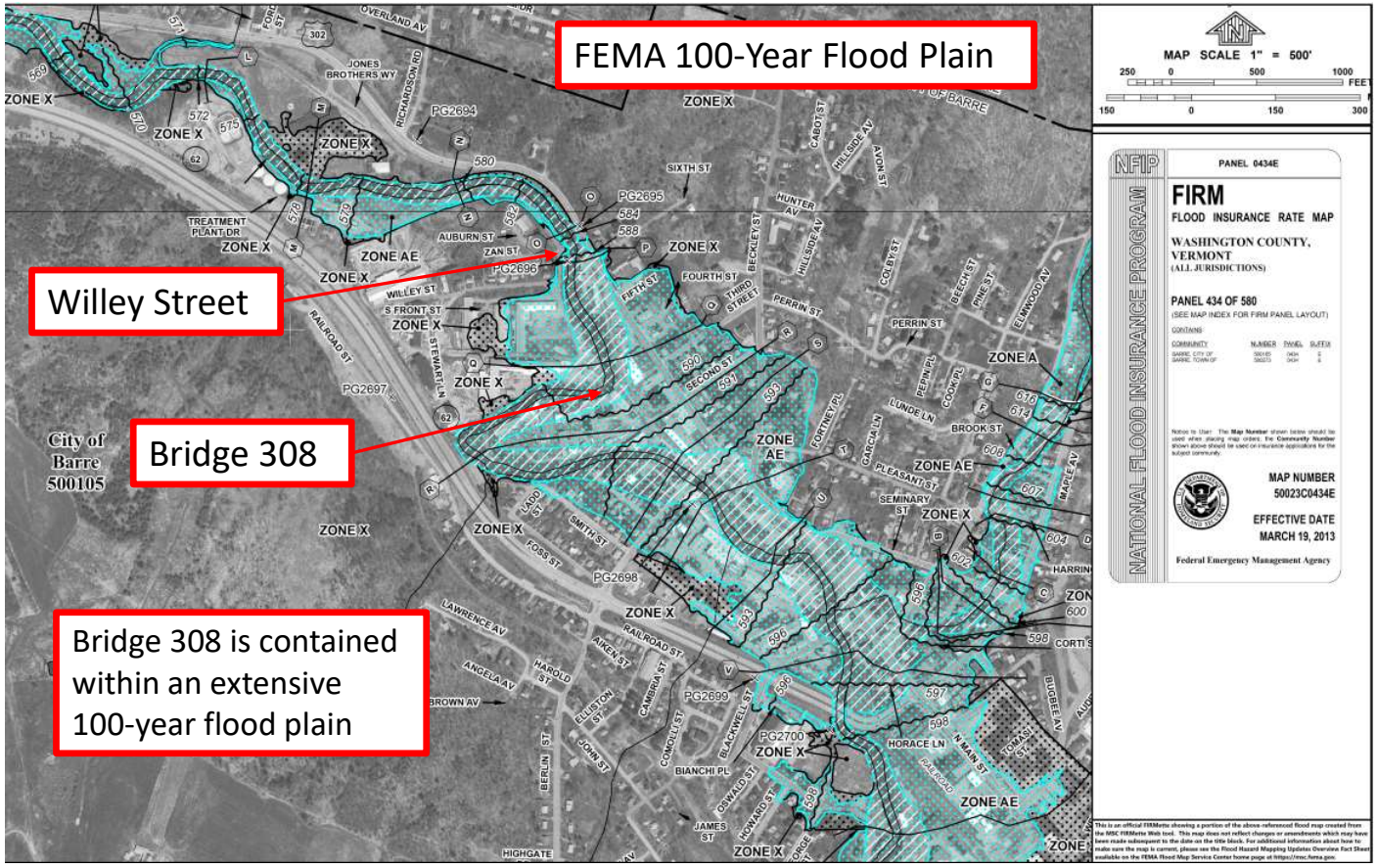
Bridge Site Plan



Existing Bridge Elevation



FEMA FIRMETTE



4. ENVIROMENTAL RESOURCES

The following resources were identified as nonexistent within the site or having no adverse affect:

*Archeological *Historic *Aquatic Organism *Agricultural Soils *Wildlife Habitat *6(f) Properties *Wild Scenic Rivers *Act 250 *Protected Lands *Us Coast Guard – Not Navigable * Lakes and Ponds *Scenic Highway/Byway *Operational Stormwater

The following resources are to be considered during design improvements to the site:

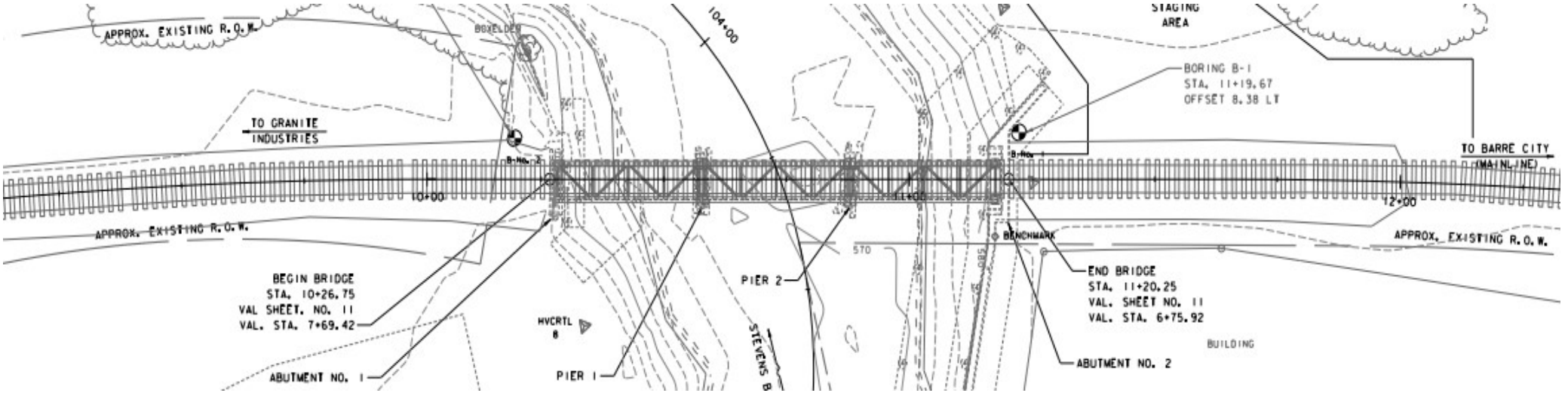
- **Wetlands/Watercourses**: There will be minor temporal impacts to the river during the removal of the existing piles and the installation of the new steel piles. Work will likely qualify for the VT COE General Permit.
- **Rare, Threatened and Endangered Species**: The project is within the northern long-eared bat, Myotis septentrionalis (state endangered, federally T) range.
- **Hazardous Waste**: A known hazardous waste site is identified within the proposed project area, however, impact to this site is not anticipated.
- **Contaminated Soils**: The proposed project is located within a mapped Urban Background Soils area. Disturbed soils within this project should be expected to be kept on site or follow notice to bidders' guidance.
- **FEMA Floodplains**: There are FEMA Floodplains mapped within the project area and a Flood Hazard Area/ River Corridor Permit may be required.
- **River Corridor**: There are River Corridors mapped within the project area and a Flood Hazard Area/ River Corridor Permit may be required if there are impacts.
- **Environmental Justice**: There is an EJ low-income population within the proposed projects area based upon the EPA EJ Screen online mapping tool.

5. RAILROAD RIGHT-OF-WAY

- Proposed work for all alternatives presented is contained within the Railroad Right-Of-Way.
- Access and staging areas located to the east of the bridge includes access to the rail corridor from West 2nd Street.
- Staging area at the east approach is contained within the Railroad Right-Of-Way.
- Potential contractor access and staging areas located to the west of the bridge would necessitate an agreement with the property owners of Granite Industries.

6. SITE UTILITIES

- Barre City owns both water lines and sewer lines.
- Overhead aerial lines owned by Charter Communications, Consolidated Communications, Green Mountain Power, and Vermont Telephone Company.
- It is anticipated that these utilities would not require adjustment as part of this project.



