VERMONT
AGENCY OF TRANSPORTATION

US ROUTE 4 – BRIDGE 61 OVER OTTAUQUECHEE RIVER

QUECHEE GORGE
BRIDGE
PROJECT

Public Information Meeting on Conceptual Plans

November 29, 2018

Tonight's Agenda

- Introductions
- Project Overview
- Project Development Process
- Project Schedule
- Project Design
- Safety Barrier Research
- Conceptual Plans – Gill Engineering
- Safety Barrier Conceptual Options
- Questions and Discussion

Introductions

Vermont Agency of Transportation

- J. B. McCarthy, P. E., Project Manager
- Matt Langham, Regional Planning Coordinator
- Andrew Lemieux, Design Engineer

Gill Engineering

- Joe Gill, P. E.
- Amy Spera, P. E.

Fitzgerald & Halliday, Inc. – Public Outreach

- Jill Barrett
- Shawna Kitzman, AICP

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Project Overview

- Project added to Bridge Program – 2016
- Bi-Annual Bridge Inspection – noted deterioration of superstructure
- 2017 Report to Legislature on Suicide Prevention Alternatives
- “Forever” bridge due to the site and historical significance
- Funded for construction starting in calendar year 2021
- 80% Federal and 20% State funds

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Project Overview

2019 Capital Program

Agency of Transportation Multiyear Transportation Program

PROJECT INFORMATION	PHASE AND FUNDING	ESTIMATED TOTAL COST	ACTUAL EXPENDED THRU FY 2017	ESTIMATED CURRENT YEAR FY 2018	ESTIMATED BUDGET YEAR FY 2019	PROJECTED FY 2020	PROJECTED FY 2021	PROJECTED FY 2022	ESTIMATED COST TO COMPLETE
STATE HIGHWAY BRIDGES	PE	250,000	0	0	50,000	75,000	75,000	50,000	0
HARTFORD (QUECHEE)	ROW	0	0	0	0	0	0	0	0
NH 020-2(45)	CONST	5,000,000	0	0	0	0	0	2,000,000	3,000,000
	OTHER	0	0	0	0	0	0	0	0
Route:	TOTAL	5,250,000	0	0	50,000	75,000	75,000	2,050,000	3,000,000
US-4	Description:	REHABILITATION OF BRIDGE 61 (QUECHEE GORGE) ON US-4 IN THE TOWN OF HARFORD OVER THE OTTAUQUECHEE RIVER.							
Year Added: 2018									
Project Manager:	Comments:								
James McCarthy									
802-505-1451									

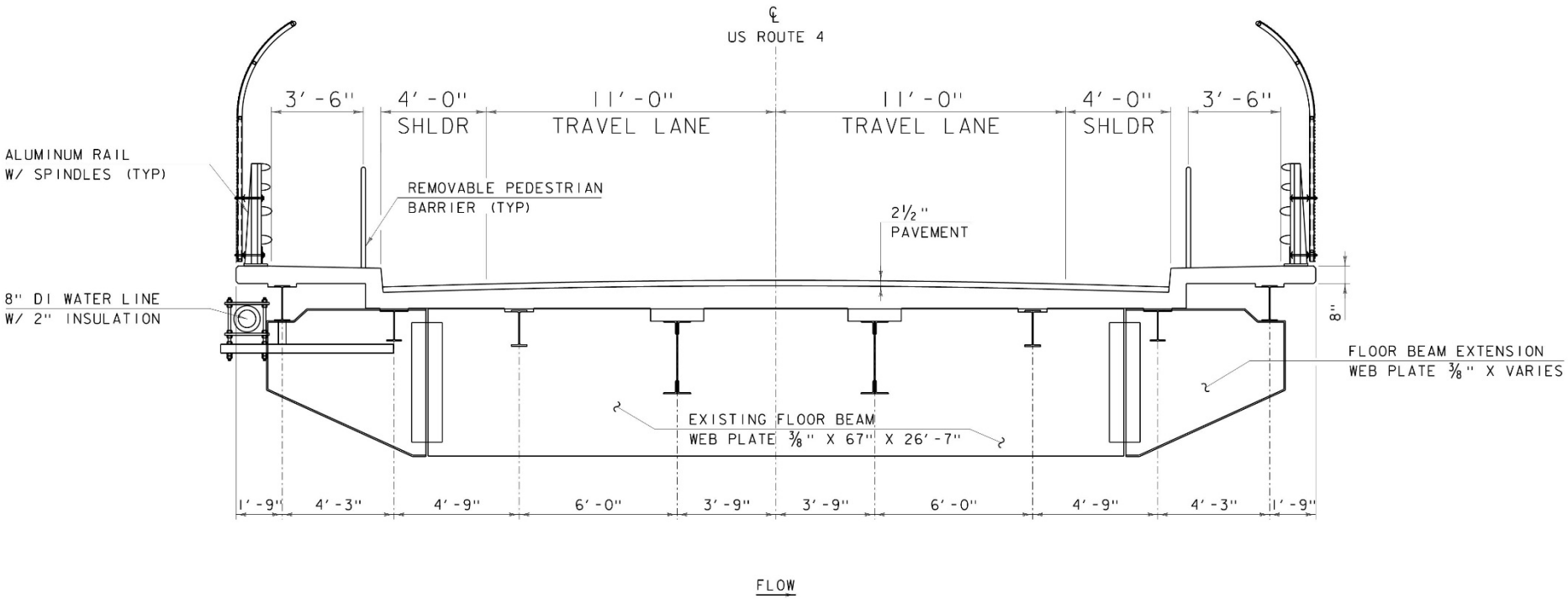
Project Overview

Existing Bridge Conditions

- 3-Span Steel Deck Arch
- Spans: 40’ – 188’ – 50’ over Ottauquechee River
- Owned by state of Vermont
- Constructed in 1911 as a railroad bridge
- 1930s converted to a highway bridge
- 1972 project added 4’-2” sidewalks
- 1988 project replaced interior sections of deck
- High crash location; 22 crashes in last 5 years

