
Town of Peterborough



Main Street Bridge, US 202 & Retaining Wall Project Design Concepts Discussion

February 16, 2010

Prepared by:

Hoyle, Tanner
& Associates, Inc.

Outline

- Concepts
 - Bridge Alternatives
 - Roadway/Intersection Concepts
 - Temporary Traffic Control Alternatives
- What's Next?



Since Last We Met

- Testing of Bridge Concrete
 - Tests Revealed Problems
- Structural Analysis of Bridge
 - Bridge Capacity < Legal Loads
- Prepared Report Entitled “Existing Bridge Conditions and Summary Recommendations”
 - Results
 - Post Bridge For “15 Tons”
 - Dismiss Rehabilitation as Viable
- Evaluated Several Replacement Alternatives



Since We Last Met

- Received Topographic Survey Mid-December 2009
- Evaluated Several US 202/Main Street Intersection Concepts
- Coordinated Traffic Growth with SWRCP
- Performed Retaining Wall Probes and Pavement Cores
- Met with Public Works Director January 22, 2010



Bridge Alternatives

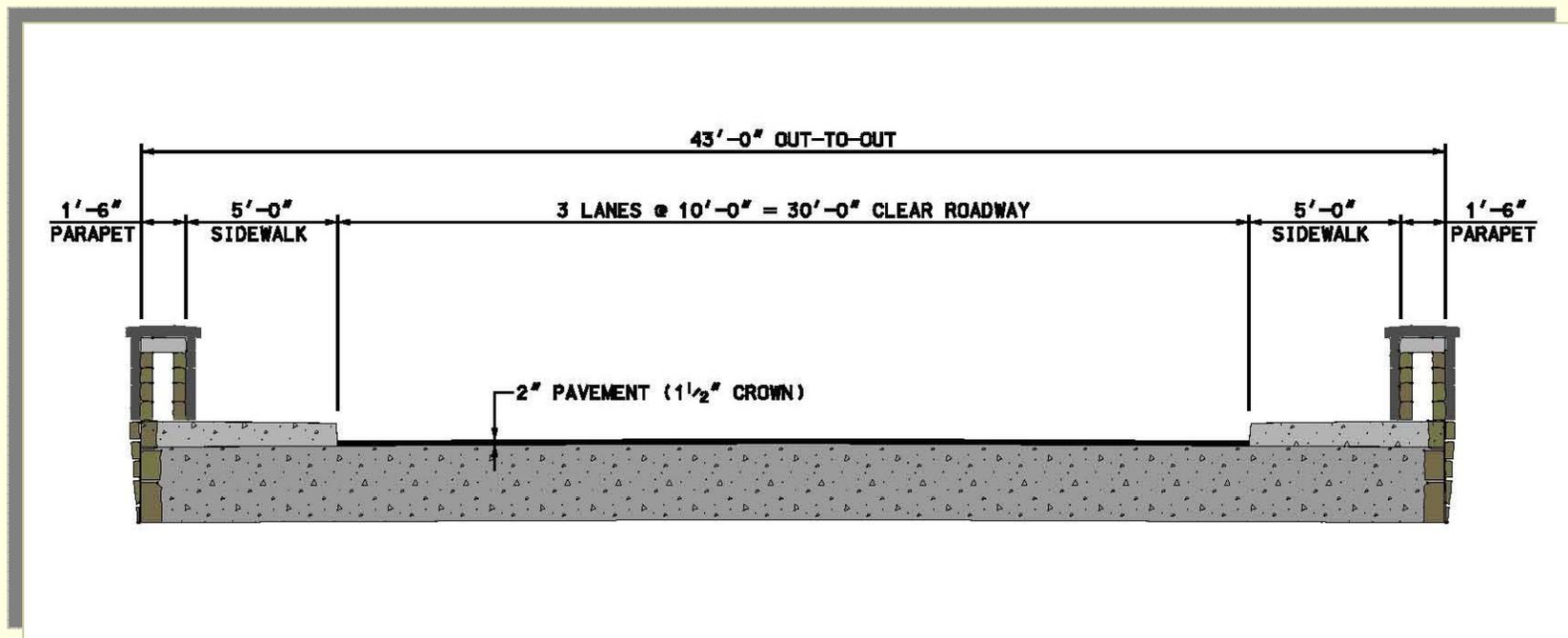
3 Bridge Alternatives

- Alternative #1 – Concrete Rigid Frame
- Alternative #2 – Prestressed Concrete Box Beam
 - Option A – 77' Span
 - Option B – 100' Span
- Alternative #3 – Steel Beam & Concrete Deck
 - Option A – 77' Span
 - Option B – 100' Span



Bridge Alternatives

Bridge Alternative #1 - Concrete Rigid Frame (Replica of Existing Bridge)

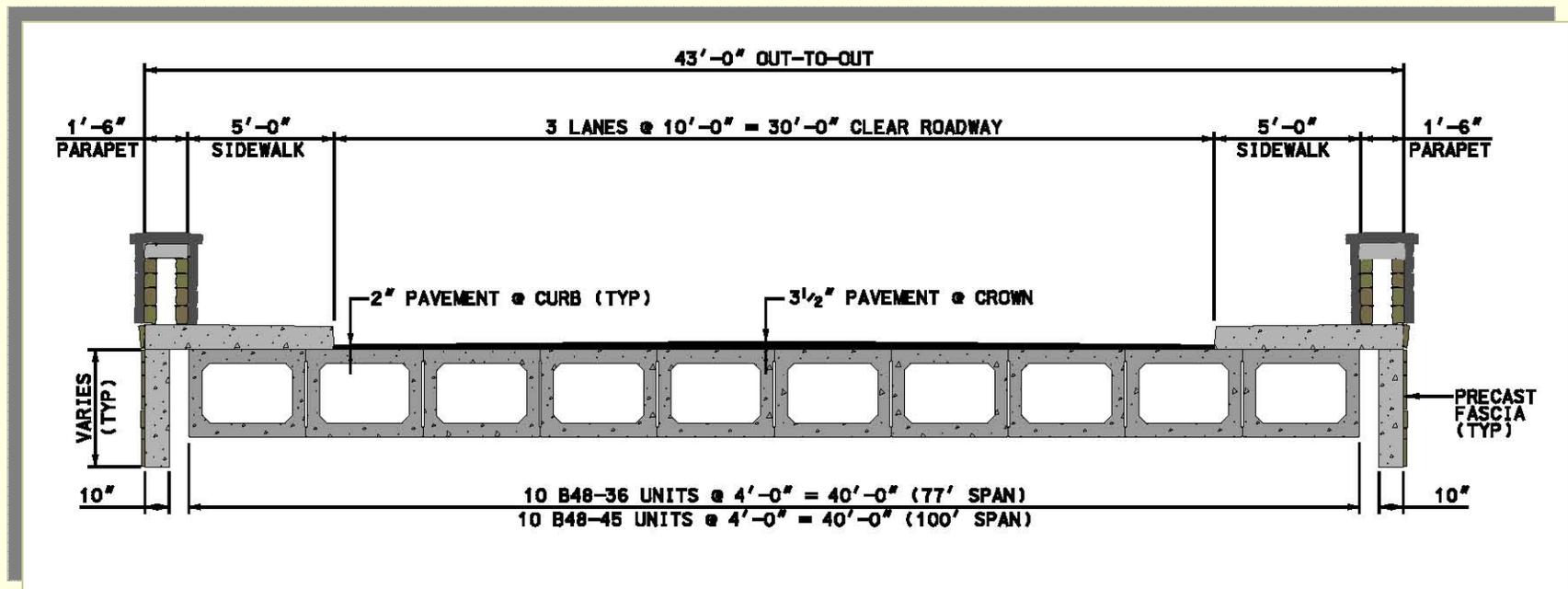


Town of Peterborough
Main Street Bridge, US 202 &
Retaining Wall Project

Hoyle, Tanner
& Associates, Inc.

Bridge Alternatives

Bridge Alternative #2A & 2B – Prestressed Concrete Butted Box Beams with a Precast Concrete Fascia

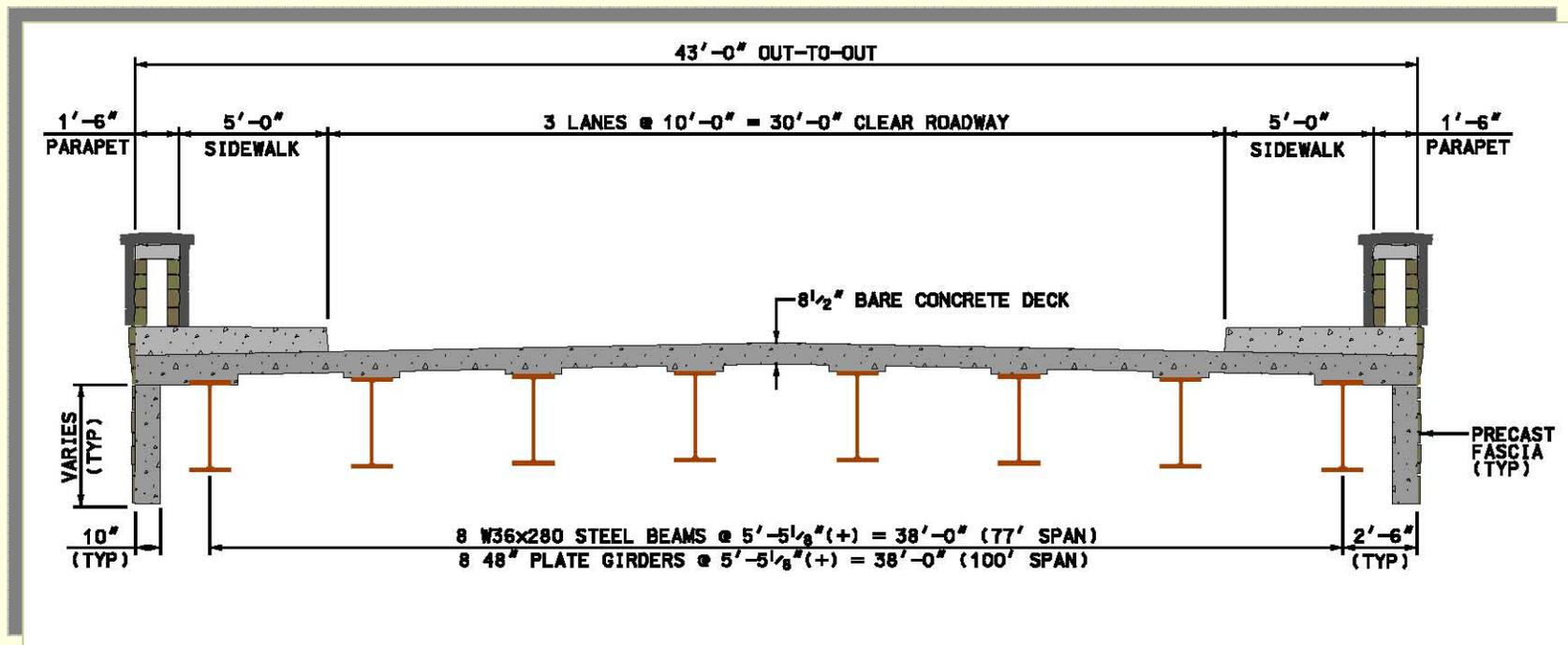


Town of Peterborough
Main Street Bridge, US 202 &
Retaining Wall Project

Hoyle, Tanner
& Associates, Inc.