7. Overview of Bridge Alternatives

Proposed Alternatives:

- Alternative #1: Existing bridge remains in place. Debris is not modeled.
- Alternative #1A: Same as Alternative 1, with debris modeling.
- Alternative #2: Bridge Repair - replace damaged piers.
- Alternative #2A: Same as Alternative #2, with debris modeling
- Alternative #3: New 2 span bridge – one pier at the center of the span.
- Alternative #3A: Same as Alternative #3, with debris modeling.
- Alternative #4: New single span bridge – no piers.
- Alternative #5: Removal of the existing superstructure and piers.
- Alternative #6: Removal of the existing superstructure, piers, and abutment 1.

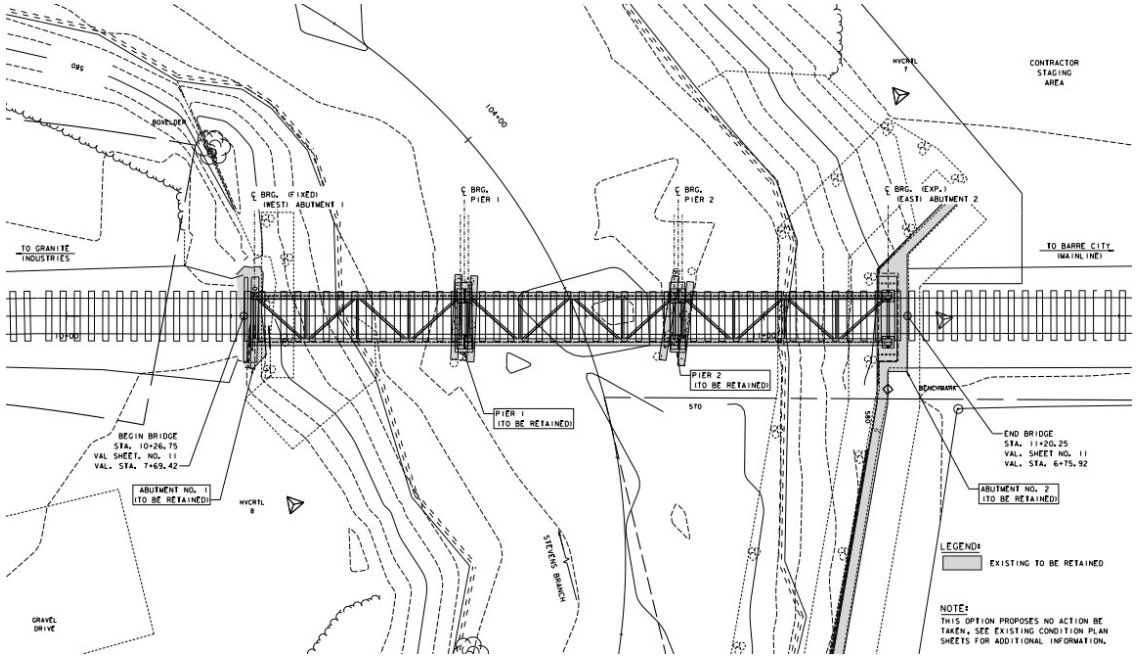
Bridge Alternative 1: No Action

Pros:

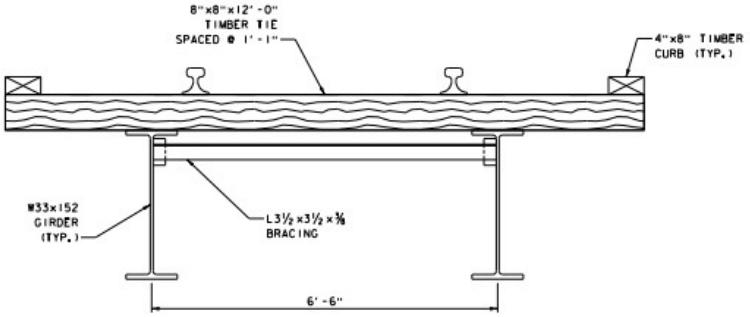
- Least expensive option

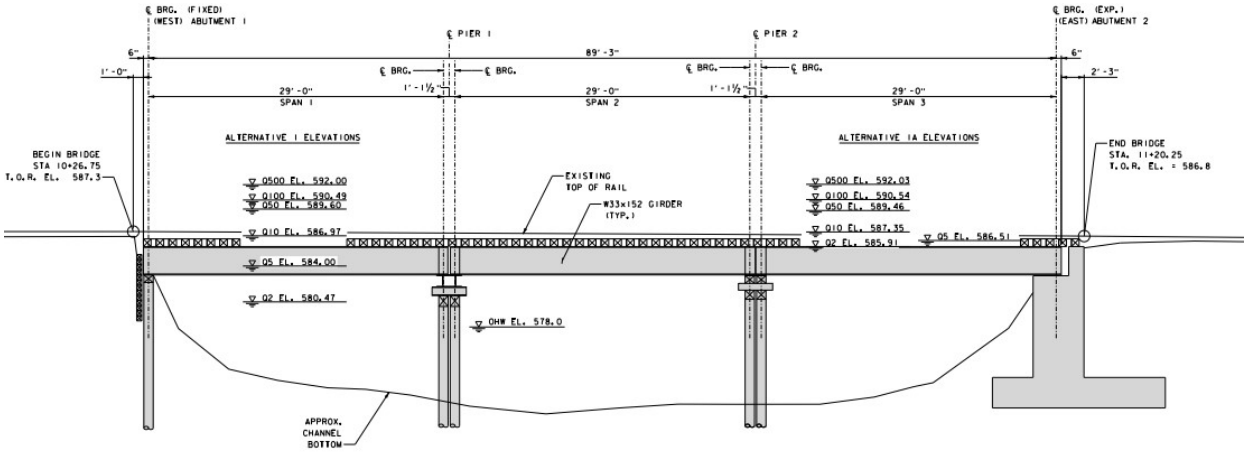
Cons:

- Does not re-establish rail traffic
- Increases local truck traffic for movement of goods by the customers once served by rail
- Does not improve ice/debris build-up
- Ice/debris maintenance is still required
- Future removal will still be required as the existing bridge elements deteriorate / fail



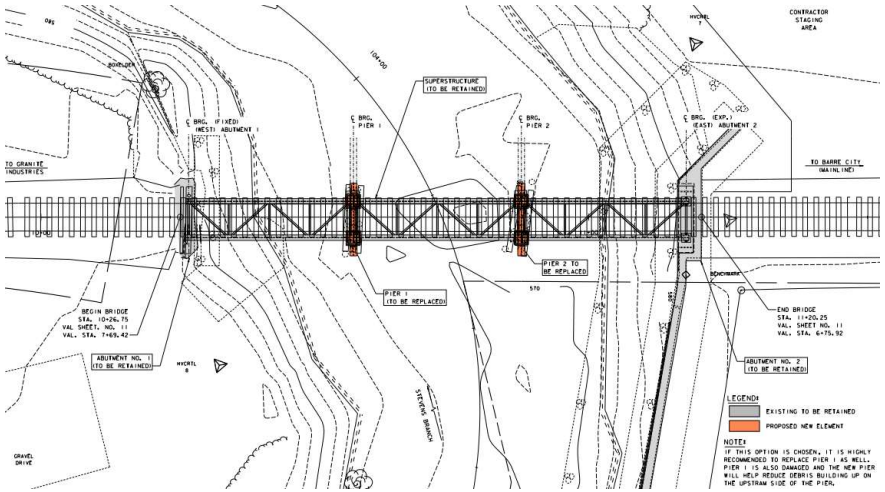
Bridge Alternative 1: No Action (CONT'D)





- Alternative 1 (Existing bridge remains in place, debris is not modeled) The 10%, 2%, 1%, and 0.2% floods all overtop the existing structure. We do not recommend this alternative, if the bridge is not put back in service, we recommend alternative 6, remove the superstructure, piers, and abutment 1.
- Alternative 1A (Same as Alternative 1, with debris modeling) The water surface elevation with debris modeling is most impacted in the smaller 50% and 20% annual chance floods. Although the 50% and 20% flood events do increase the water surface elevations, the flood events are contained within the channel banks. The 10%, 2%, 1%, and 0.2% floods were not affected.