2018 Structural Condition	
Deck	7 - Good
Superstructure	5 - Fair
Substructure	6 - Satisfactory

Existing Bridge Cross Section



Project Overview

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Looking East Over Bridge

- Roadway Classification – Principal Arterial (on National Highway System - NHS)
- Average Daily Traffic of 10,000 autos
- Design Hourly Volume of 1,200
- % Trucks: 5.7
- Design speed of 35 mph
- Municipal utilities

Preventative Bridge Maintenance

Replacement of Deteriorated Steel Members

- Replace lattice members – increase section

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Preventative Bridge Maintenance

Bridge Joint Replacement

- 3 Vermont joints in poor condition
- Leaking water and salt on steel members below

Preventative Bridge Maintenance

Bearing Replacement

- Bearings at abutments are in poor condition

Preventative Bridge Maintenance

Slope Stabilization

- Shale slope
- Weathered ledge is loose and falling on bridge members

Project Development Process

Project Scoping:

- Identify what's in/what's out
- Public Meeting – June 2018
- Quechee Bridge Scoping Report on website
- Recommended alternative – structure rehabilitation with safety improvements

Conceptual Design:

- Horizontal and vertical alignments
- Extent of rehabilitation
- New typical bridge section – set the new width
- Show safety barrier concepts
- Public Meeting – November 2018
- Begin Environmental Permitting - NEPA

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Project Development Process

Preliminary Design:	Site plan and construction limits
	Barrier refinement
	Property owner meetings (if needed)
	Begin right-of-way process (not anticipated)
	Last chance for changes – March 2019
Final Design:	Design/detailing of bridge components
	Barrier connections
	Develop Final Plan, specifications and construction estimate
	Secure ALL environmental permits, utility clearances and right-of-way clearances

Project Development Process

Contract Plans:

- Advertise for construction bids – Fall 2020
- Perform bid analysis on low bid
- Award the contract

Construction:

- Pre-construction public meeting – Contractor, Resident Engineer, Designers
- Final inspection

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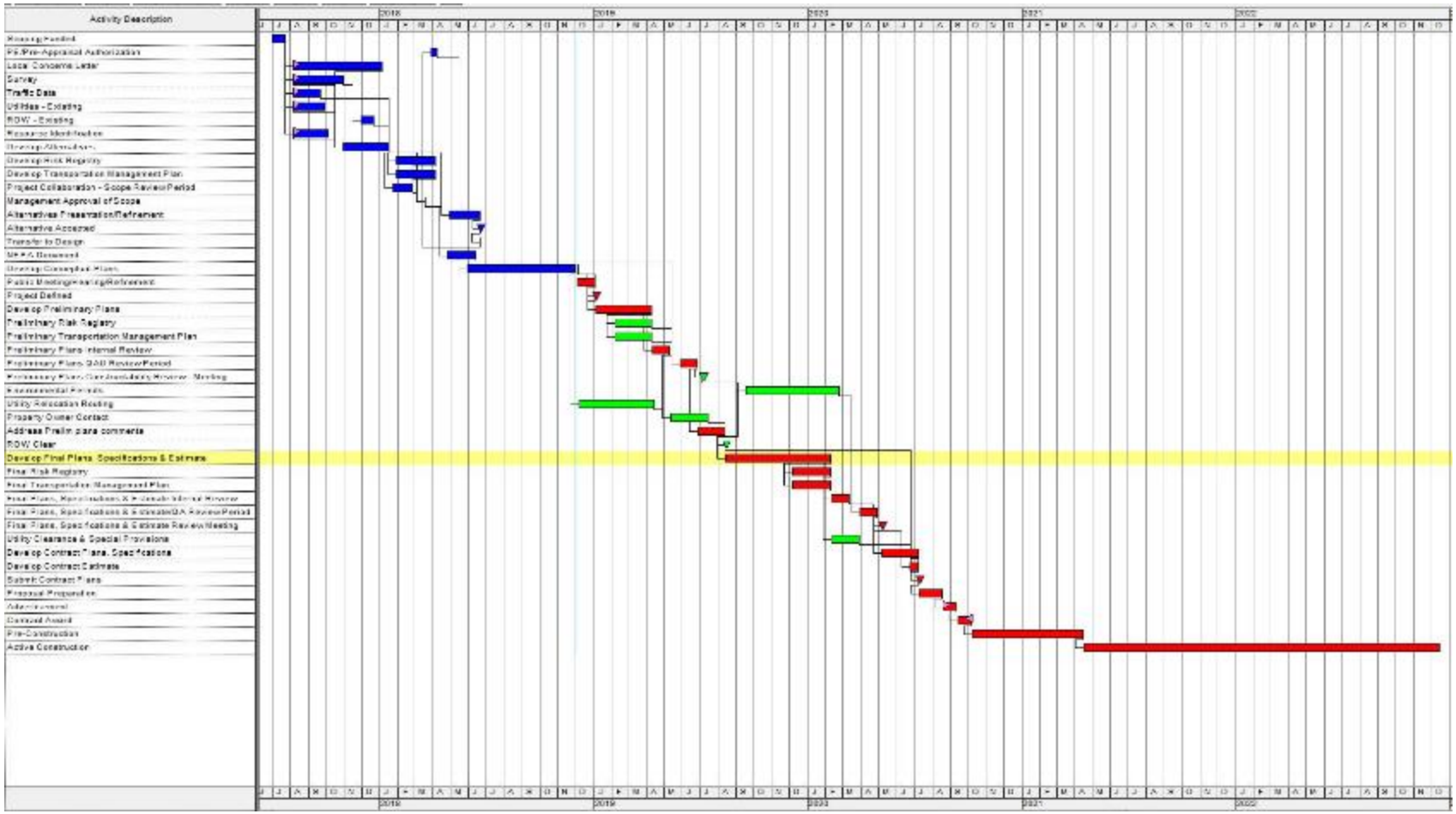
Project Schedule