Bridge Alternatives

Bridge Alternative #3A & 3B – Steel Beams and Concrete Deck with a Precast Concrete Fascia

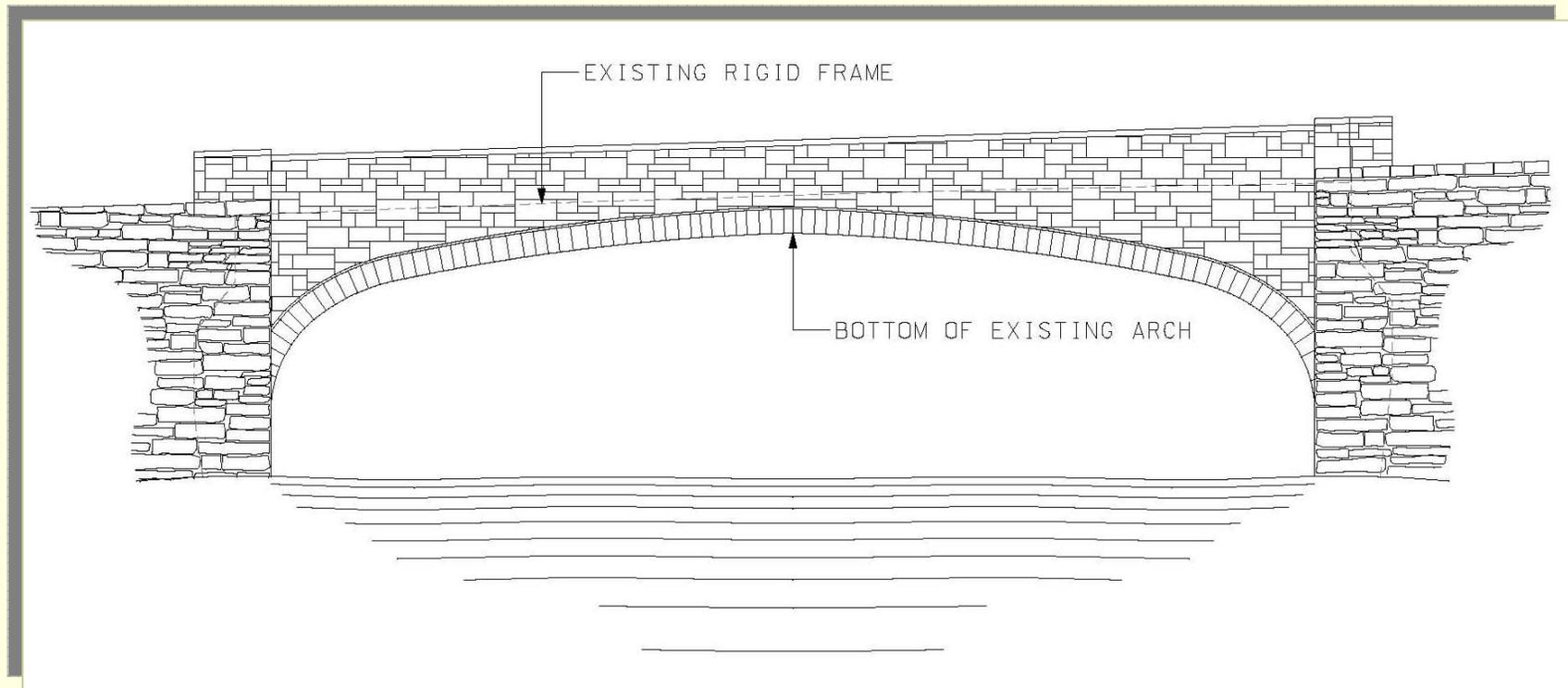


Town of Peterborough
Main Street Bridge, US 202 &
Retaining Wall Project

Hoyle, Tanner
& Associates, Inc.

Bridge Alternatives

Bridge Aesthetics Evaluation - Existing Bridge Elevation

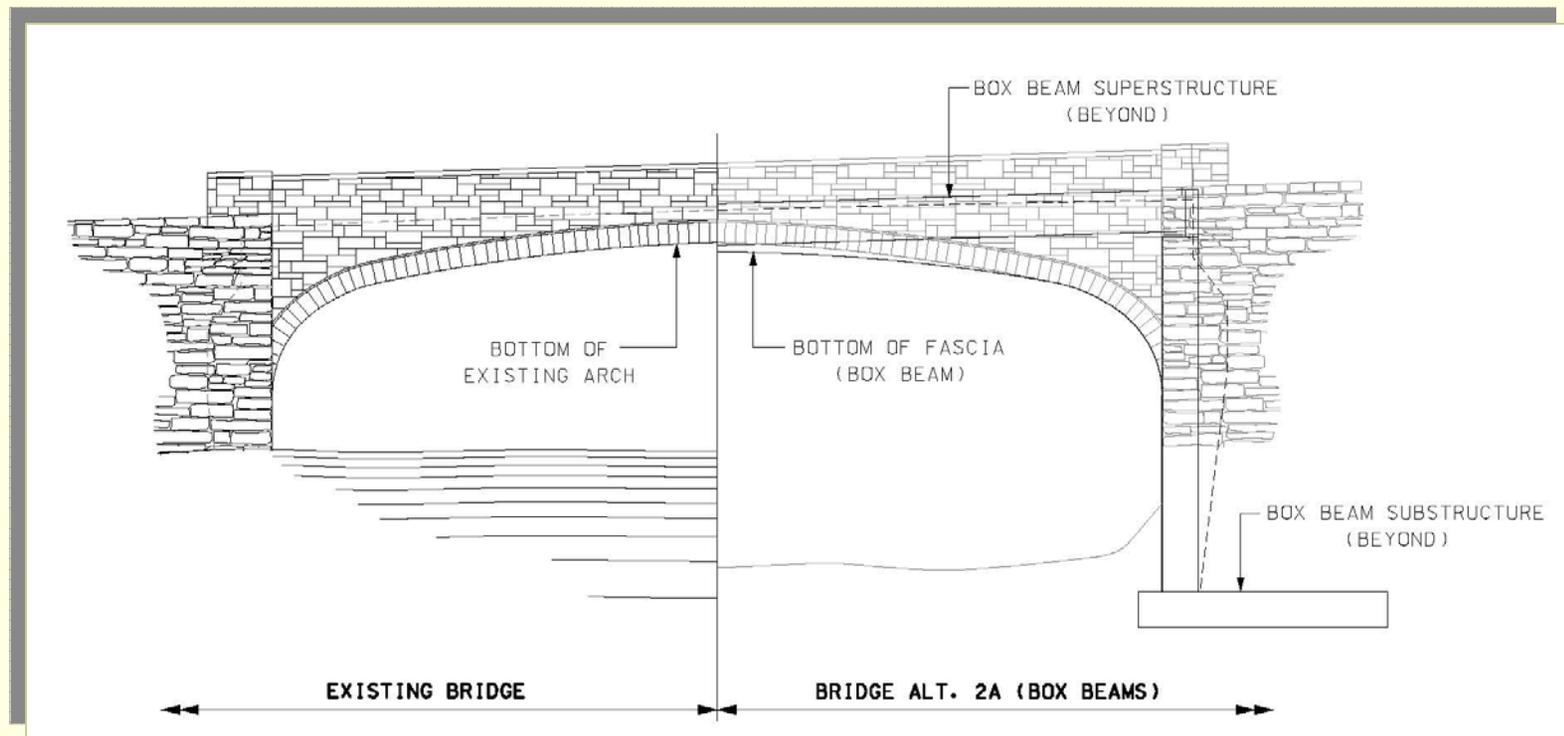


Town of Peterborough
Main Street Bridge, US 202 &
Retaining Wall Project

Hoyle, Tanner
& Associates, Inc.