Bridge Alternative 2: Bridge Repair



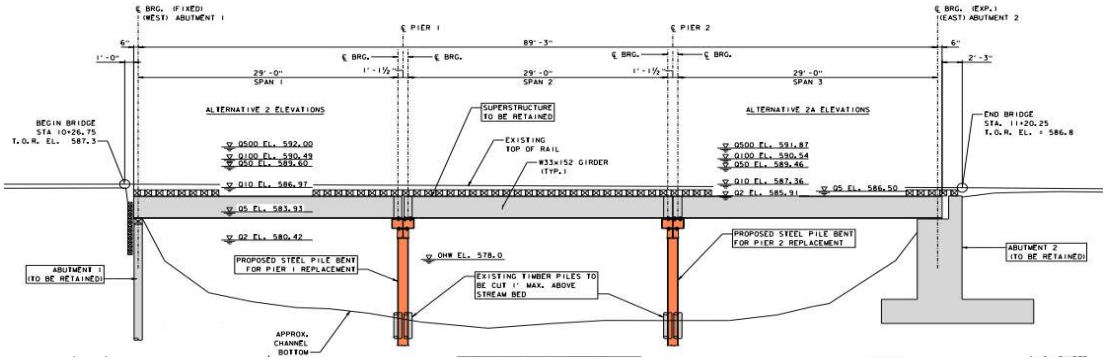
Pros:

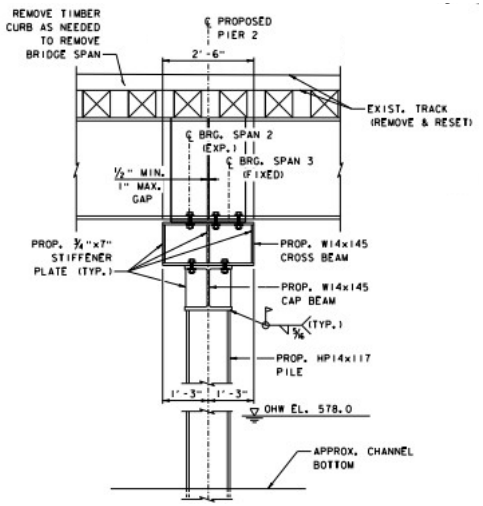
- Re-establishes rail traffic thus reducing local truck traffic for the customers served by rail.
- Cost of Alternative 2 is less than Alternatives 3 & 4 if re-establishing rail traffic.
- Alternative 2 can be designed and constructed in a reduced amount of time as compared to Alternatives 3 & 4.
- Service life of the structure is extended by 25 years.
- Replacing the piers with consideration of future design loading allows for the piers to be maintained for a future superstructure replacement.
- Improves resiliency for ice/debris build-up with single row of piles rather than double row of piles.
- Superstructure rehabilitation will allow 286 kip cars over the bridge and remove the current load restriction limit to 263 kip car.
- The profile is unchanged, and modification of adjacent roadway crossing is not needed.
- There will be no impacts on adjacent properties, utilities, or environmental resources.

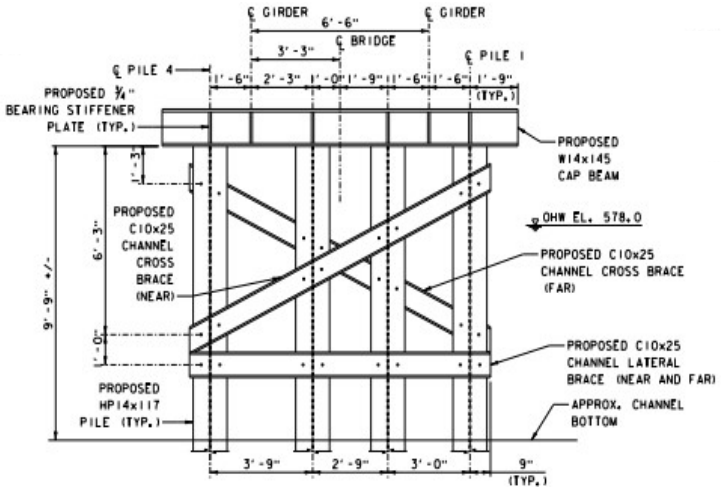
Cons:

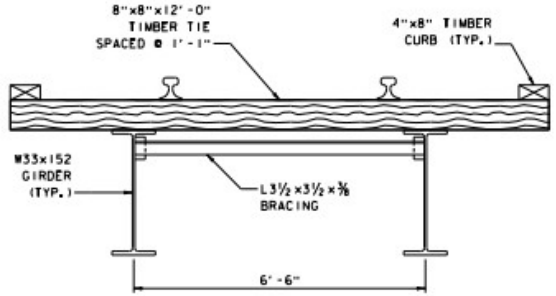
- This solution provides an extension of the current bridges service life of 25 years, which is considerably less than the service lives provided by Alternatives 3 and 4 of 75 years.
- The steel piles proposed for the piers will have an increased ice flow durability, however the possibility of larger logs “spanning” across the piers still exists.

Bridge Alternative 2: Bridge Repair (CONT'D)



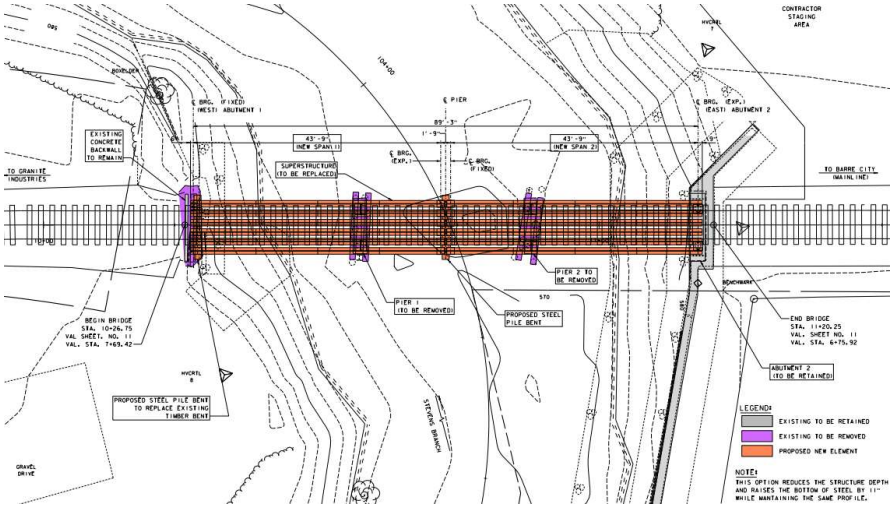






- Alternative 2 (Bridge repair - replace damaged piers, debris not modeled) The water surface elevations for the smaller 50% and 20% annual chance floods decreased slightly compared to the existing bridge while the 10%, 2%, 1%, and 0.2% floods provided the same results as alternative 1.
- Alternative 2A, (Same as Alternative 2, with debris modeling) The water surface elevations were nearly identical to the water surface elevations in Alternative 1A as both options contain 2 piers in the channel. Like alternative 1A, the water surface elevation with debris modeling is most impacted in the smaller 50% and 20% annual chance floods. Although the 50% and 20% flood events do increase the water surface elevations with debris modeled, the flood events are contained within the channel banks. The 10%, 2%, 1%, and 0.2% floods were not affected.