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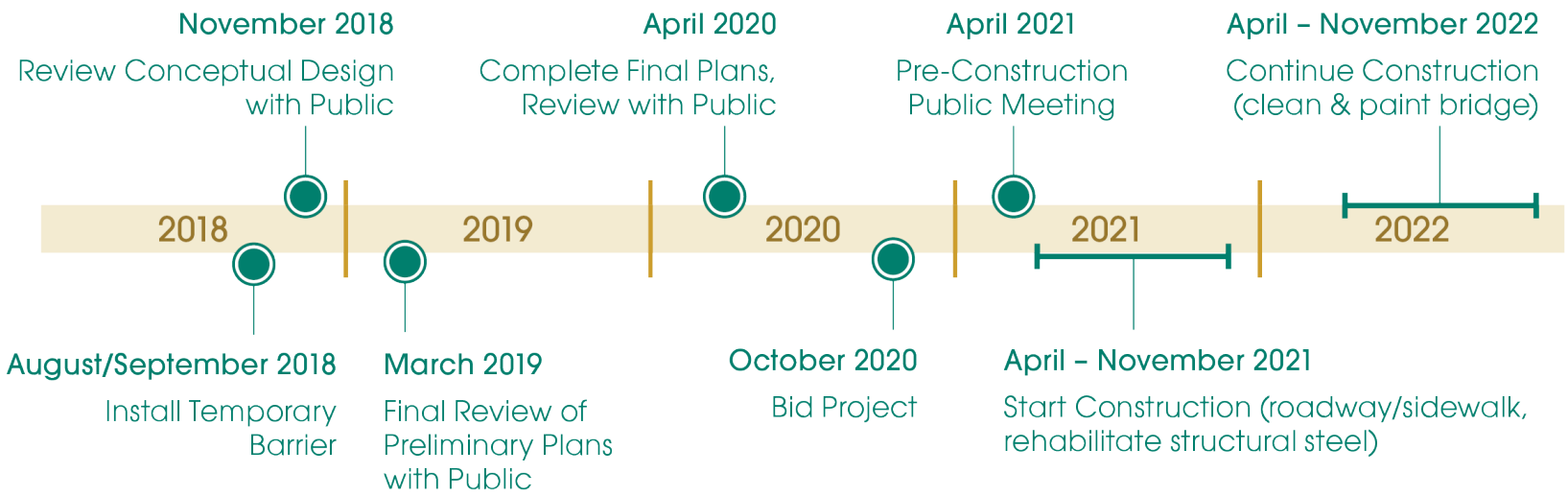
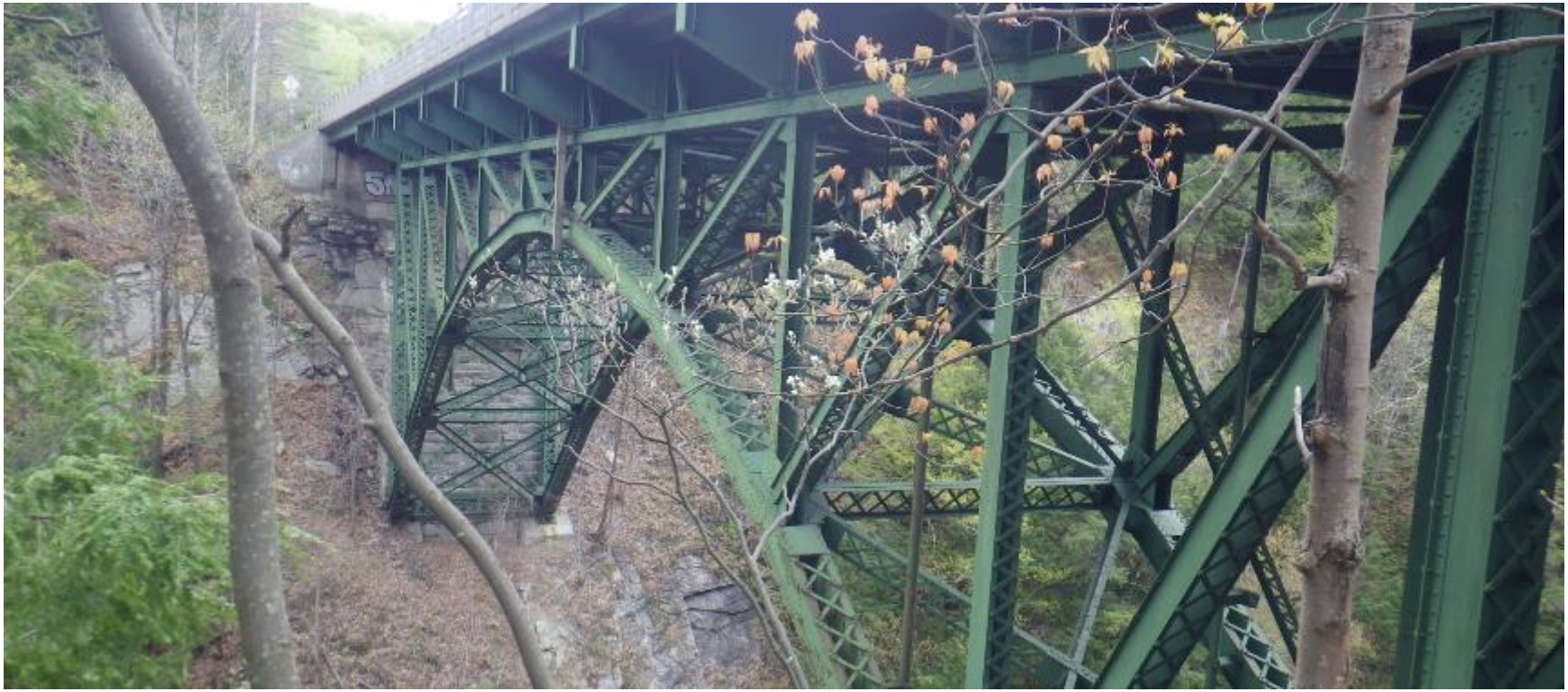
Project Timeline Overview