Bridge Alternatives

Bridge Aesthetics Evaluation (77' Span) - Box Beam Alternative (2A)

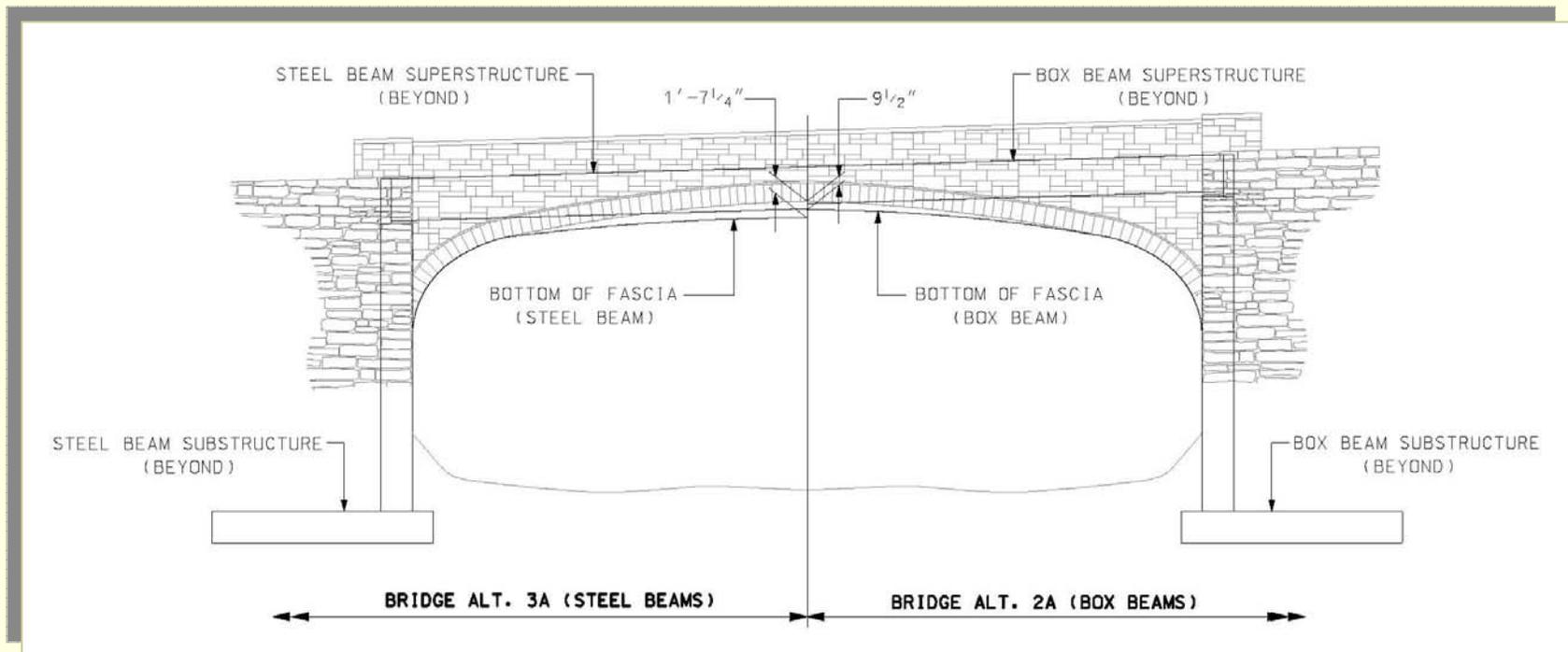


Town of Peterborough
Main Street Bridge, US 202 &
Retaining Wall Project

Hoyle, Tanner
& Associates, Inc.

Bridge Alternatives

Bridge Aesthetics Evaluation (77' Span) - Box Beam (2A) & Steel Beam Alternative (3A)

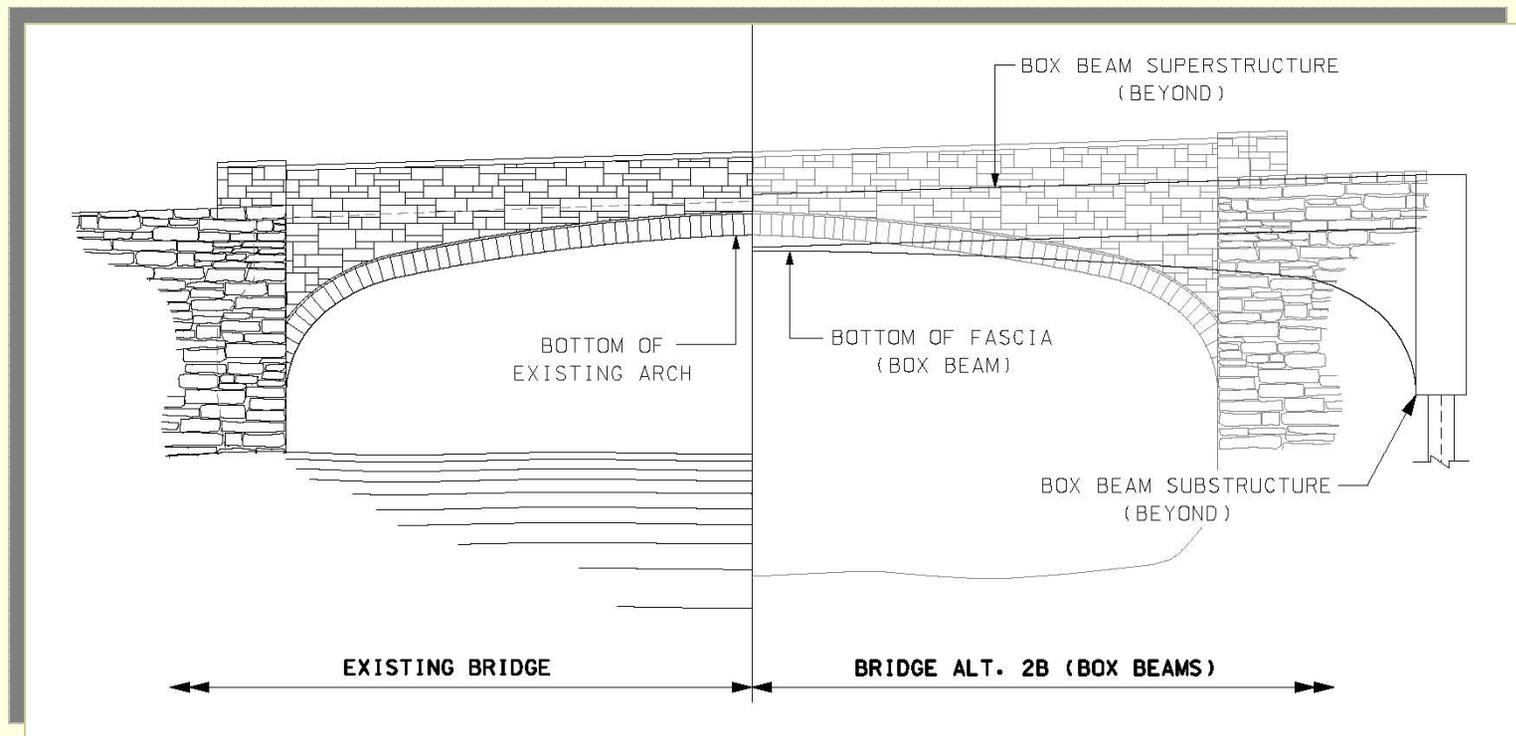


Town of Peterborough
Main Street Bridge, US 202 &
Retaining Wall Project

Hoyle, Tanner
& Associates, Inc.

Bridge Alternatives

Bridge Aesthetics Evaluation (100' Span) - Box Beam Alternative (2B)

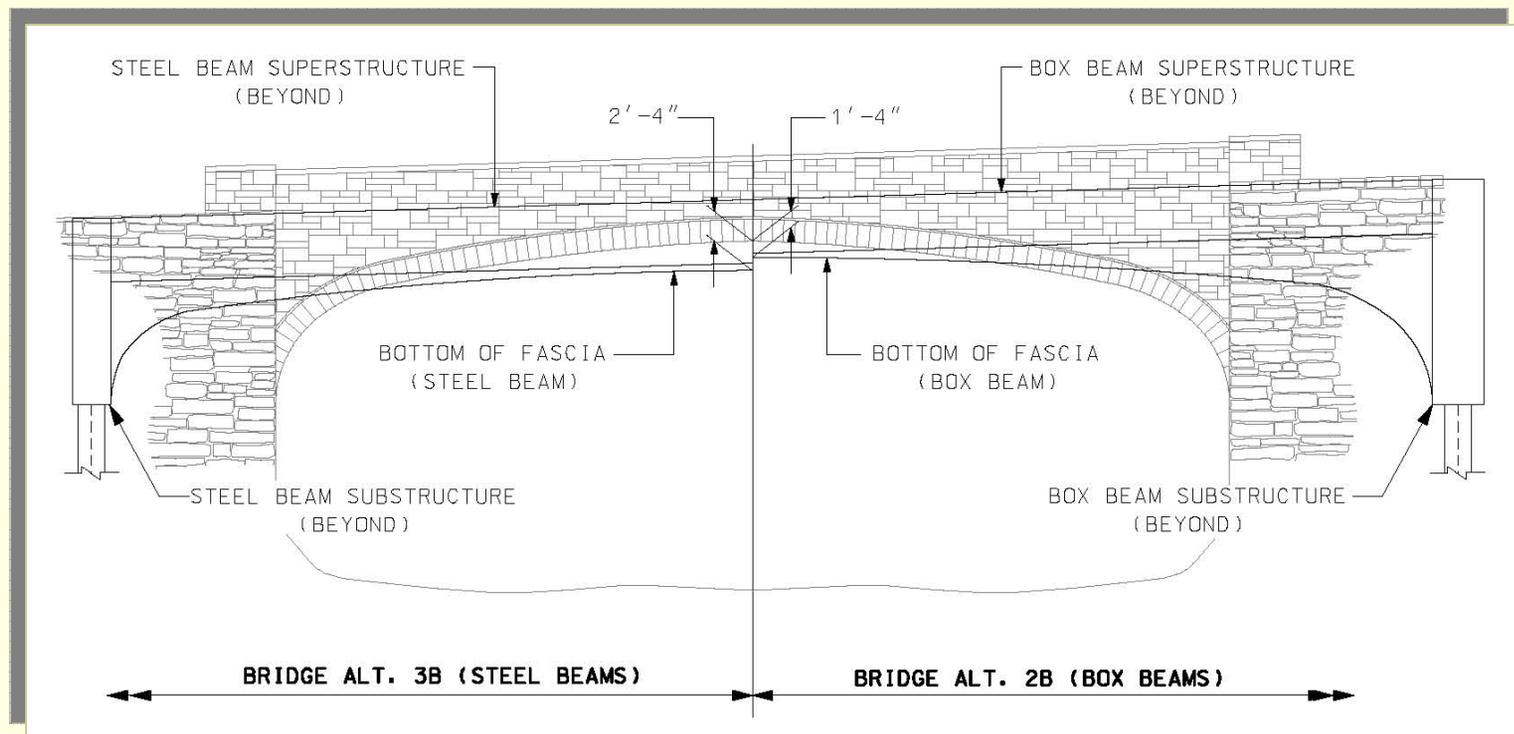


Town of Peterborough
Main Street Bridge, US 202 &
Retaining Wall Project

Hoyle, Tanner
& Associates, Inc.

Bridge Alternatives

Bridge Aesthetics Evaluation (100' Span) - Box Beam (2B) & Steel Beam Alternative (3B)



Town of Peterborough
Main Street Bridge, US 202 &
Retaining Wall Project

Hoyle, Tanner
& Associates, Inc.

