US Route 2 (Rogers' Rangers) Bridge
Lancaster, NH – Guildhall, VT
NHDOT Bridge No. 111/129
NHDOT Project No. 16155

Second Public Informational Meeting

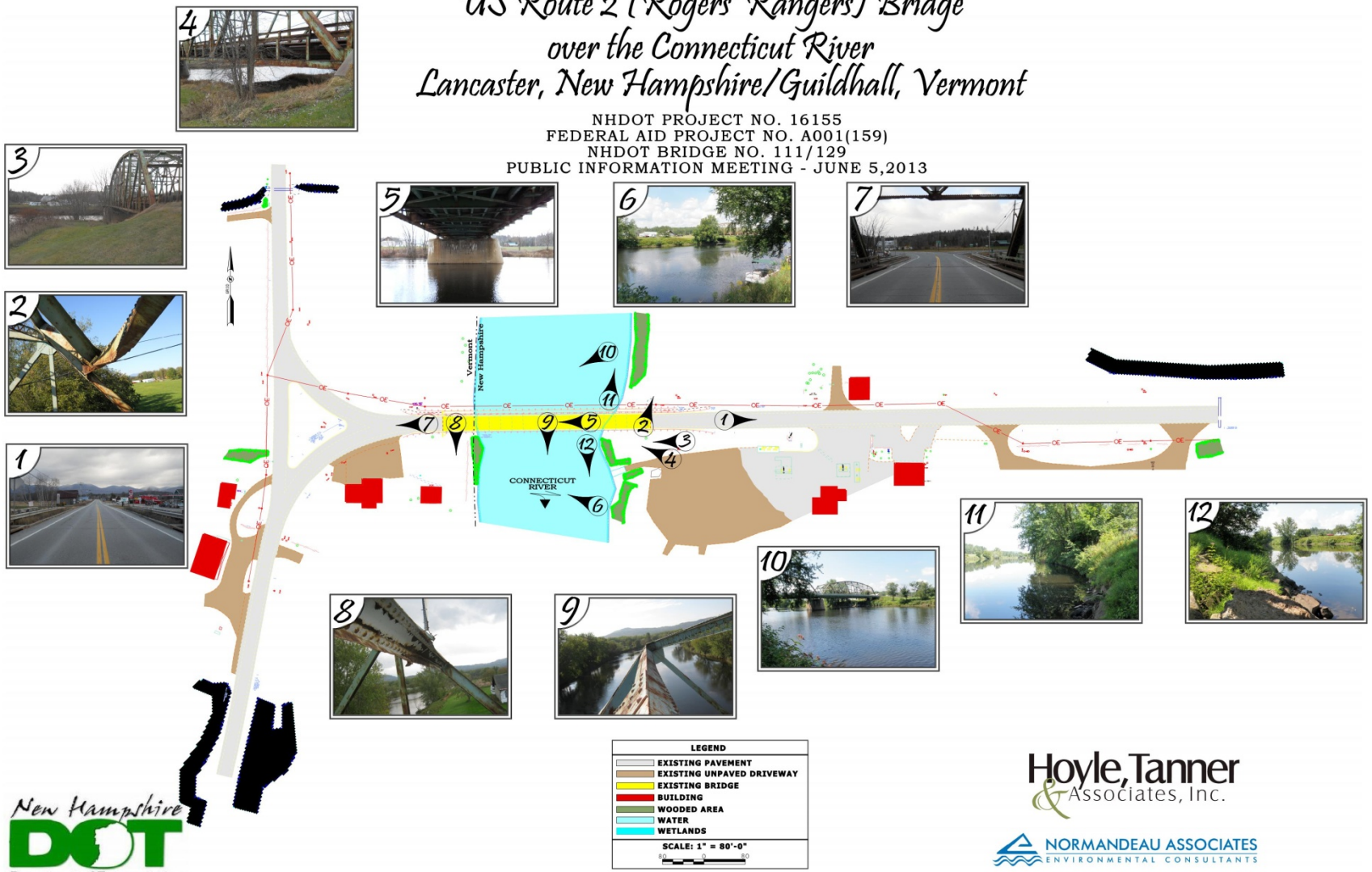
June 5, 2013

Existing Bridge Information

- Bridge constructed in 1950.
- Cantilevered sidewalk added in 1996.
  - Sidewalk used by snowmobilers to cross the Connecticut River as part of the local trail system.
- Bridge Type: High Parker Steel Through Truss
- Bridge Deck: Reinforced Concrete
- Sidewalk Deck: Timber
- Substructures: Reinforced Concrete Abutments and River Pier
- Span Lengths: 2 at 198’-0” each
- Overall Length: 398’-0”
- Roadway Width: 28’-0” (2 – 14’-0” Travel Lanes)
- 2 – 2’-6” Open Grid Safety Curbs

US Route 2 (Rogers' Rangers) Bridge over the Connecticut River
Lancaster, New Hampshire/Guildhall, Vermont

NHDOT PROJECT NO. 16155
FEDERAL AID PROJECT NO. A001(159)
NHDOT BRIDGE NO. 111/129
PUBLIC INFORMATION MEETING - JUNE 5,2013



New Hampshire DOT
Department of Transportation

Hoyle, Tanner & Associates, Inc.

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

In-Depth Inspection Performed in September 2011

- Inspection Revealed the Following:
  - Bridge deck cracking, spalling and leakage.
  - Bridge deck pavement cracking.
  - Safety curb open grid members have section loss.
  - Sidewalk timber deck is weathered and has some rot.
  - Numerous boards have curled ends creating a tripping hazard.
  - Bridge rail deterioration.
  - Extensive deterioration of floor system members below the bridge deck.
  - Truss bottom chord advanced deterioration.
  - Light to moderate truss top chord rusting.

In-Depth Inspection Performed in September 2011

- Lower half of truss diagonal members exhibit heavy rusting and deterioration on the side exposed to snow and salt spray.
- Damaged truss vertical members due to vehicular impact on sway bracing members.
- Bent truss sway bracing and portal members due to vehicular impact.
- Abutment and pier concrete spalling and cracking.
- Overall condition of bridge is fair.

- Structural analysis resulted in need for repairs performed by NHDOT.
- Bridge is currently posted "E-1"
  - Certified single unit vehicles restricted from crossing the bridge.