QUECHEE BRIDGE PROJECT SCHEDULE





Project Design

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Selected Alternative

Rehabilitation

- Structure classified as a “Forever Bridge”
- Preservation essential to keep bridge in serviced condition

Preventative Maintenance

- Structural steel repairs and painting
- Bridge joint replacement (drainage)
- New concrete fascias
- New sidewalks widened (meets ADA)
- New guardrail
- Waterproofing
- Membrane and pavement
- Slope stabilization at abutments

New Safety Barrier

Design Criteria and Considerations

Engineering Design Criteria

- AASHTO Standard Specifications – Bridge Design Code
- AASHTO Roadside Design Guide – bridge approach guard rail
- National Highway System mandates Manual for Assessing Hardware (MASH) approved vehicular bridge railing
- VT State Standards for Design – lane and shoulder widths
- VT Standard Specifications for Construction

Design Criteria and Considerations

Design Criteria - Bridge Elements

- Structurally adequate (meets code)
- Functional (some code requirements)
- Durable – low maintenance
- Inspectable – “hands on”
- Aesthetic

Design Criteria and Considerations

Environmental Resources

Eliminate, minimize or mitigate impacts

- Biological
- Archeological
- **Historic**

Right-of-Way

Avoid or minimize impacts

- Property Owners

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Means Restriction Rail and Net Research

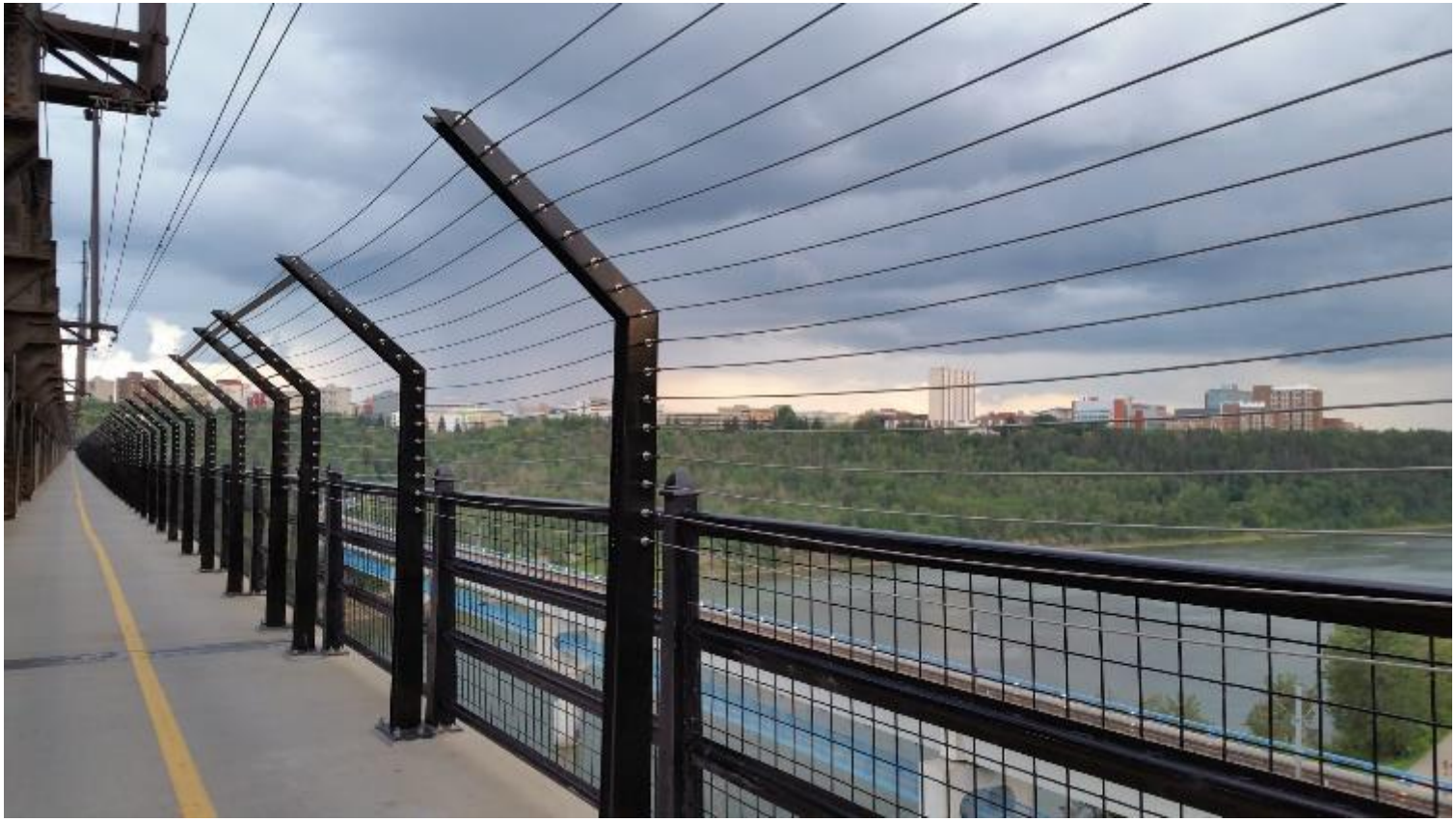
Pedestrian Safety Barrier (vertical)