Bridge Alternatives

Bridge Alternative	*Bridge (Only) Construction Cost with Contingency	Cost Difference to (2B)	Construction Duration	Environmental Impacts	Hydraulic Capacity	Aesthetics
1 –Concrete Rigid Frame (Replica of Existing Bridge)	\$2.75M	+\$850K	2 Seasons	Most	Matches existing	Matches existing
2A – Prestressed Box Beams with a Precast Concrete Fascia (77' Span)	\$2.40M	+\$500K	1.5 Seasons	Most	Reduced (bottom of bridge 0.8' lower).	Precast concrete fascia. Parapet portion of fascia can re-use existing stonework.
3A – Steel Beams with a Precast Concrete Fascia (77' Span)	\$2.55M	+\$650K	1.5 Seasons	Most	Reduced (bottom of bridge 1.6' lower).	Precast concrete fascia. Parapet portion of fascia can re-use existing stonework.
2B – Prestressed Box Beams with a Precast Concrete Fascia (100' Span)	\$1.90M	N/A	1.5 Seasons	Least	Reduced (bottom of bridge 1.3' lower).	Precast concrete fascia. Parapet portion of fascia can re-use existing stonework.
3B – Steel Beams with a Precast Concrete Fascia (100' Span)	\$2.05M	+\$150K	1.5 Seasons	Least	Highest reduction to hydraulic opening (bottom of bridge 2.3' lower).	Precast concrete fascia. Parapet portion of fascia can re-use existing stonework.



Town of Peterborough
Main Street Bridge, US 202 &
Retaining Wall Project

Hoyle, Tanner
& Associates, Inc.

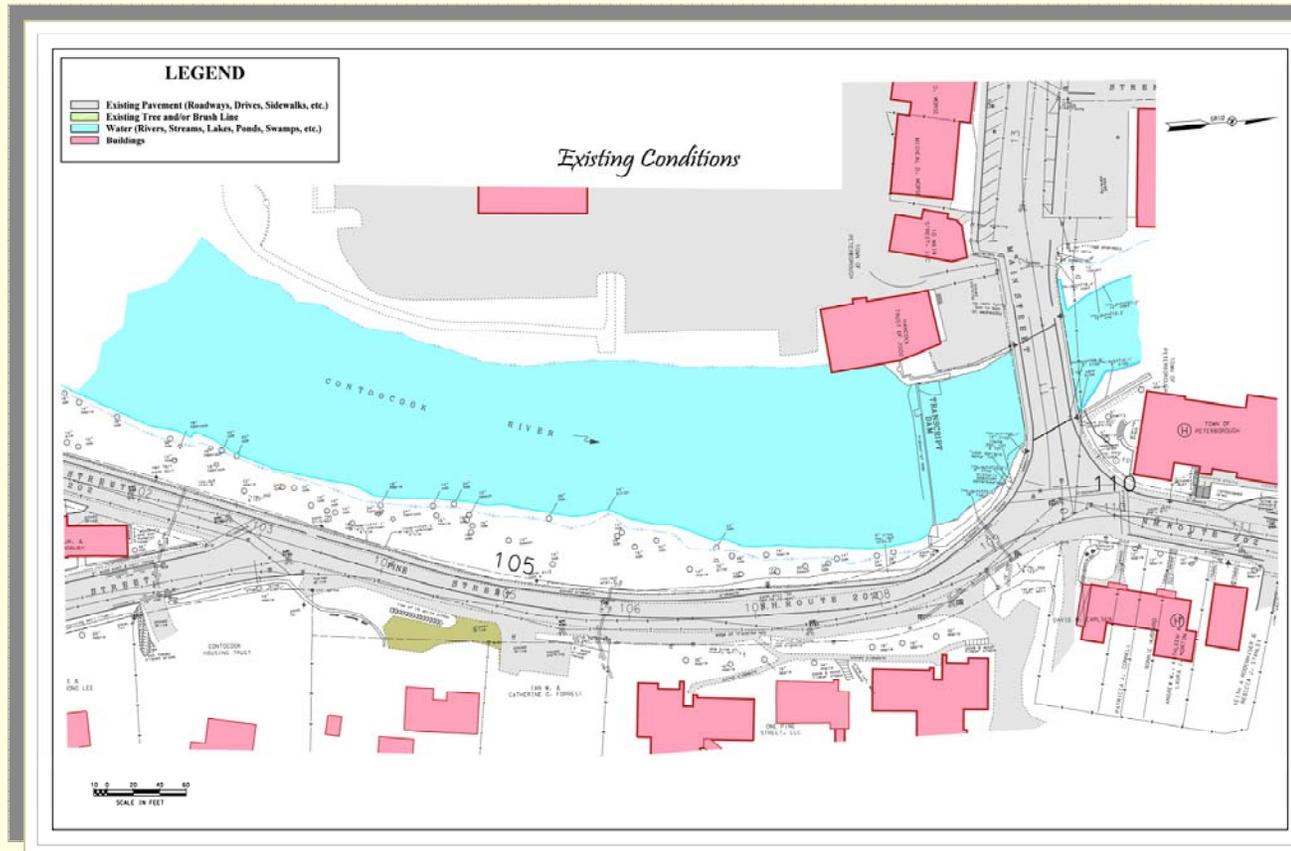
Roadway Concepts

- Existing Conditions
- Configurations Studied
- 2 Roadway / Intersection Concepts
 - Concept #1- Realignment of Route 202
 - Concept #2- Realignment with Oval at Main Street



Roadway Concepts

Existing Conditions



Town of Peterborough
Main Street Bridge, US 202 &
Retaining Wall Project

Hoyle, Tanner
& Associates, Inc.

Roadway Concepts

Existing Conditions – Design Elements

- Concord St. / US 202 / Pine St. Carries 14,000 VPD.
- Main Street Carries 7,200 VPD.
- Intersection meets warrant for signals (LOS = H).
- Horizontal alignment meets criteria for 25 MPH.
- Vertical alignment meets criteria for 20 MPH.



Roadway Concepts

Existing Conditions – Design Elements

- Posted speed is 30 MPH with 20 MPH advisory signage.
- Pavement layout is narrow through curves and presents safety issues.
- Curb reveal varies 0” – 4” +/-.



Roadway Concepts

Existing Conditions – Design Elements

- Pedestrian accommodations are provided but not safe due to pavement layout.
- Roadside barrier is sub-standard south of intersection.
- Utility poles in front of curb – north of intersection.



Roadway Concepts

Configurations Studied (Today and Design Year)

- Do Nothing (LOS H / LOS H)
- 3-Way Stop (LOS H / LOS H)
- Signalization (LOS F / LOS F)
 - Existing Lane Use Due to Others Impact Library
- Oval (LOS C / LOS D)
- Bypass – Not Studied



Roadway Concepts

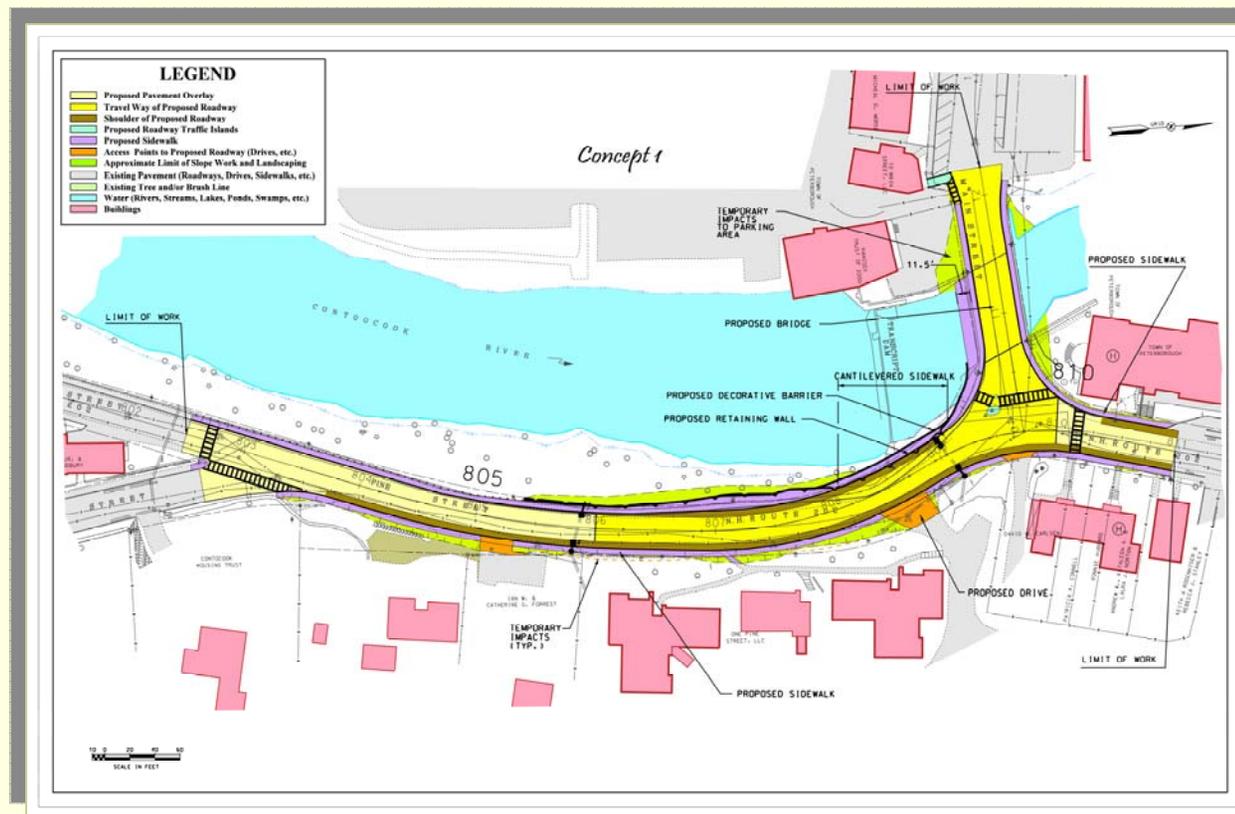
Roadway Context – Design Controls

- Historic Properties
- Pedestrian Movements and Safety – Link to Downtown
- Unique Visual Character of the Area
(Hardscape/Landscape Features)
- Contoocook River / Transcript Dam
- Accommodate Vehicular Movements
- Alleviate Backups by Increasing Capacity



Roadway Concepts

Roadway Concept #1



Town of Peterborough
Main Street Bridge, US 202 &
Retaining Wall Project

Hoyle, Tanner
& Associates, Inc.