Bridge Alternative 3: New Two-Span Structure



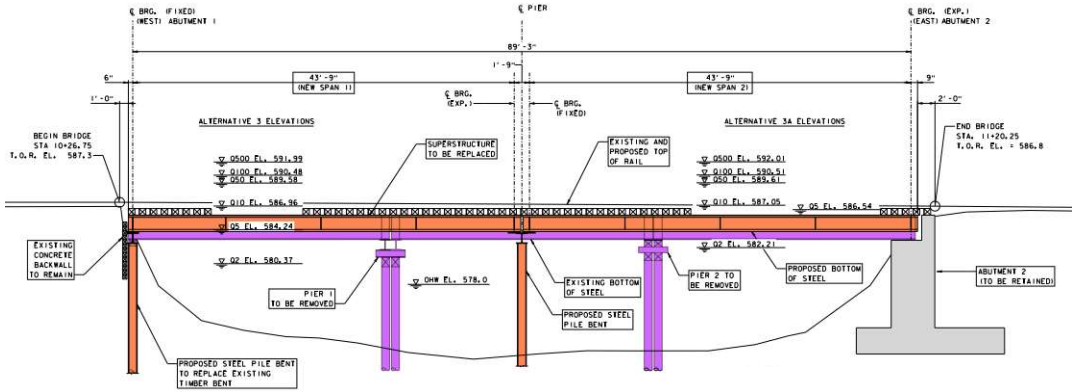
Pros:

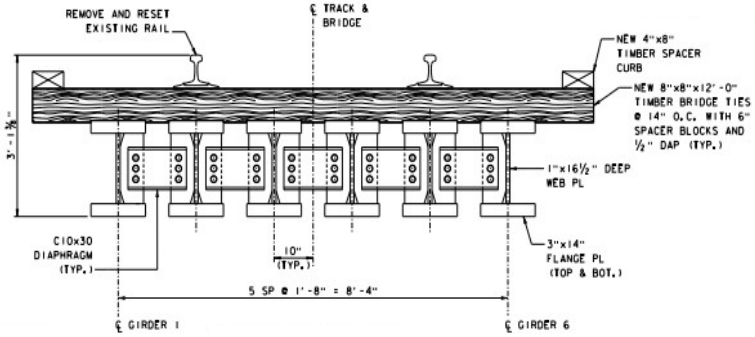
- Re-establishes rail traffic thus reducing local truck traffic for the customers served by rail.
- Service life of the structure is extended to 75 years.
- This option is significantly less expensive than Alternative 4 when considering bridge replacement.
- Improves resiliency and hydraulic performance for ice/debris build-up with a single pier in the channel versus 2 piers.
- There would be no load carrying capacity restriction of the bridge.
- There will be no impacts on adjacent properties, utilities, or environmental resources.
- Hydraulic characteristics of the brook will be slightly improved due to a single pier.
- Bridge and channel maintenance is significantly reduced if not completely mitigated due to the structure being new and this option only having one pier in the channel.

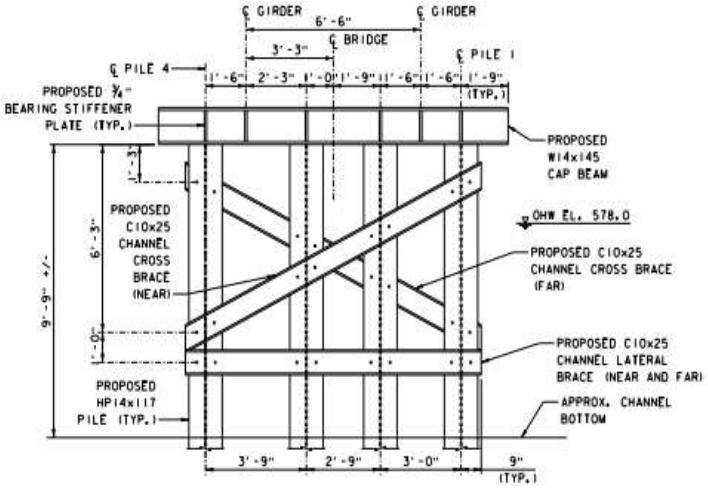
Cons:

- The cost of Alternative 3 is more than Alternative 2 when considering re-establishing rail traffic.
- The steel piers will have increased durability and significantly reduce ice/debris build-up; however, a pier will still be placed in the channel.
- This alternative requires longer design, fabrication, and construction durations relative to Alternative 2.

Bridge Alternative 3: New Two-Span Structure (CONT'D)

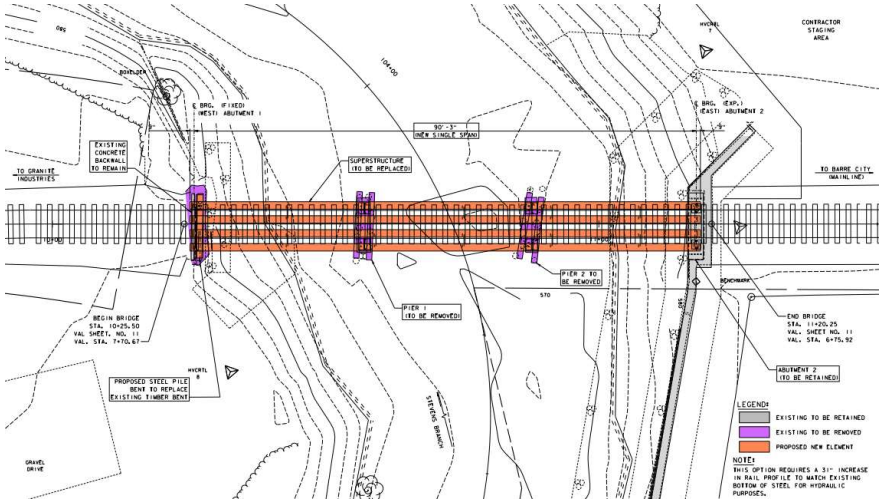






- Alternative 3 (New 2 span bridge – one pier at the center of the span, debris not modeled) The removal of one pier in the flow area results in a slight decrease of the water surface elevations for the 50% flood and a slight increase in the 20% flood. The larger 10%, 2%, 1%, and 0.2% floods are similar to alternative 1 and is expected to overtop the bridge structure.
- Alternative 3A (Same as Alternative 3, with debris modeling) The water surface elevation is reduced by 3.7 feet during the 50% flood and essentially unchanged for the 20% storm as compared to Alternative 1A. The water surface elevations in 10% and larger floods were not affected when compared to alternative 1A and alternative 3.

Bridge Alternative 4: New Single Span Structure



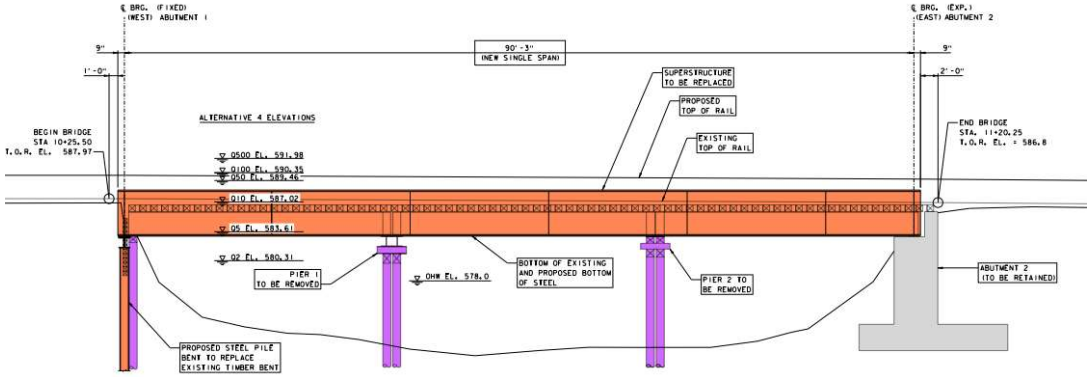
Pros:

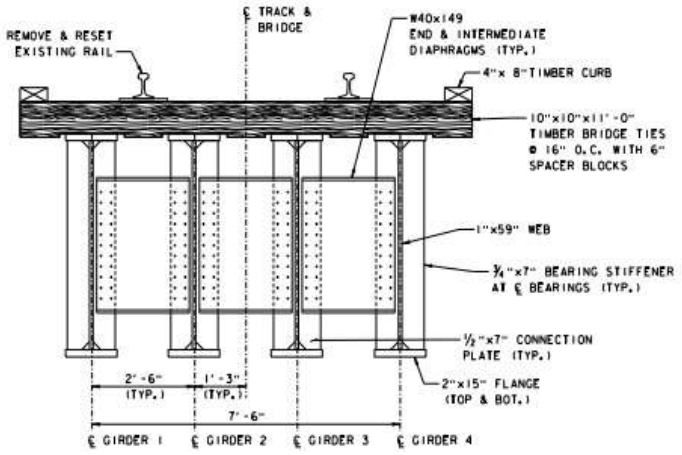
- Re-establishes rail traffic thus reducing local truck traffic for the customers served by rail.
- Service life of the structure is extended to 75 years.
- Improves resiliency and hydraulic performance for ice/debris build-up without pier in the channel.
- There would be no load carrying capacity restriction of the bridge.
- Hydraulic characteristics of the channel will be improved slightly by eliminating both piers.
- Bridge and channel maintenance is significantly reduced if not completely mitigated due to the structure being new and this option having no piers in the channel.