- High Level Bridge, Edmonton, Alberta
- Smith St. Bridge, St. Paul Minnesota
- Route 128 Gloucester, Massachusetts
- Prince Edward Viaduct, Toronto, Ontario

Means Restriction Netting

- 4 Bridges in Ithaca, NY (Cornell University)
- Golden Gate Bridge – San Francisco, CA (Planned)

High Level Bridge - Canada

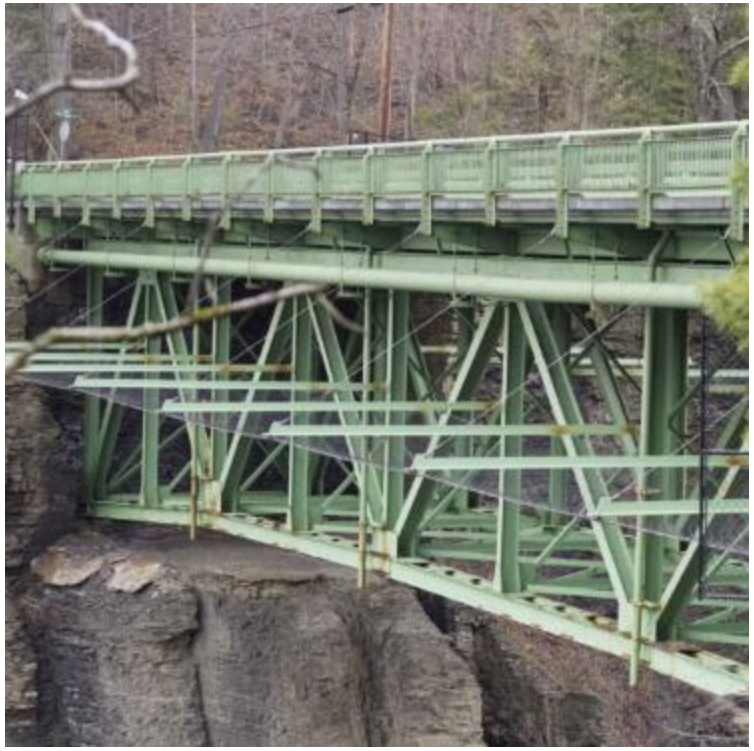


Smith Avenue Bridge - Minnesota

Route 128 - Massachusetts

Prince Edward Viaduct - Canada

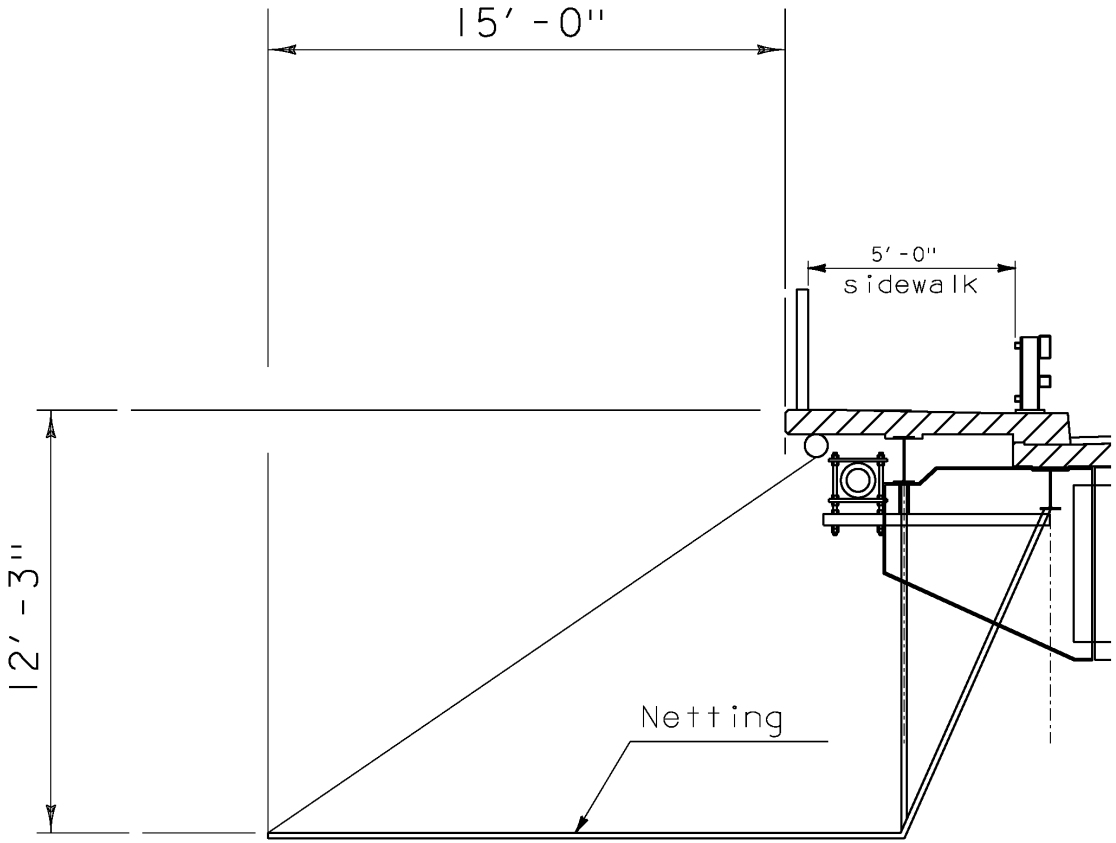
Stewart Ave. Bridge - Ithaca, NY



Golden Gate Bridge – San Francisco

Pedestrian Bridge - Ithaca, NY

Means Restriction Netting



Means Restriction - Netting

Cost

- Low profile netting (steel cables) – Specialty product not made in USA
- FHWA requires US manufactured steel (Buy America)
- VTrans responsible for 100% of netting

Design and Inspection

- Special design considerations – high costs
- Cameras, lights and motion sensors designed and installed
- Annual Specialty Inspection contract for net system

Emergency Access