Roadway Concepts

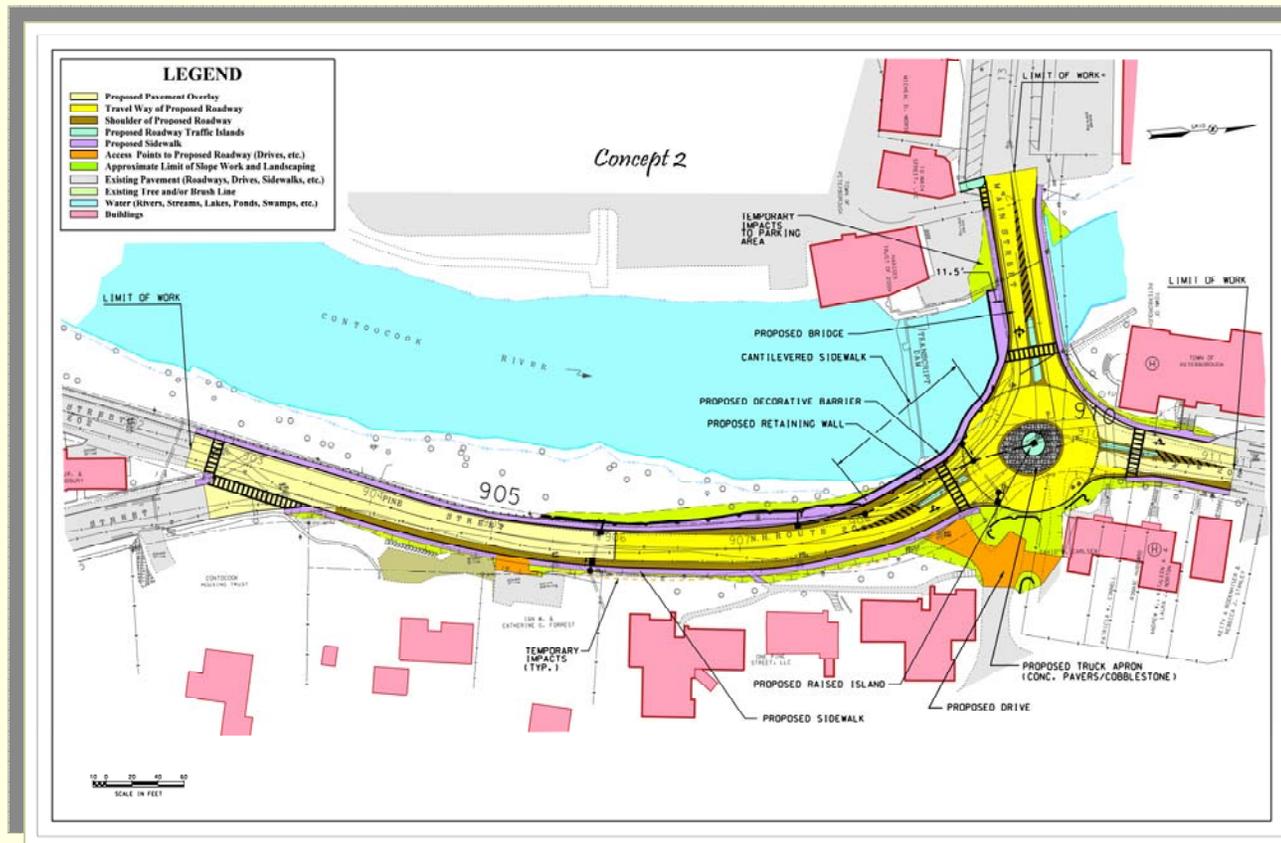
Roadway Concept #1

- Realigns Roadway and Widens Shoulders South of Intersection
- Better Traffic Movement
- Separation between Vehicles and Pedestrians
- Wide Pedestrian Sidewalks and Cross Walks
- Amenities Added
 - Benches, Planters, Railing
 - Lighting
- Minimal Right-of-Way Impacts
- Little or No Intersection Capacity Improvements
- Reconstructs 350' of Retaining Wall



Roadway Concepts

Roadway Concept #2



Town of Peterborough
Main Street Bridge, US 202 &
Retaining Wall Project

Hoyle, Tanner
& Associates, Inc.

Roadway Concepts

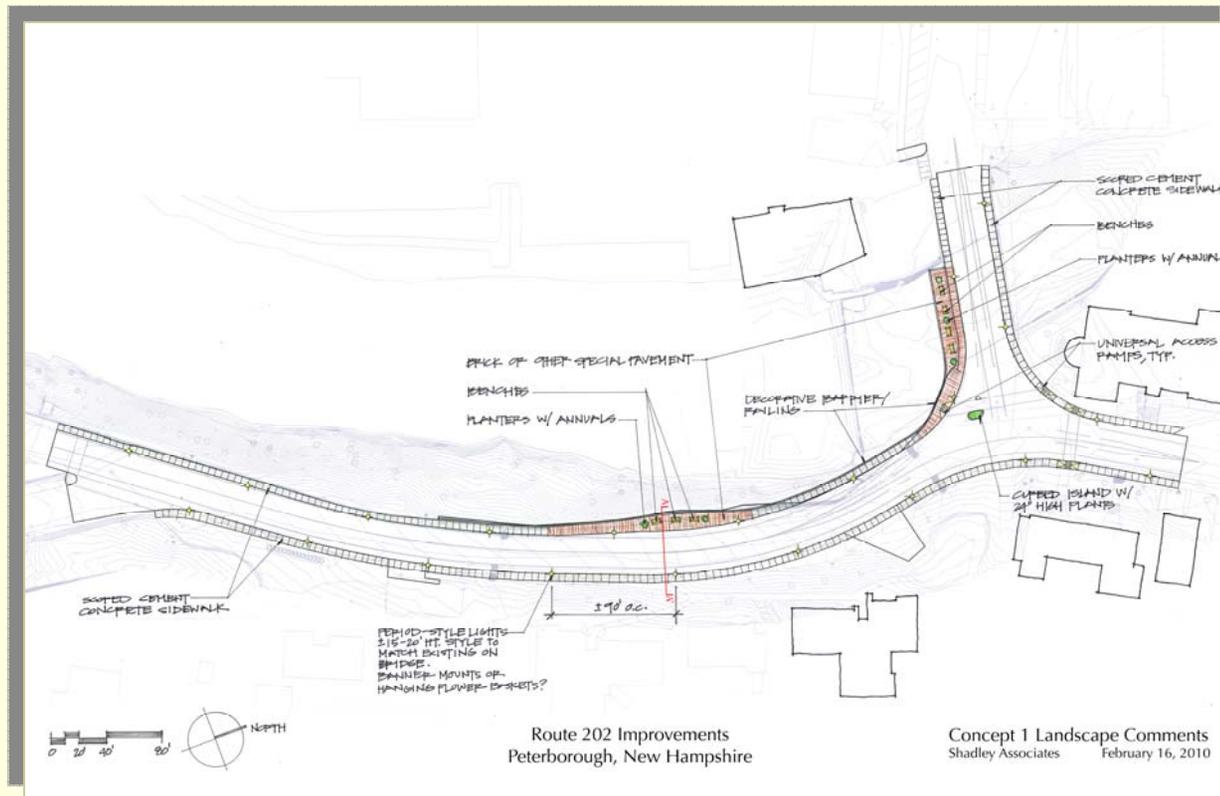
Roadway Concept #2

- Oval Proposed at Intersection (Accommodate MRI Vehicle)
- Reconstructs 400' of Retaining Wall
- Wide Pedestrian Sidewalk and Cross Walks
 - Amenities Added (Benches, Planters, Railings)
 - Lighting
- Improves Intersection Capacity (LOS C)
- Increased Opportunities for Enhanced Landscaping
- Right-of-Way Impacts
- Shared Drive (Wall/Grading)
- Roadway Safety Improvements
- Inherent Traffic Calming Properties
- Higher Cost Alternative