Bridge Deck and Pavement Deterioration

Bridge Rail, Sidewalk Deck Deterioration and Impact Damage

Exterior Stringer Deterioration

First Interior Stringer Deterioration

Floorbeam Deterioration

Truss Bottom Chord Deterioration

Truss Bottom Chord Deterioration

Diagonal Deterioration and Bent Vertical Due to Sway Bracing Vehicular Impact

Upper and Lower Lateral Bracing Deterioration and Damage

Portal Bracing Vehicular Impact Damage

Sway Bracing Vehicular Impact Damage

Gusset Plates

End Lower Gusset and Lower Lateral Bracing Gusset Plate Deterioration

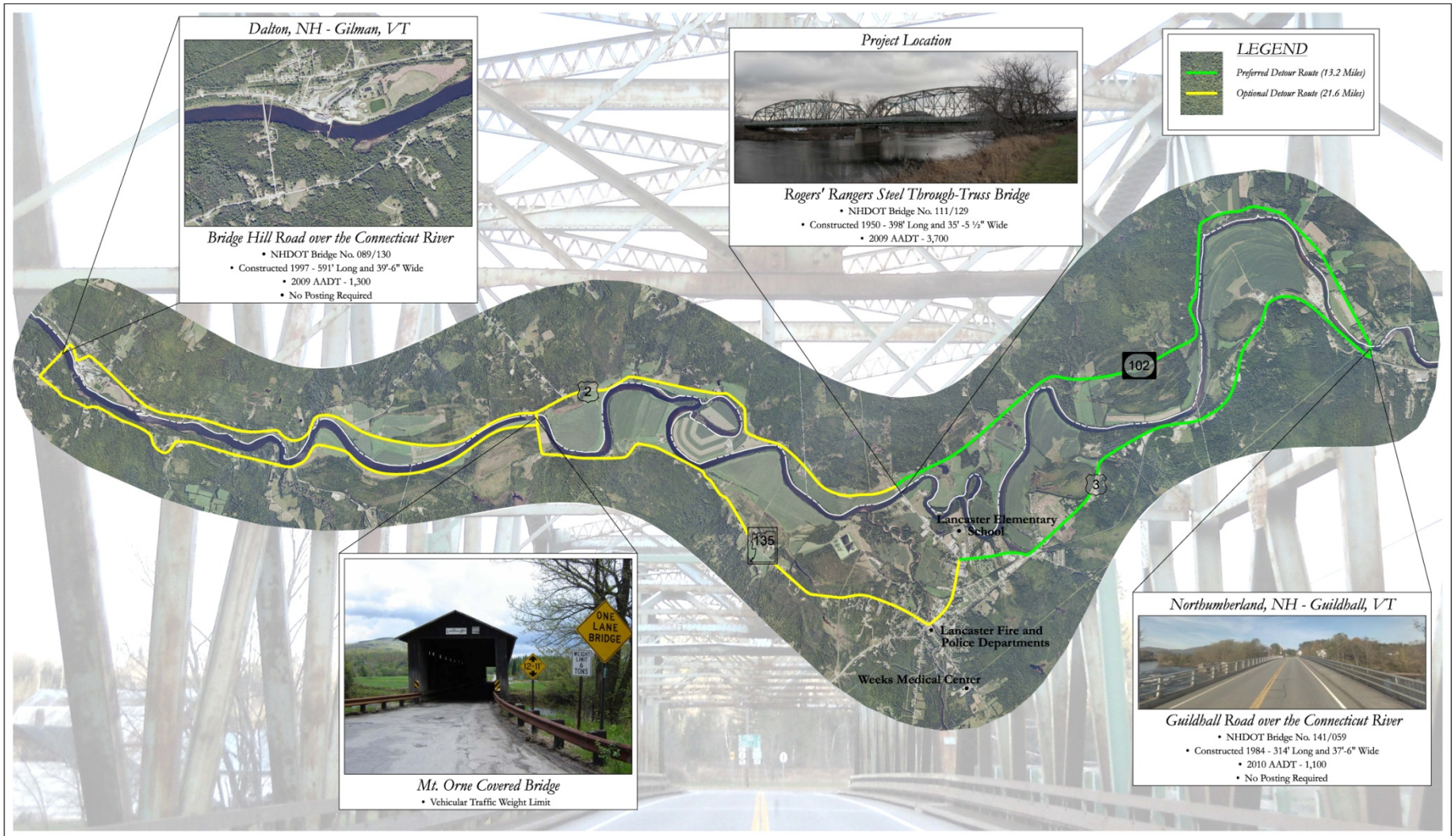
Vermont Abutment Deterioration

New Hampshire Abutment Deterioration

Pier Deterioration

Alternatives Analysis

- Bridge Rehabilitation/Replacement investigated due to:
  - Condition of bridge.
  - Truck traffic volume.
  - Inadequate vertical clearance.
- Traffic Control Options:
  - Close bridge for repairs (Detour length approximately 13 miles).
    - Not recommended since this route is a major commerce corridor and is used by both communities for mutual aid, public school transportation and hospital access.
  - Temporary bridge located upstream.
  - New bridge located upstream.
- Anticipated Construction Duration:
  - Close bridge: 1 to 2 seasons.
  - Temporary bridge: 3 seasons, 2 seasons until traffic.
  - New bridge: 2 seasons



New Hampshire DOT Department of Transportation

2400 0 2400 4800
SCALE IN FEET

US Route 2 (Rogers' Rangers) Bridge over the Connecticut River
Potential Detour Routes
Public Information Meeting - June 5, 2013

Hoyle, Tanner & Associates, Inc.

New Hampshire DOT
Department of Transportation

100 0 100 200
SCALE IN FEET

US Route 2 (Rogers' Rangers) Bridge over the Connecticut River
Proposed Temporary Bridge Layout
Public Information Meeting - June 5, 2013

Hoyle, Tanner & Associates, Inc.