- Access to bottom of gorge not possible with current equipment
- Specialty system will require training for recovery

Means Restriction - Netting

Bridge Inspection Access:

- Servi-Lift inspection not possible
- Catwalks not practical given arch structure
- Special bridge staging inspection contract every two years

Historic Concerns:

- Bridge is on National Register
- Netting has a negative effect on the aesthetic aspects of the arch/truss

Additional Considerations:

- Trash/debris accumulation on netting

Means Restriction - Netting

Based on the costs (capital and maintenance) of the safety nets, supporting equipment and emergency training required along with the additional cost and difficulty incurred for the biannual bridge inspection of the Quechee Gorge Bridge, **The Agency of Transportation will not pursue the further consideration** or development of the netting alternative.

Project Design - Gill Engineering

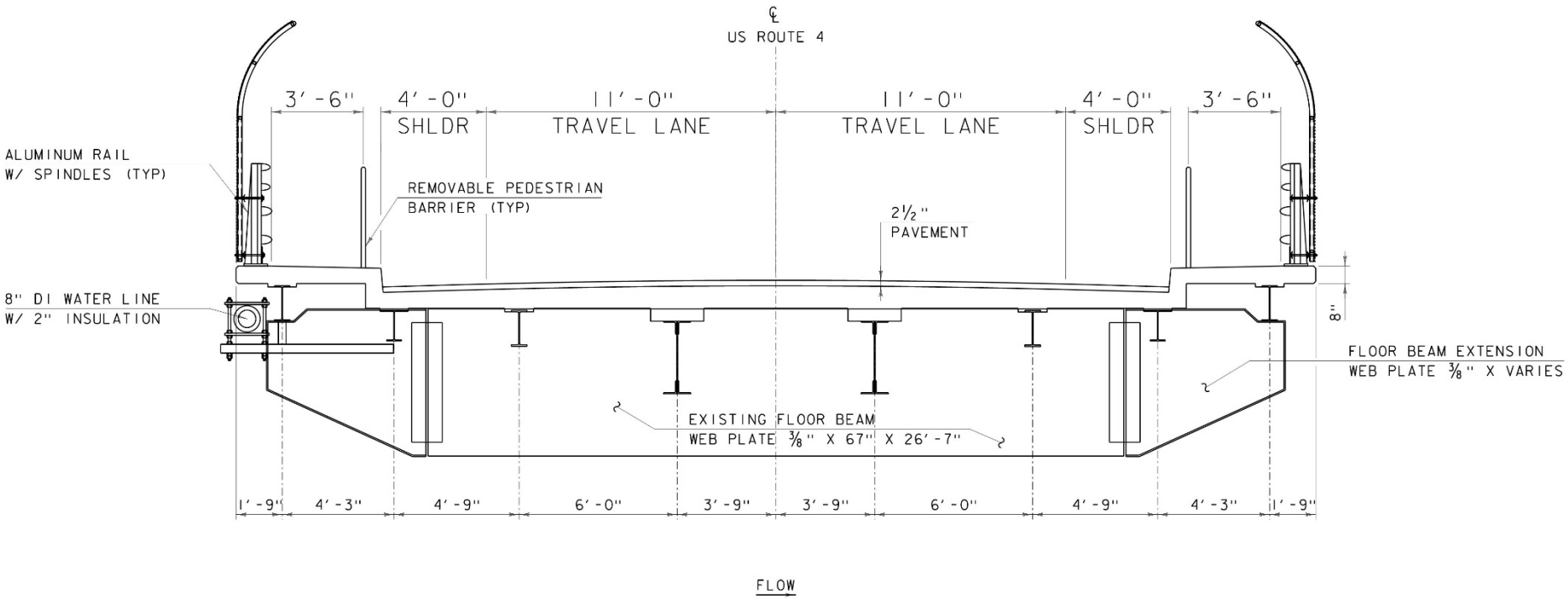
Bridge Preservation – "Forever Bridge"