Roadway Concepts

Streetscape with Concept #1 – Plan View

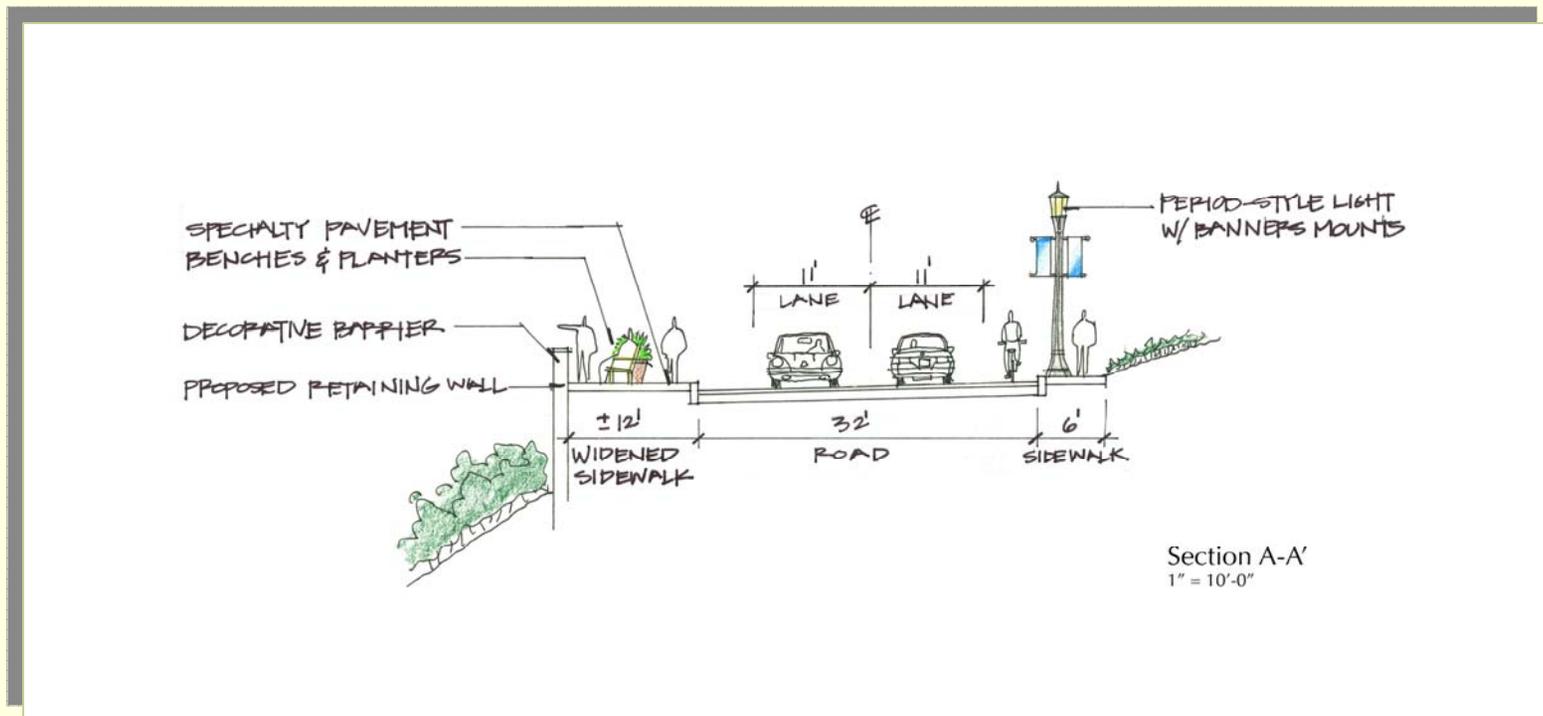


Town of Peterborough
Main Street Bridge, US 202 &
Retaining Wall Project

Hoyle, Tanner
& Associates, Inc.

Roadway Concepts

Streetscape with Concept #1 – Section View

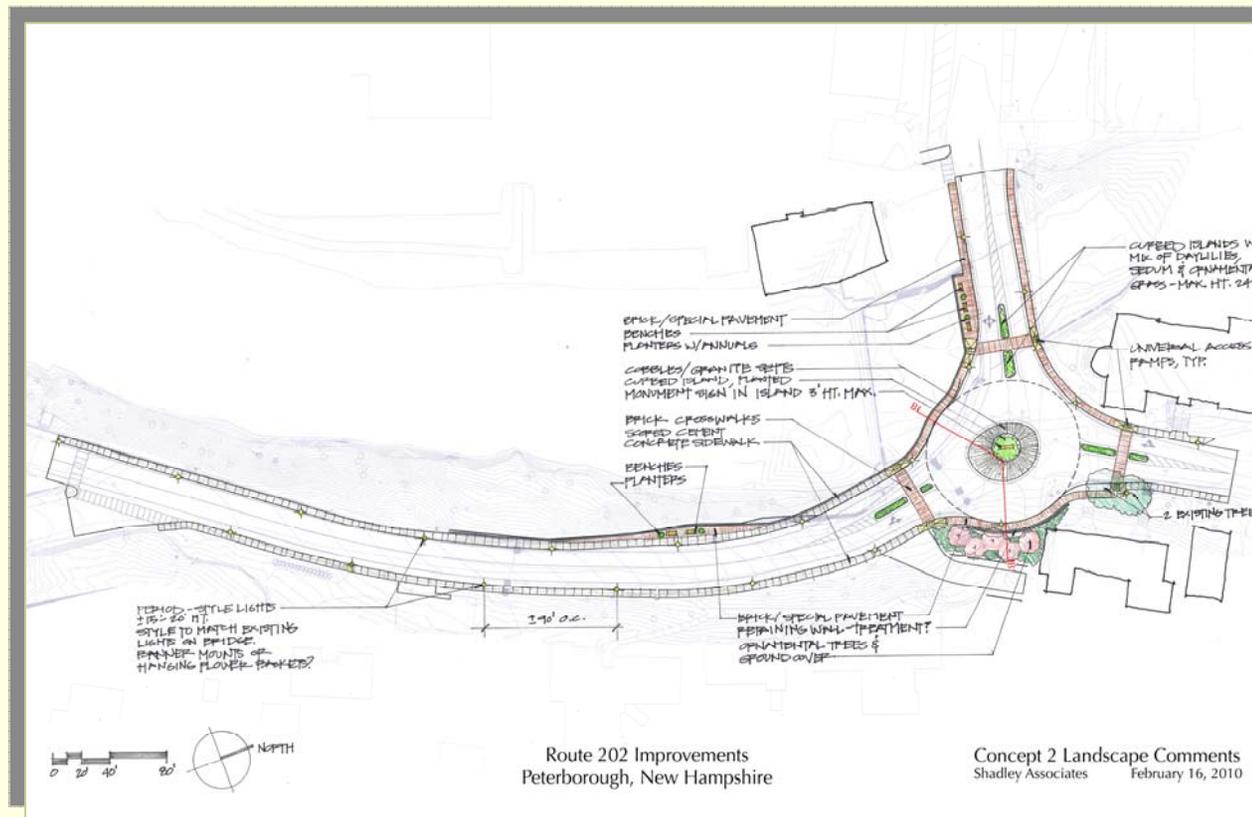


Town of Peterborough
Main Street Bridge, US 202 &
Retaining Wall Project

Hoyle, Tanner
& Associates, Inc.

Roadway Concepts

Streetscape with Concept #2 – Plan View

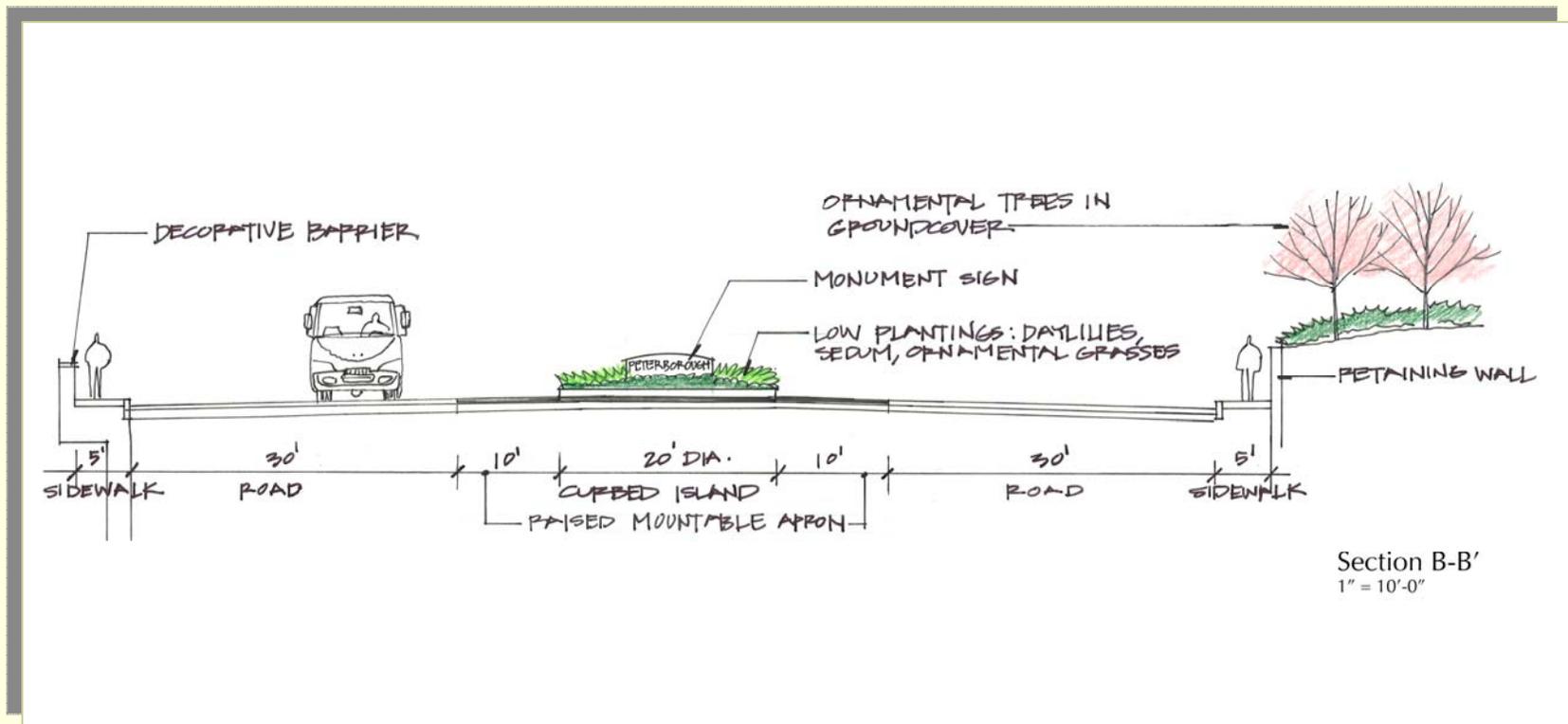


Town of Peterborough
Main Street Bridge, US 202 &
Retaining Wall Project

Hoyle, Tanner
& Associates, Inc.

Roadway Concepts

Streetscape with Concept #2 – Section View



Town of Peterborough
Main Street Bridge, US 202 &
Retaining Wall Project

Hoyle, Tanner
& Associates, Inc.