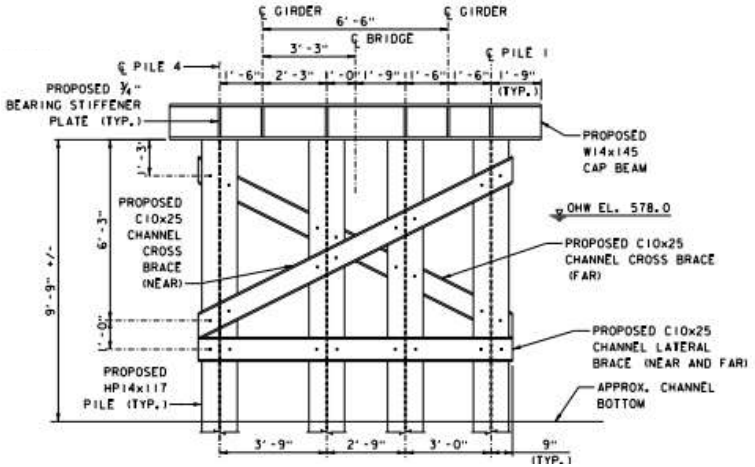
Cons:

- There will be significant impacts to the adjacent properties and utilities due to the vertical increase in profile.
- The increase in profile and subsequent building up of the track bed will create a dam effect within the flood plain.
- This alternative requires a longer design, manufacturing, and construction duration relative to Alternatives 2 and 3.
- This option is significantly more expensive than Alternatives 2 and 3 when considering bridge replacement.

Bridge Alternative 4: New Single Span Structure (CONT'D)







- Alternative 4 (New single span bridge – no piers) The water surface elevation at and upstream of the bridge are decreased in all floods by up to 5", except for the 10% flood which showed a slight increase of 1". Water surface elevations are decreased with no pier (thus no debris) in the channel but is offset by the deeper bridge superstructure since the 10% and larger flood events will overtop the bridge. This alternative is not recommended as the increased structure depth increases track elevation by 2.67 feet, creating a dam effect across the flood plain.

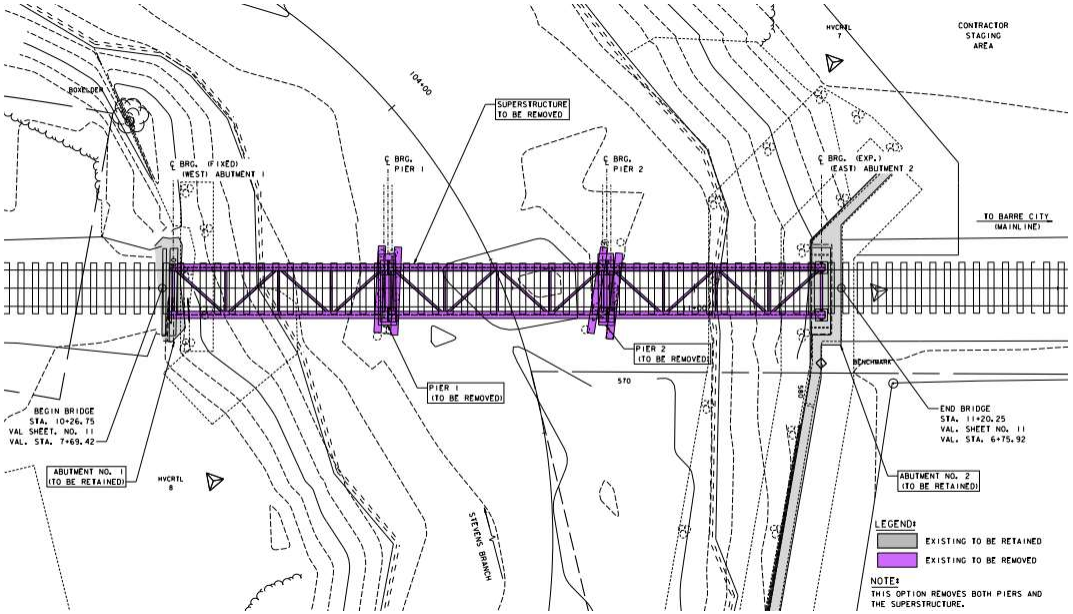
Bridge Alternative 5: Remove Superstructure and Piers

Pros:

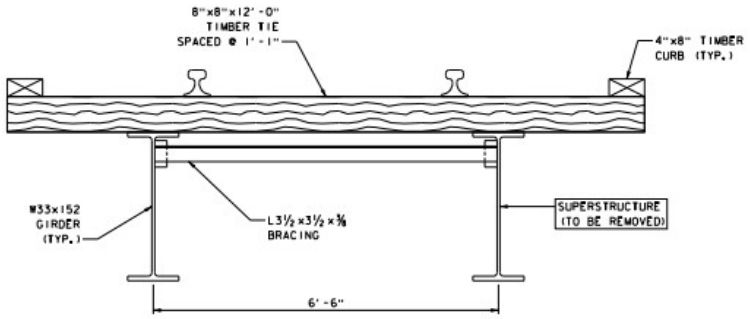
- Second least expensive option
- Eliminates ice/debris build-up for all flood events

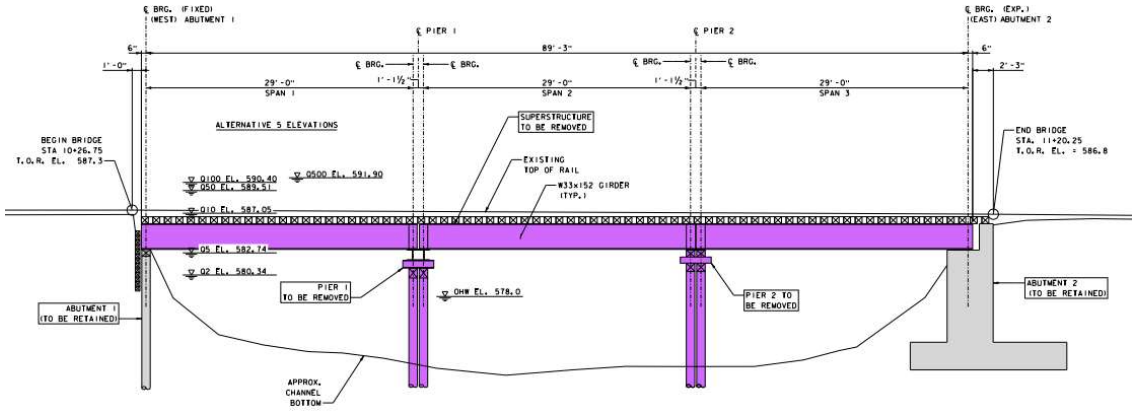
Cons:

- Does not re-establish rail traffic
- Increases local truck traffic for movement of goods by the customers once served by rail
- Future removal of abutment 1 required if the bridge is not replaced in the future.



Bridge Alternative 5: Remove Superstructure and Piers (CONT'D)





- Alternative 5 (Removal of the existing superstructure and piers) The water surface elevations at and upstream of the bridge decreased 1.2 feet in the 20% flood while remaining similar to Alternative 1 in all other flood events.
- The water surface elevations were reduced by 5.5 feet and 3.75 feet for the smallest 50% and 20% flood events as compared to Alternative 1A debris model, but unaffected by the larger flood events.