- Steel repairs to arch truss members
- Deck replacement (partial width) and new wider sidewalks
- Joint repair or replacement
- Bearing repair or replacement
- Waterproof membrane and pave
- Clean and paint bridge
- Stabilize the eastern shale slope
- Silane application to substructures, sidewalks and fascias

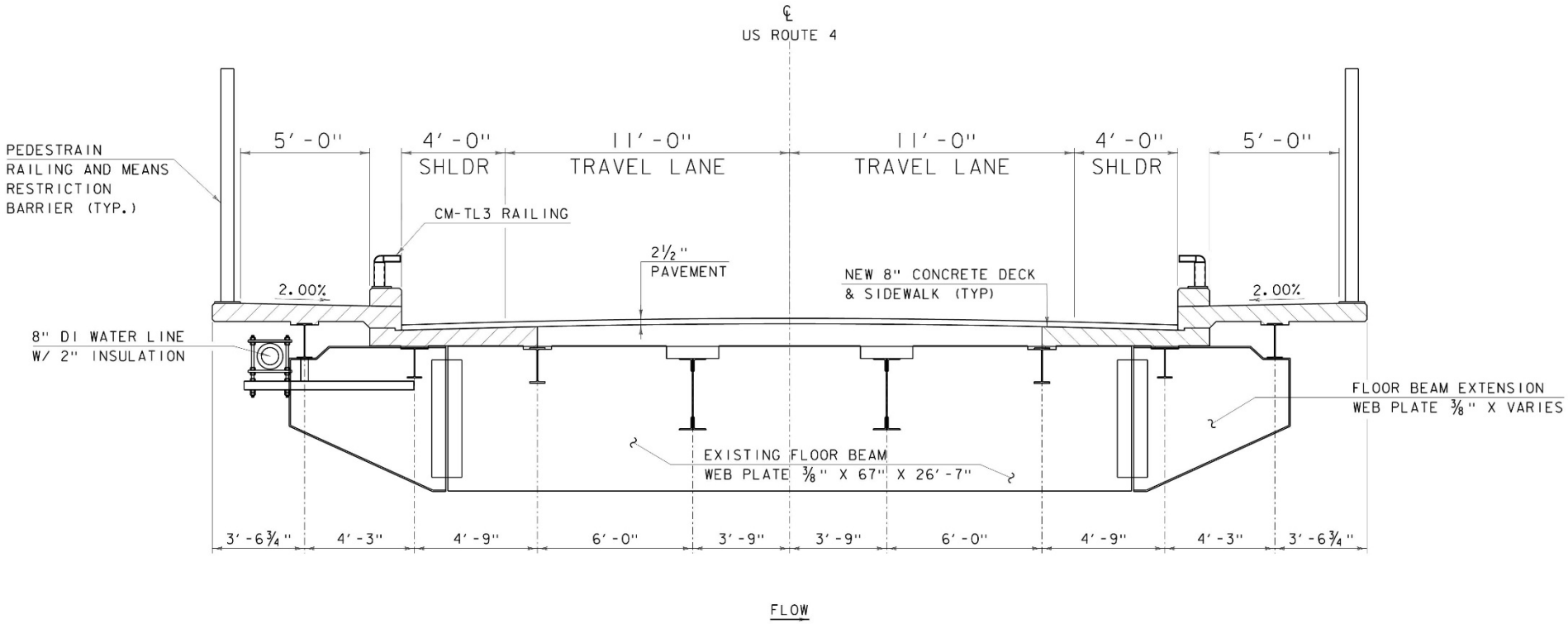
Safety Improvements

- Curb-mounted vehicular railing
- Increased sidewalk width (5' minimum)
- Pedestrian safety barrier