Traffic Control Concepts

2 Temporary Traffic Control Alternatives

- Temporary Bridge
- Phased Construction

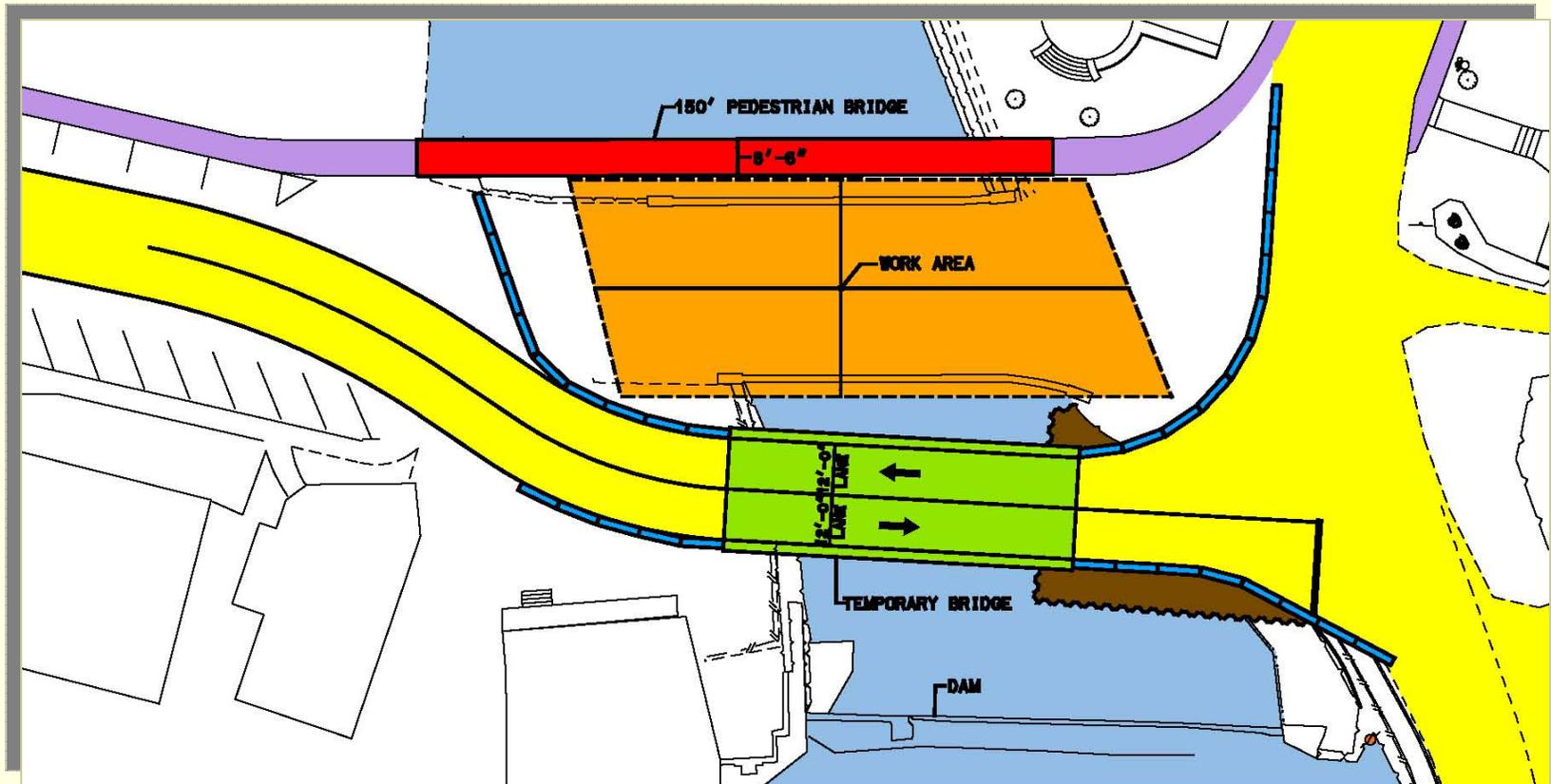
Alternatives Require Maintenance of Pedestrian Traffic too.



Town of Peterborough
Main Street Bridge, US 202 &
Retaining Wall Project

Hoyle, Tanner
& Associates, Inc.

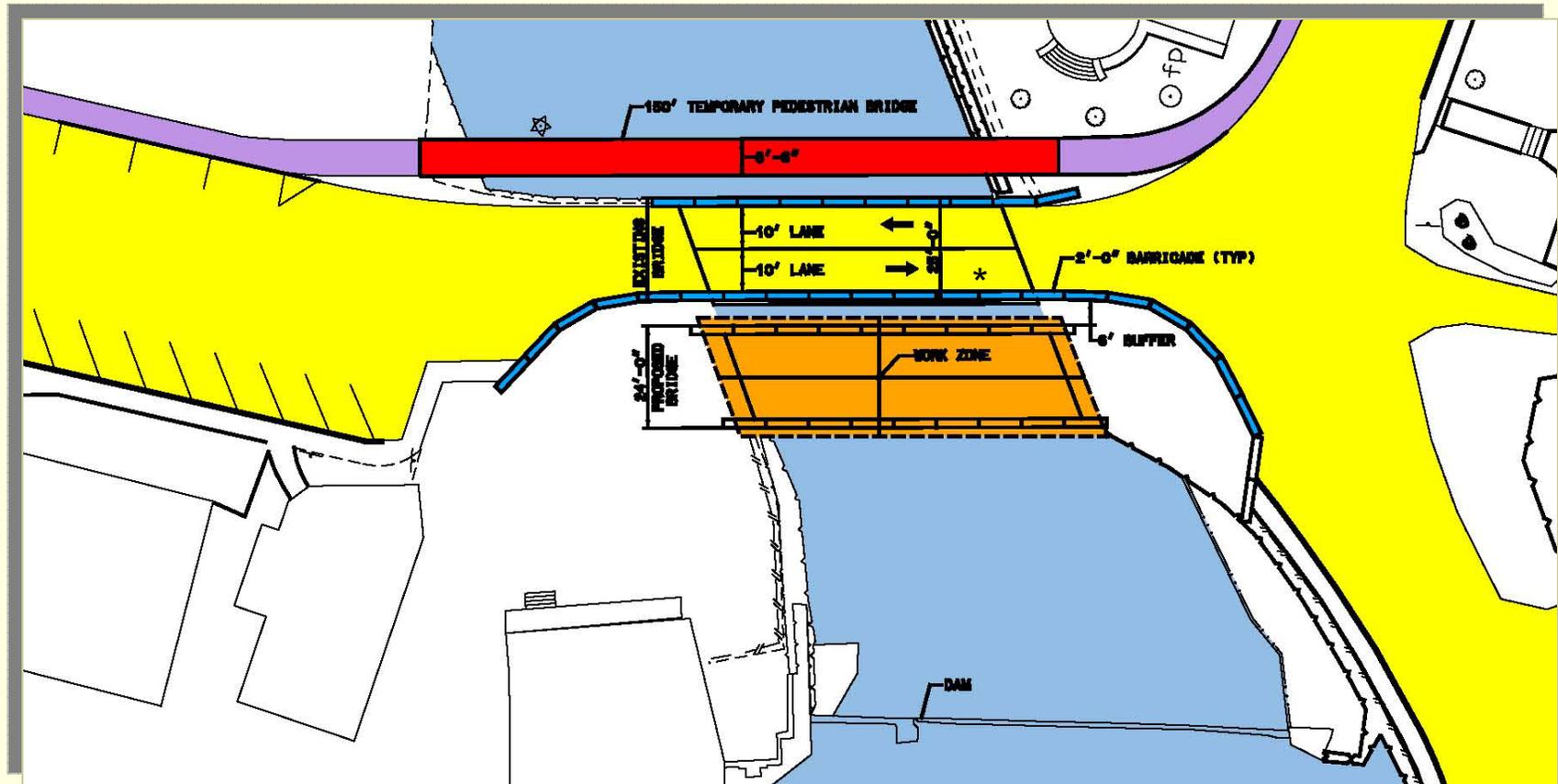
Traffic Control Alternative #1 – Temporary Bridge



Town of Peterborough
Main Street Bridge, US 202 &
Retaining Wall Project

Hoyle, Tanner
& Associates, Inc.

Traffic Control Alternative #2 – Phased Construction - Phase 1



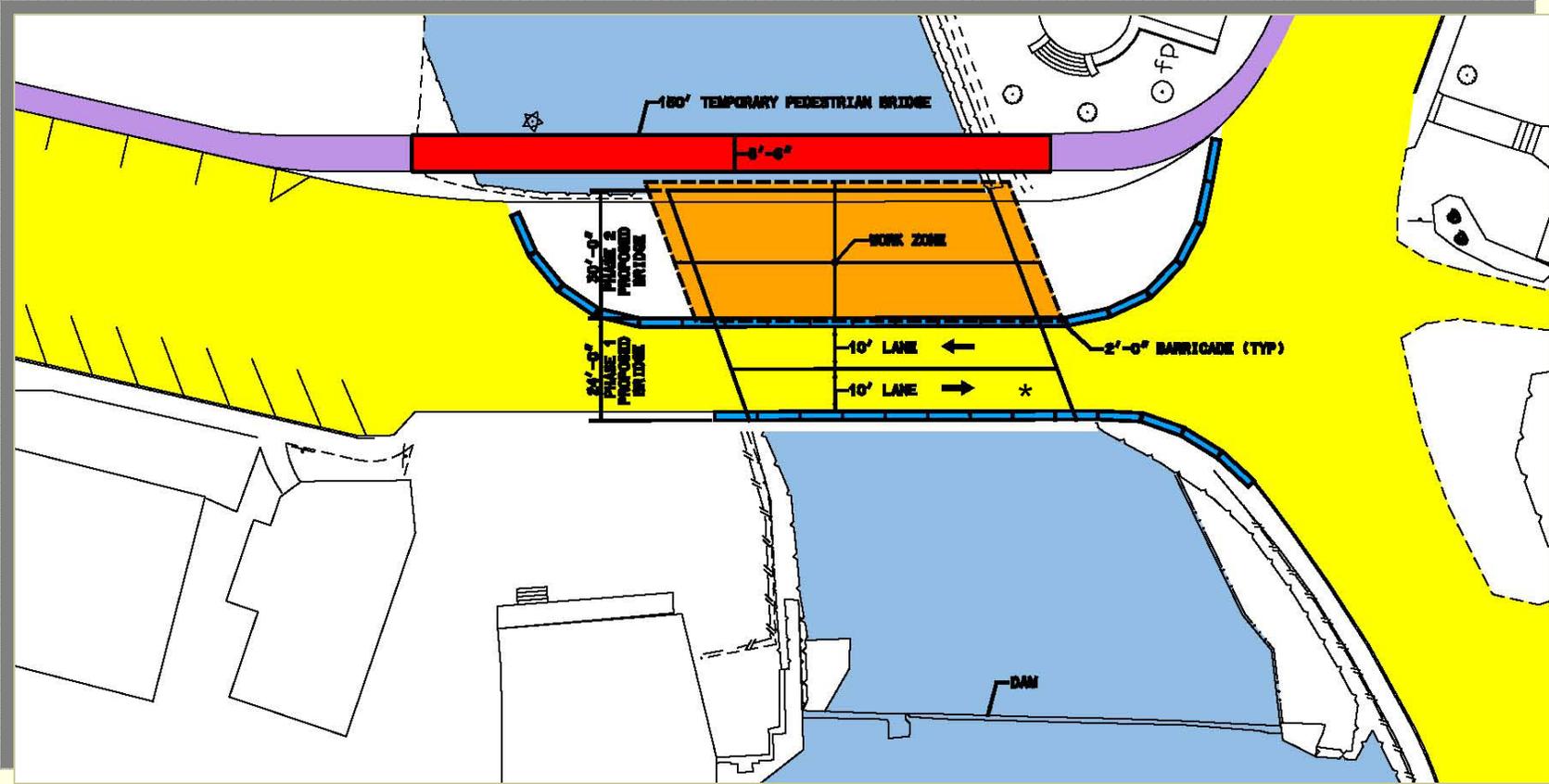
* Eastbound - Yield or Stop Condition



Town of Peterborough
Main Street Bridge, US 202 &
Retaining Wall Project

Hoyle, Tanner
& Associates, Inc.