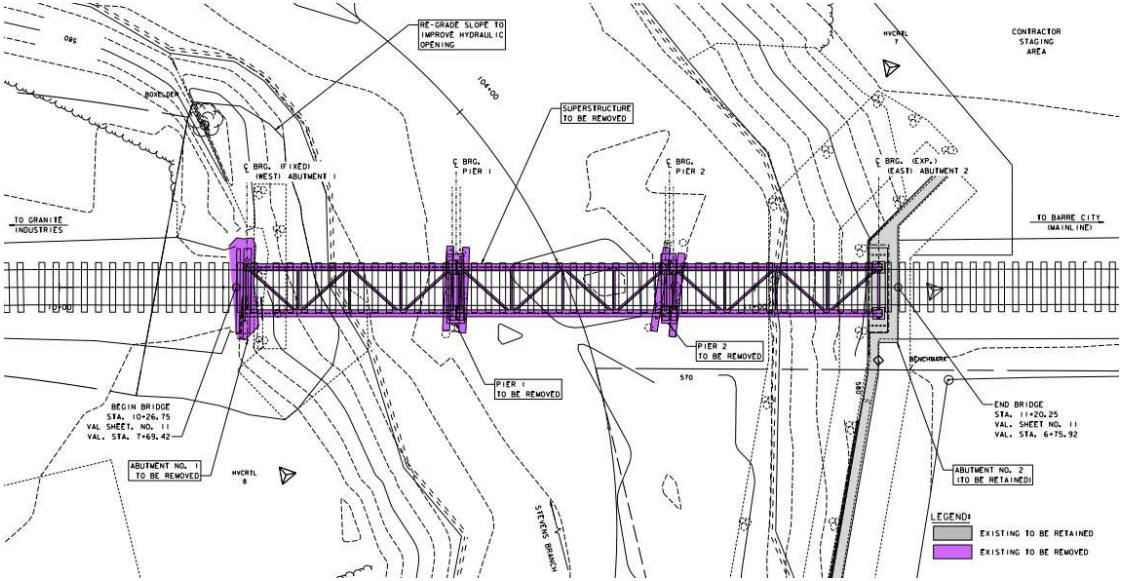
Bridge Alternative 6: Remove Superstructure, Piers, and Abutment 1

Pros:

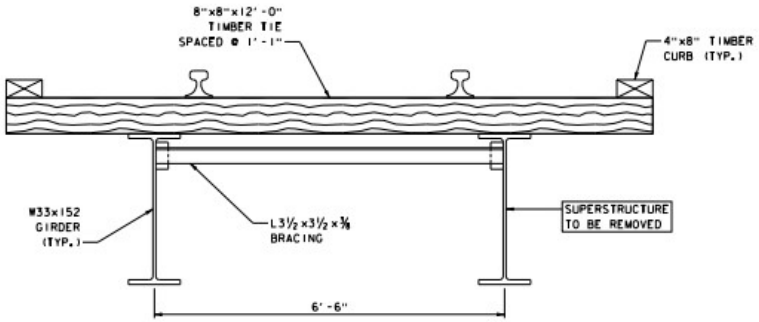
- Third least expensive option
- Eliminates ice/debris build-up for all flood events
- No need to remove abutment 1 in the future

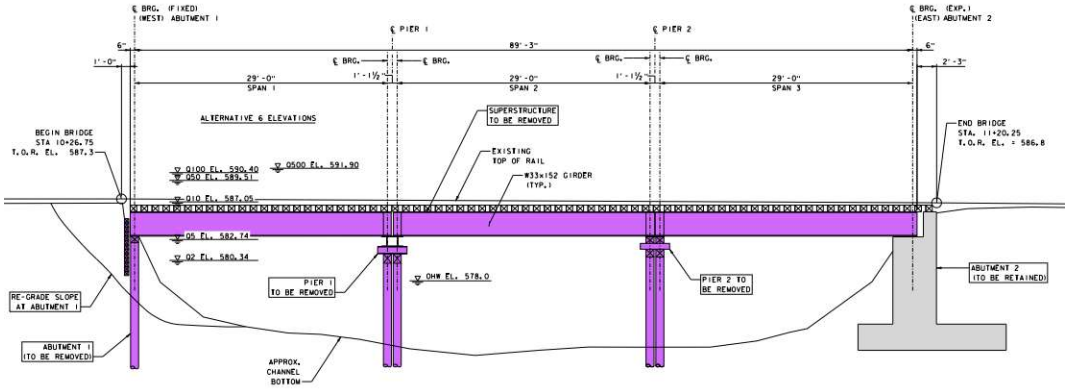
Cons:

- Does not re-establish rail traffic
- Increases local truck traffic for movement of goods by the customers once served by rail



Bridge Alternative 6: Remove Superstructure, Piers, and Abutment 1 (CONT'D)





- Alternative 6 (Removal of the existing superstructure, piers, and abutment 1) produced similar results as Alternative 5, as removing abutment 1 does not significantly increase the waterway. If the bridge is not put back in service, this alternative is recommended as it removes the piers from the channel and removes abutment 1 now rather than in a future project when the abutment begins to deteriorate over time.

8. HYDRAULIC ANALYSIS

Data Sources:

- Topographic ground survey (provided by Vermont Agency of Transportation), performed in Spring 2023.
- USGS Topographic Map, Barre West, 2018, 7.5 Minute Series.
- National Flood Insurance Program (NFIP), Flood Insurance Study (FIS) 50023CV001A for Washington County, Vermont, March 19, 2013.
- National Flood Insurance Program (NFIP), Flood Insurance Rate Map (FIRM):
- Stream Stats, USGS.

WATER SURFACE ELEVATION DIFFERENCES

Annual Chance Flood	Water Surface Elevation Differences at the Bridge (ft) (As compared to existing conditions of Alternative 1)								
	Alt 1	Alt 1A	Alt 2	Alt 2A	Alt 3	Alt 3A	Alt 4	Alt 5	Alt 6
50%	-	5.44	-0.05	5.44	-0.10	1.74	-0.16	-0.13	-0.13
20%	-	2.51	-0.07	2.50	0.24	2.54	-0.39	-1.26	-1.26
10%	-	0.38	0.00	0.39	-0.01	0.08	0.05	0.08	0.08
2%	-	-0.14	0.00	-0.14	-0.02	0.01	-0.14	-0.09	-0.09
1%	-	0.05	0.00	0.05	-0.01	0.02	-0.14	-0.09	-0.09
0.2%	-	0.03	0.00	-0.13	-0.01	0.01	-0.02	-0.10	-0.10

Analysis indicates that alternatives are most affected by only the two smallest flood events

9. CONCLUSIONS:

Bridge 308 Alternatives Project Cost Comparison

Jacobs

Alternative	Project Cost
BRIDGE ALTERNATIVE 1 (No Action)	$ 10,000.00
BRIDGE ALTERNATIVE 2 (Bridge Repair)	$ 824,600.00
BRIDGE ALTERNATIVE 3 (New Two-Span Structure)	$ 1,995,825.00
BRIDGE ALTERNATIVE 4 (New Single-Span Structure)	$ 3,996,731.25
BRIDGE ALTERNATIVE 5 (Remove Superstructure and Piers)	$ 325,000.00
BRIDGE ALTERNATIVE 6 (Remove Superstructure, Piers and Abutment 1)	$ 399,750.00

Alternative 3 is recommended :

- Alternative 3 restores rail service to customers, mitigating truck traffic on local roads.
- The structure depth is slightly reduced, improving hydraulic flow versus existing conditions.
- Two existing piers are replaced with a single pier, mitigating larger logs from spanning the piers.
- Service life of the structure is extended from 25 years (alternative 2) to 75 years for alternative 3.
- Top of rail profile is maintained and not elevated, mitigating adverse effects to the flood plain and adjacent roadway crossings.
- Environmental resource impacts are limited to the work within the waterway to remove the existing piers, similar to other alternatives.
- New bridge design allows bridge capacity to be met throughout the service life of the structure.
- Due to the new structure and single pier, bridge maintenance, channel maintenance, bridge repairs and bridge replacement is mitigated or reduced to minimal maintenance for 75 years.