New Hampshire DOT Department of Transportation

100 0 100 200
SCALE IN FEET

US Route 2 (Rogers' Rangers) Bridge over the Connecticut River
Bridge Replacement Alternative Layout
Public Information Meeting - June 5, 2013

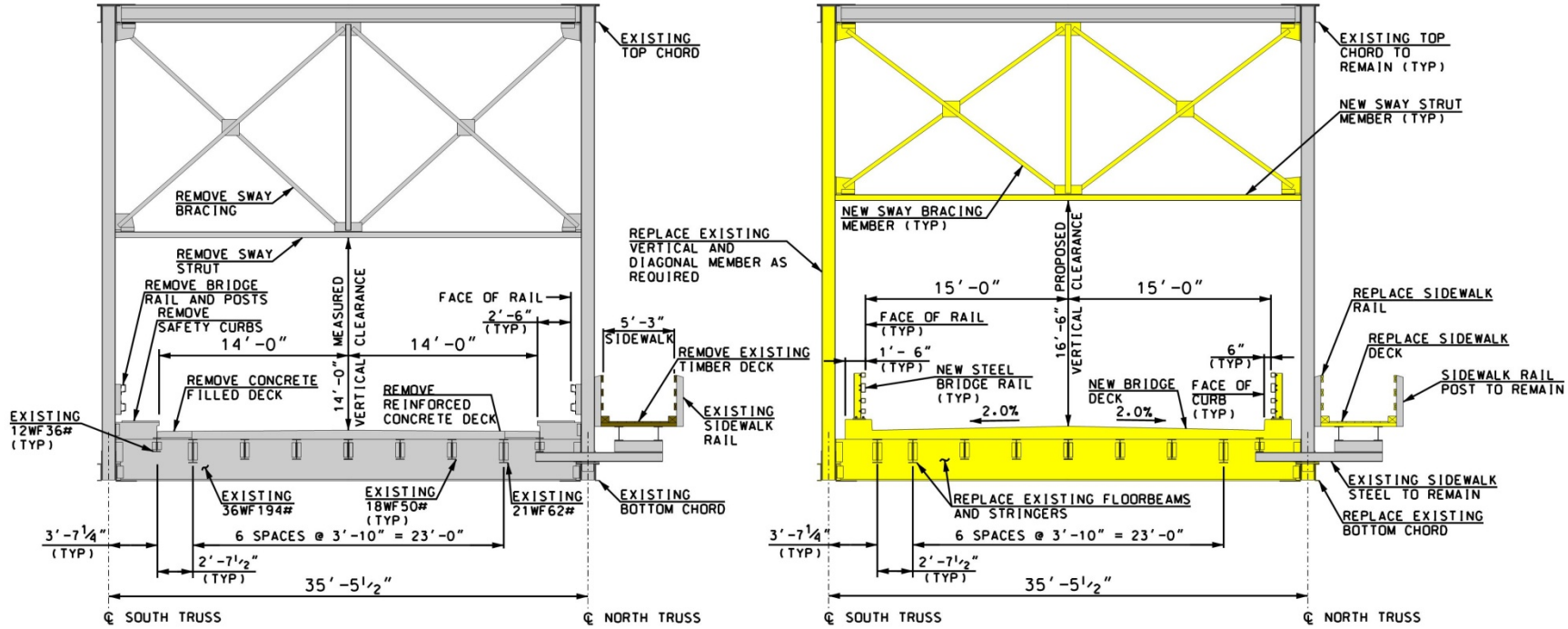
Hoyle, Tanner & Associates, Inc.

Alternatives Analysis

- Existing bridge rehabilitation detailed evaluation:
  - Replace bridge deck.
  - Replace entire floor system (floorbeams stringers and bracing).
  - Replace entire bottom chord.
  - Replace 6 diagonal members.
  - Replace 8 vertical members.
  - Replace gusset plates at all bearings and 3 other locations.
  - Remove, clean and reinstall gusset plates at 19 locations.
  - Replace 2 bent upper lateral bracing members.
  - Replace truss bracing to improve vertical clearance.
  - Clean and paint steel to remain.