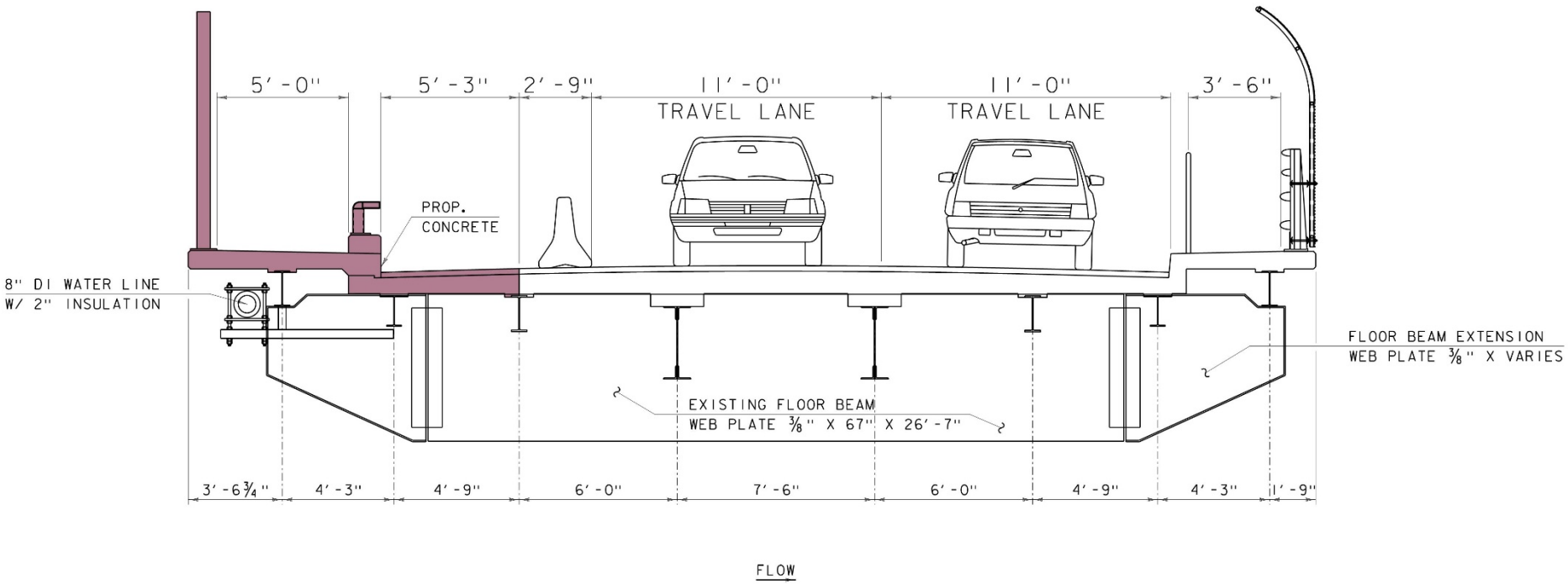
Existing Bridge Cross Section



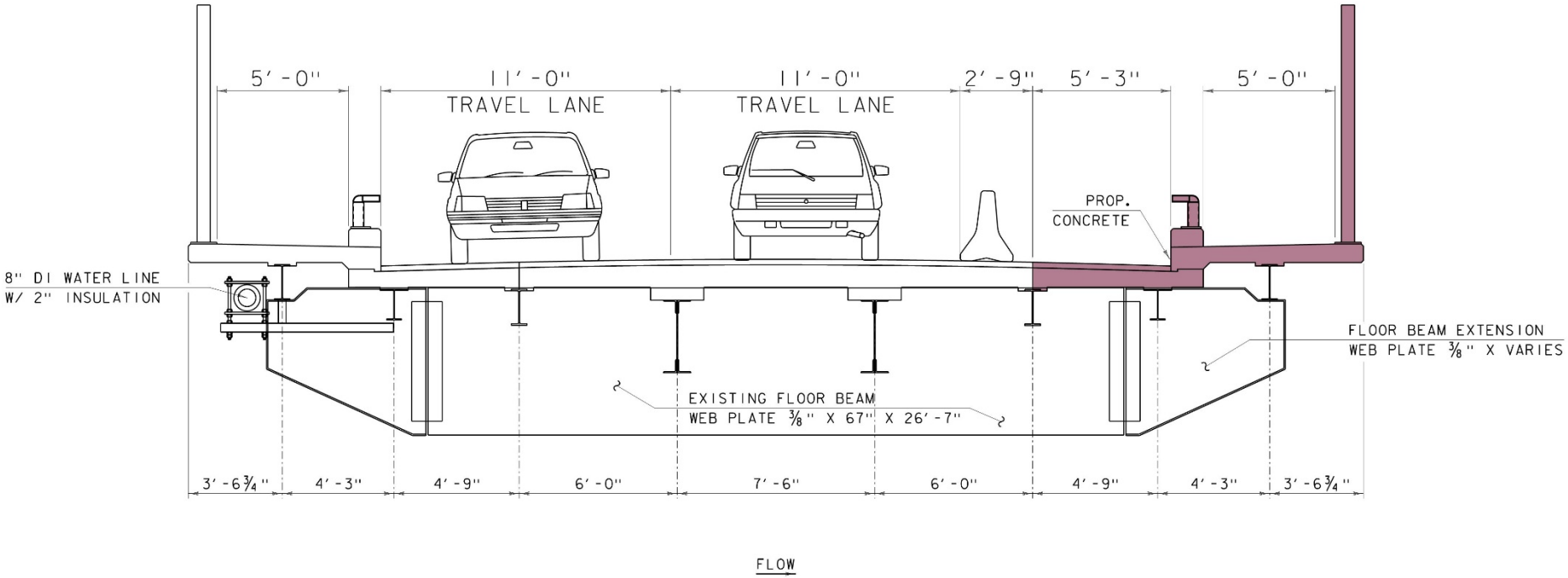
Proposed Bridge Cross Section



Construction Phase 1



Construction Phase 2



Construction Phasing

- Two construction seasons
- Roadway width reduced to 22’ with two 11’ lanes – typical
- Single alternating lane for certain construction activities – short-term
- One sidewalk will remain open throughout construction
- Regional truck detour route

Pedestrian Safety Barrier

Barrier Design Considerations:

- Total Height = 9’
- Maximum height for bridge inspection equipment
- Lower portion will serve as a pedestrian railing, and as such:
  - Must have a rail 42” above the top of sidewalk
  - Must be composed of horizontal and vertical elements that are arranged so that a 4” diameter sphere cannot pass through the clear opening
- Upper portion (above 42”) will consist of vertical steel balusters, spaced 8” on center
- Must have locations of removal panels for recovery access
- Color recommendation: green or black

Railing Option 1 - Vertical

Railing Option 2 - Circles

Railing Color Option - Green

Vertical

Circles

Railing Option - Straight

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Railing Option - Curved

Railing Option - Angled

Railing Option Color - Green

Straight

Curved

Angled

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Save the Date!

Preliminary Plan Meeting March 2019

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HTTP://VTRANS.VERMONT.GOV/PROJECTS/QUECHEE

Questions or Comments?

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