10. Discussion of Next Steps and Anticipated Schedule

A. Select preferred alternative and complete FEMA Cost Benefit Analysis (March 2024)
B. Final coordination with stakeholders, VTrans and FEMA; Submit final Alternatives Analysis Report (May 2024)
C. Potential future funding for project advancement

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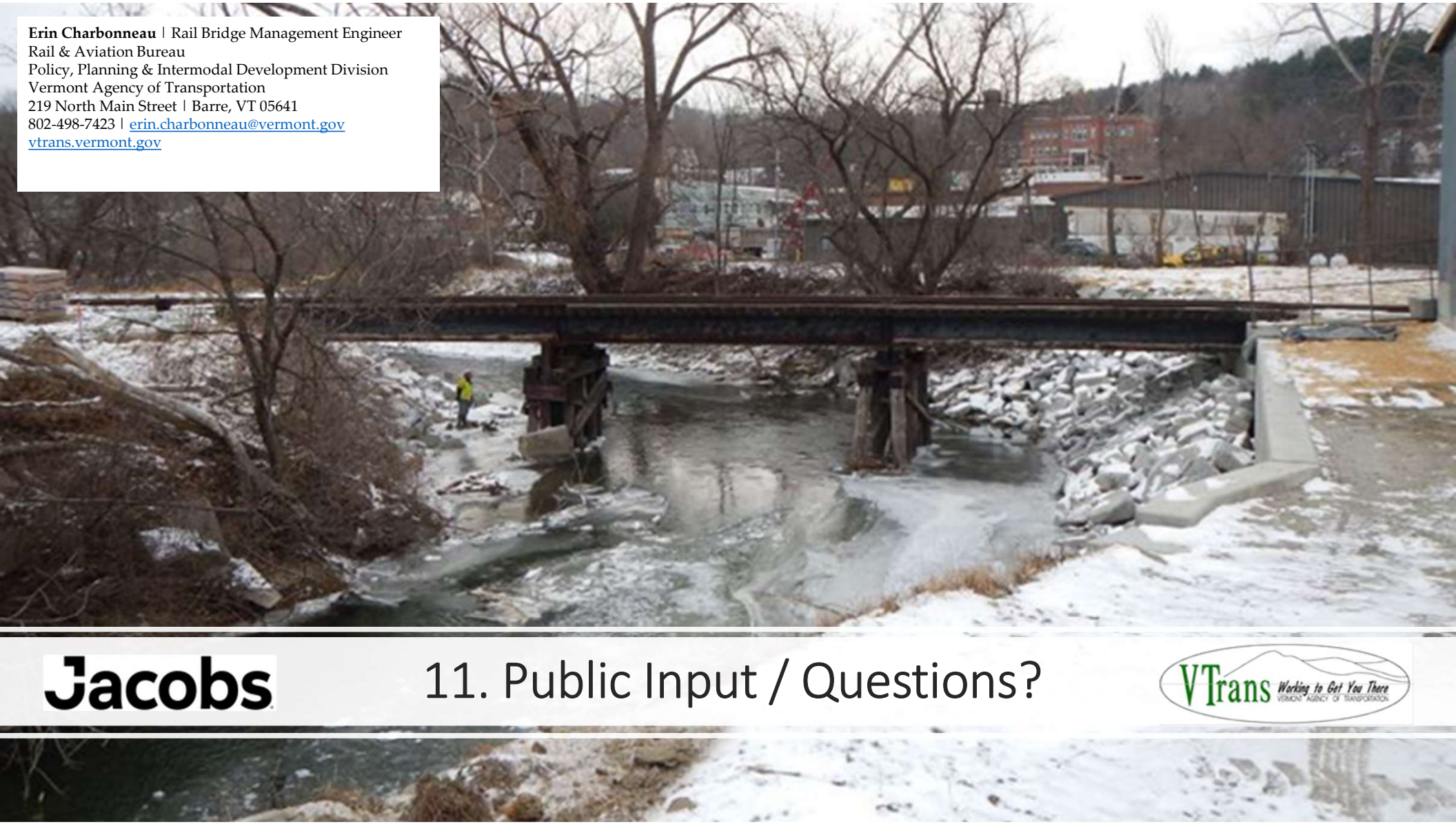
vtrans.vermont.gov