Alternatives Analysis

- Existing bridge rehabilitation detailed evaluation (cont):
  - Abutments can be rehabilitated.
  - Pier rehabilitation versus replacement:
    - Significant areas of concrete spalling, scaling, surface abrasion, delamination and map cracking on all faces.
    - Crack depths up to 3” below water line.
    - Exposed reinforcement has section loss.
    - Low concrete strength and significant deterioration due to a reaction between the cement and aggregates.
    - Replacement is recommended.



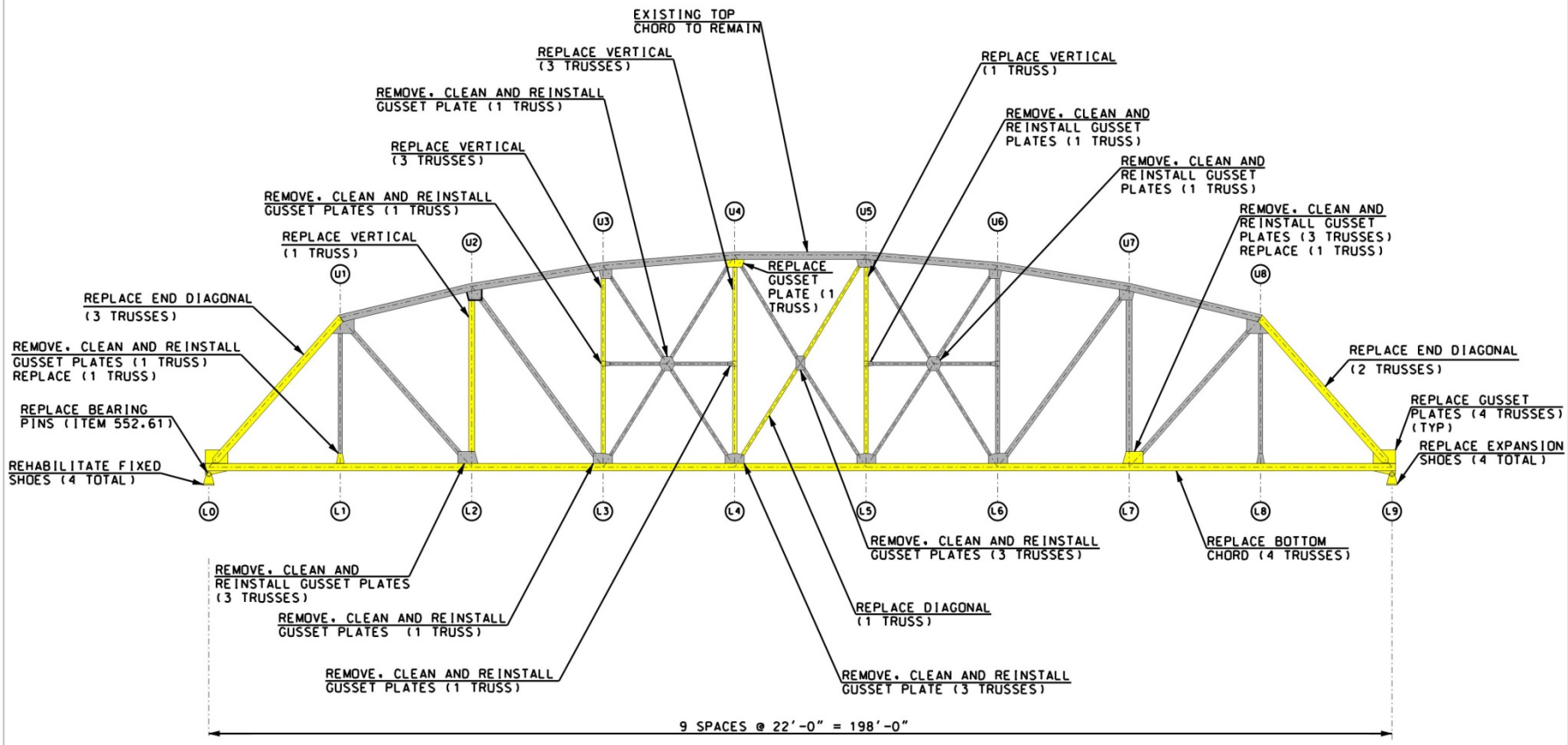
EXISTING TRUSS

REHABILITATED TRUSS

LEGEND:
- EXISTING MEMBER
- MEMBER TO BE REPAIRED OR REPLACED

New Hampshire DOT Department of Transportation

Hoyle, Tanner & Associates, Inc.



TRUSS ELEVATION

LEGEND

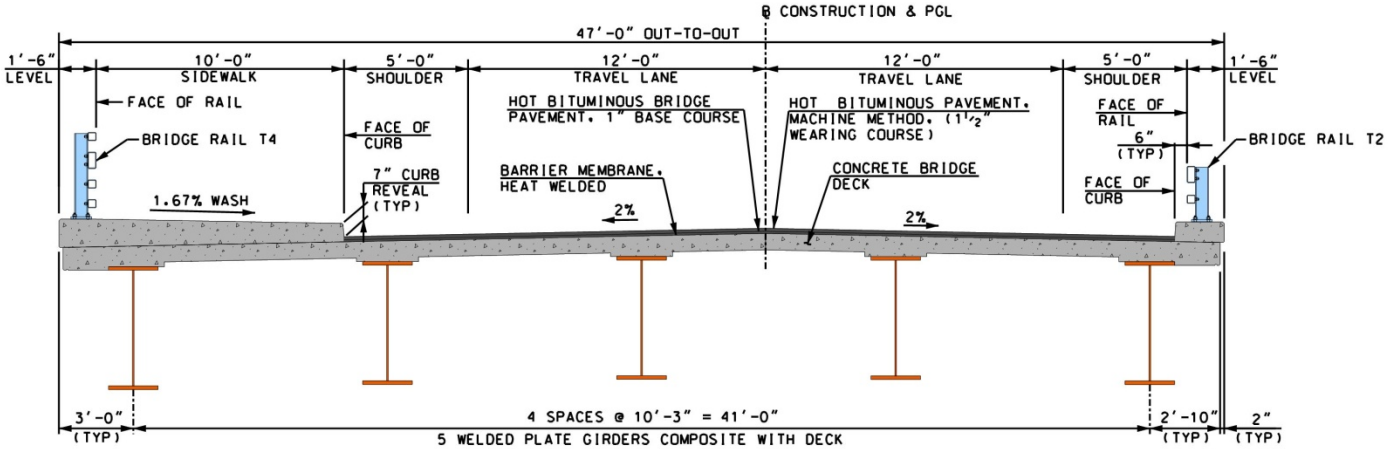
- EXISTING MEMBER
- MEMBER TO BE REPLACED

New Hampshire DOT
Department of Transportation

Hoyle, Tanner & Associates, Inc.