Traffic Control Alternative #2 – Phased Construction - Phase 2



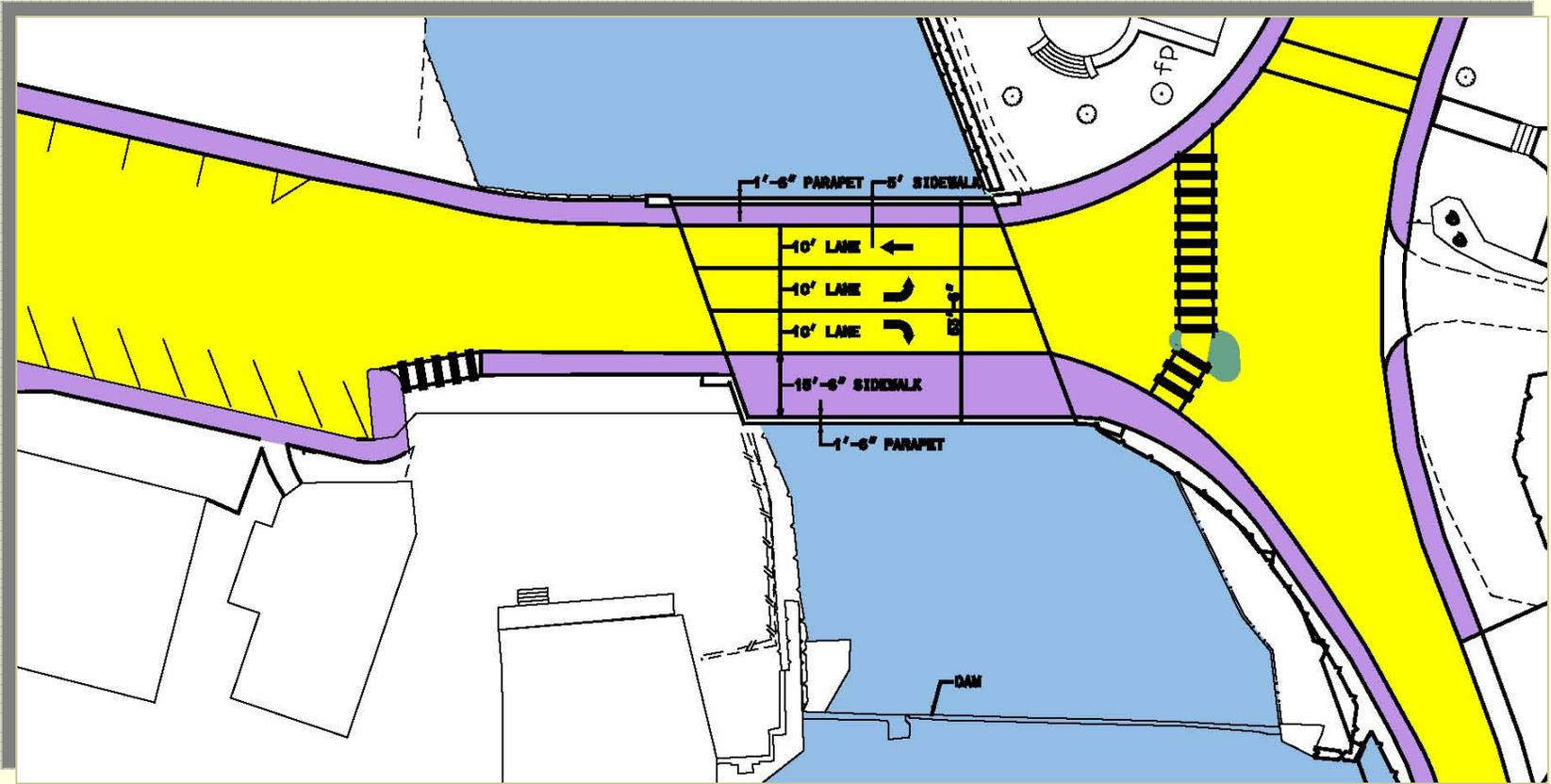
* Eastbound - Yield or Stop Condition



Town of Peterborough
Main Street Bridge, US 202 &
Retaining Wall Project



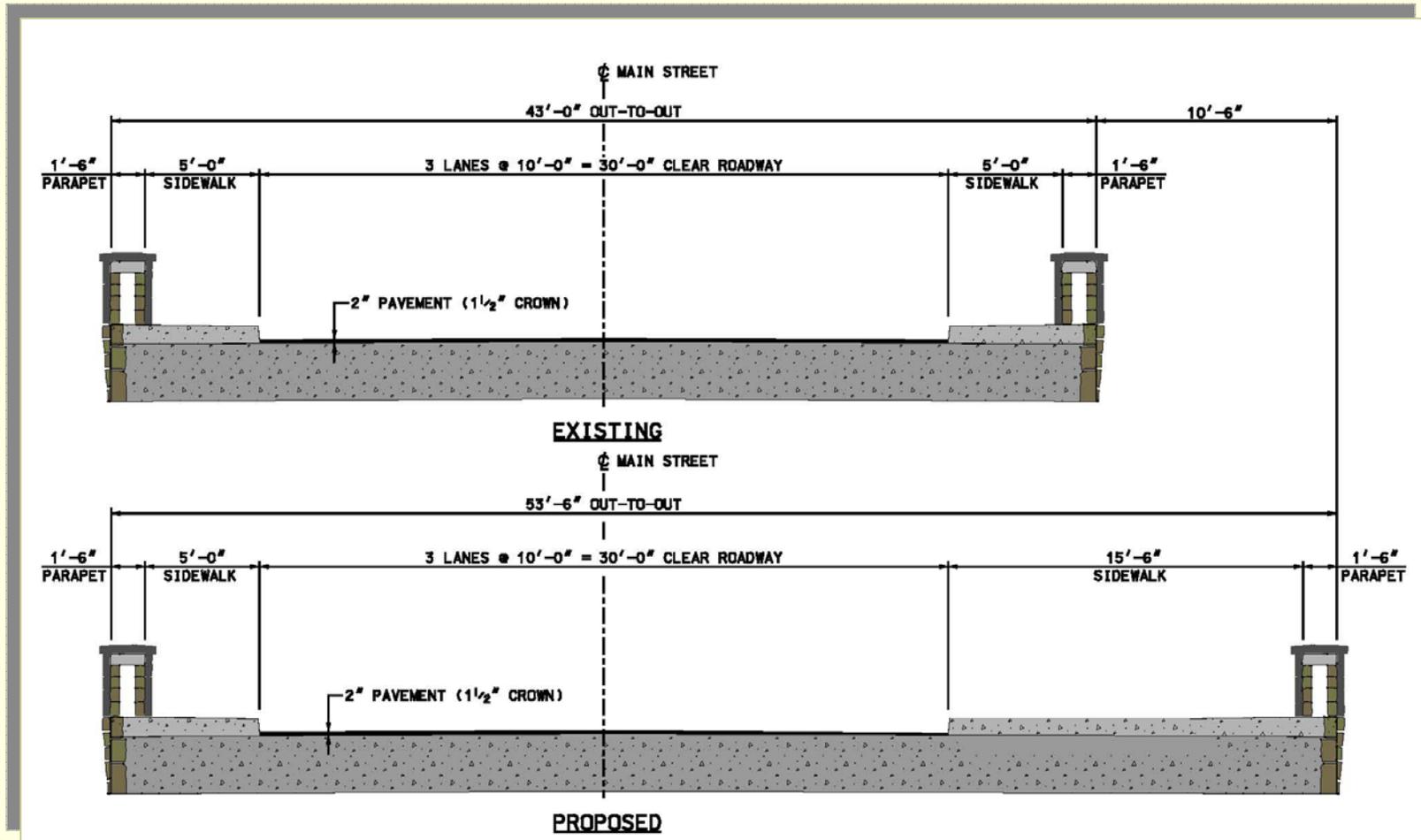
Traffic Control Alternative #2 – Phased Construction - Final



Town of Peterborough
Main Street Bridge, US 202 &
Retaining Wall Project

Hoyle, Tanner
& Associates, Inc.

Traffic Control Alternative #2 – Phased Construction - Typical Sections



Town of Peterborough
Main Street Bridge, US 202 &
Retaining Wall Project

Hoyle, Tanner
& Associates, Inc.

Traffic Control Concepts

Traffic Control Matrix

Alternative	Bridge (only) Construction Cost with 15% Contingency	Construction Duration	Environmental Impacts	Bridge Width	Traffic Impacts
#1 Temporary Bridge	\$3.25M	1.5 Seasons	Most	Match Existing +/-	Reduced Capacity
#2 Phased Construction	\$4.00M	2 Seasons	Least	Allows Wide Sidewalk	Maintain Existing +/-



What's Next?

- Select a Bridge Span and Type
- Select Roadway Concept
- Select Traffic Control Concept / Bridge Width
- Refine Landscaping and Retaining Wall Concepts
- Refine all Selected Concepts
- Present Refined Concepts at Upcoming Meeting
- Complete Engineering Study