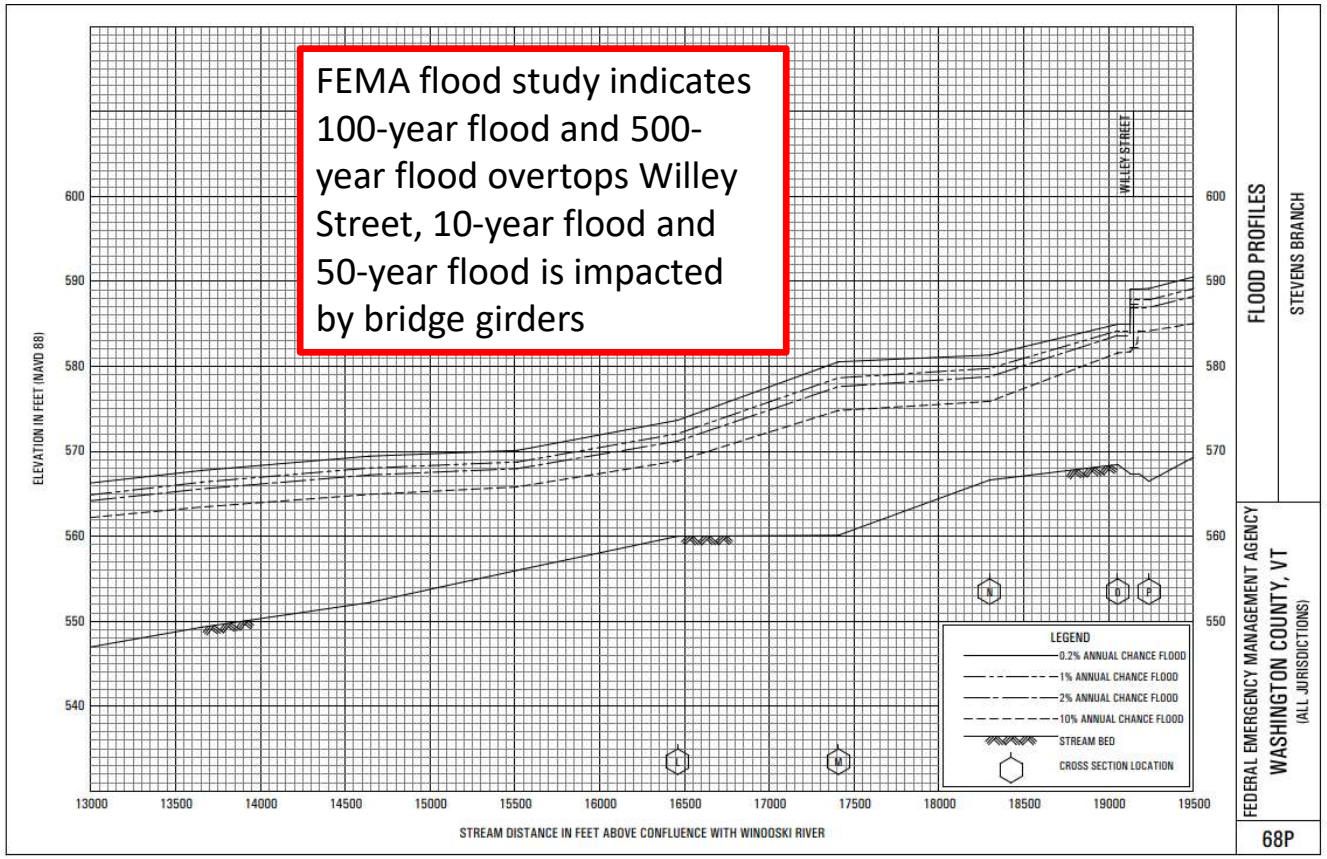


Jacobs

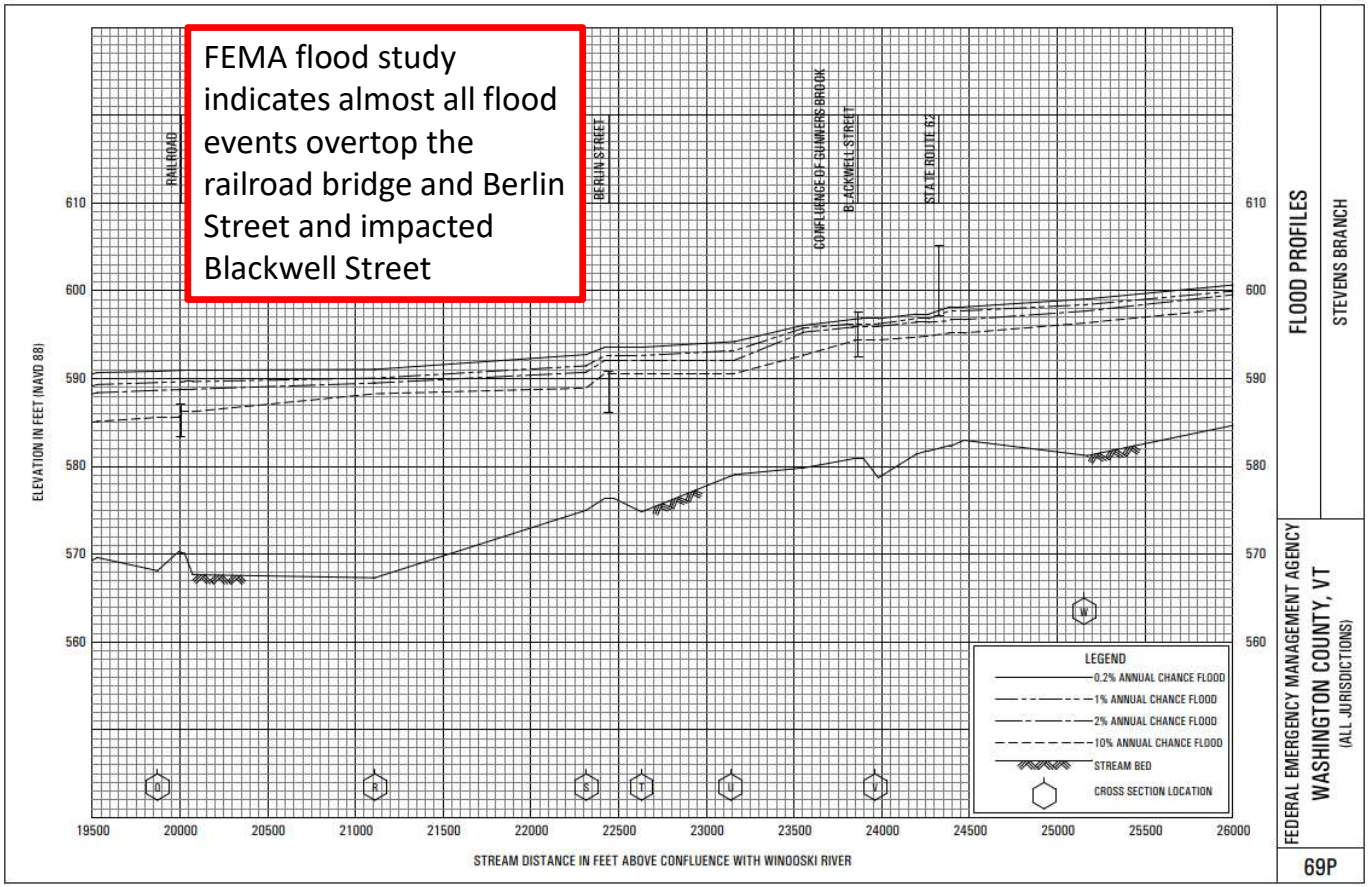
11. Public Input / Questions?

VTrans Working to Get You There
VERMONT AGENCY OF TRANSPORTATION

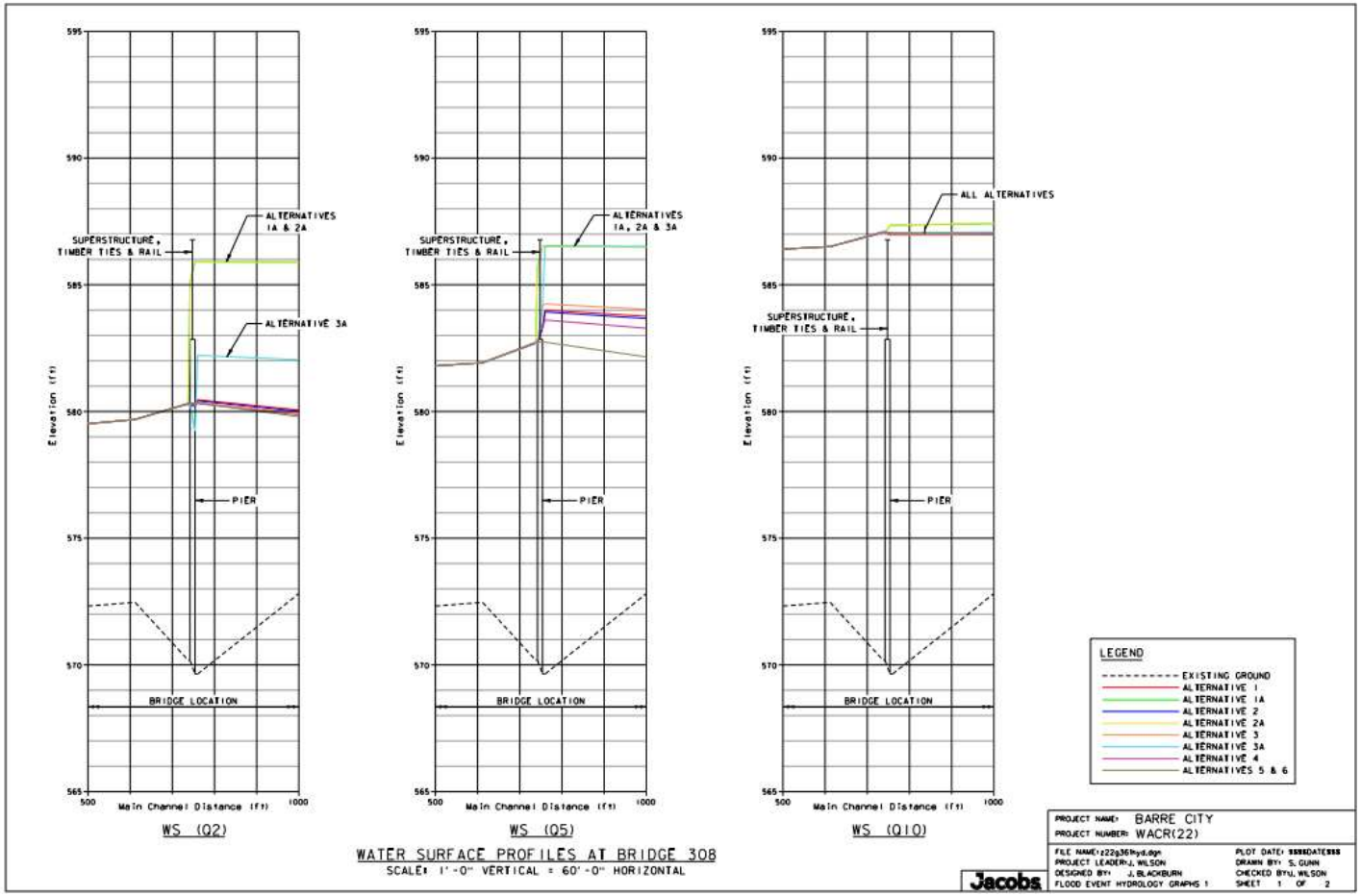
STEVENS BRANCH EXISTING FEMA FLOOD PROFILES



STEVENS BRANCH EXISTING FEMA FLOOD PROFILES (CONT'D)



FLOOD PROFILES



FLOOD PROFILES (CONT'D)