Alternatives Analysis

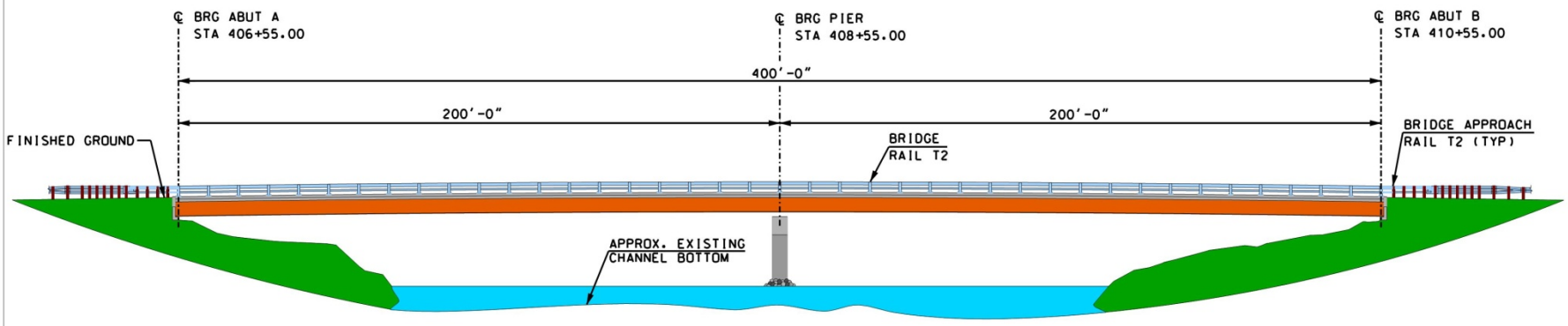
- Bridge Replacement
  - Bridge length = 400’ (match existing)
  - Bridge width = 47’
    - 2 – 12’ travel lanes
    - 2 – 5’ shoulders
    - 1 – 10’ sidewalk
    - Increased sidewalk width proposed to accommodate snowmobiles during winter months.
  - 2 and 3 span bridge layouts evaluated
    - 2 span bridge: span lengths = 200’ – 200’
    - 3 span bridge: span lengths = 120’ – 160’ – 120’



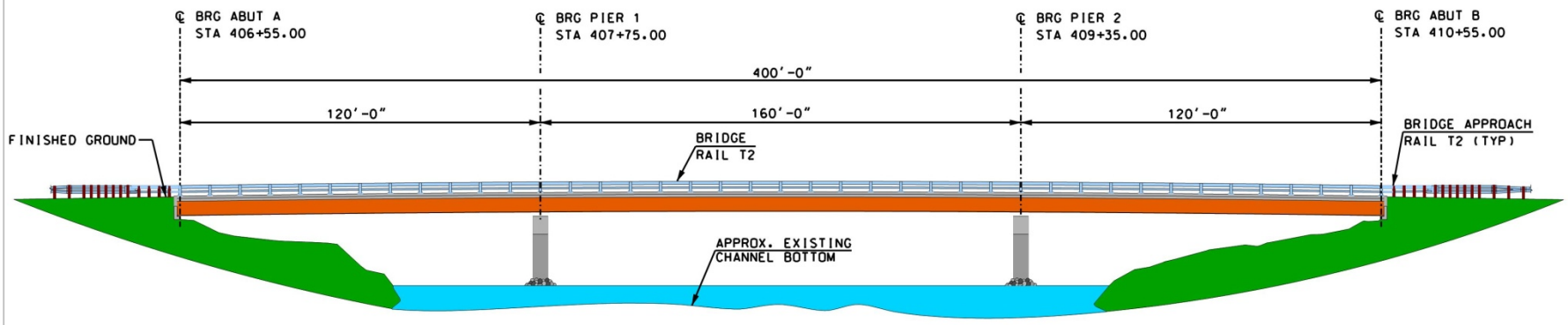
BRIDGE REPLACEMENT ALTERNATIVE TYPICAL DECK SECTION

New Hampshire DOT Department of Transportation

Hoyle, Tanner & Associates, Inc.



2 SPAN BRIDGE REPLACEMENT ALTERNATIVE ELEVATION



3 SPAN BRIDGE REPLACEMENT ALTERNATIVE ELEVATION

New Hampshire DOT Department of Transportation

Hoyle, Tanner & Associates, Inc.

Alternative Analysis Cost Estimates

- Bridge Rehabilitation: $14,200,000
  - Bridge rehabilitation = $10,200,000
  - Temporary bridge = $3,000,000
  - Roadway = $300,000
  - Temporary = $700,000
- Bridge Replacement: $10,000,000
  - Bridge Replacement = $7,500,000
  - Roadway = $1,500,000
  - Bridge Removal: $1,000,000

Alternatives Analysis

- Alternatives evaluation will include:
  - Incorporating public input.
  - Refinement of bridge replacement alternative.
  - Refinement of initial construction and life cycle costs.
  - Public safety considerations.
  - Environmental impact evaluation.
  - Property impact evaluation.