Walpole – Charlestown 14747
Reconstruction of NH Route 12
PAC Meeting 4-12-16
Existing Conditions and Need for the Project

- The existing pavement is 24 feet wide with no shoulders, pedestrians and bicyclists must use the roadway
- 50 MPH Design and Posted Speed Limit
- The 2013 Average Daily Traffic is 6320 vehicles
- Southern roadway embankments show signs of failure
- Pavement shows signs of deterioration
- Accident history associated with lack of shoulders, need for updated guardrail in some areas and appropriate safety zone between the roadway and river/railroad.
- Geometric Constraints (River, Railroad, NH Route 12A Bridge)
- Areas of substandard drainage
NH Route 12
Originally Proposed Design

• Alternatives Considered during the Design Process:
  o No Build
  o Western Alignment Shift (Alternative 2)
  o Eastern Alignment Shift (Alternative 3)
  o Eastern Bypass (Alternative 4)
  o Online Alignment with Retaining Walls (Alternative 5)
  o Hybrid, Northern Segment Westward Shift (Alt 3-2-2)
  o NH Route 12/12A Intersection Reconfiguration (Alt 3-2-2A & Alt 3-2-3A)

• Rationale used for the selection of Alternative 3-2-3
  o Avoids impacts to the river in the southern and northern segments
  o Avoids costly impacts to a steep slope located east of the railroad in the middle section
  o Avoids extensive impacts to surrounding properties
  o Estimated construction cost approximately $15 million to $20 million
Design and Construction Challenges Associated with the Selected Alternative (3-2-3)

- Design Coordination with the Railroad
- Geotechnical Issues – Blasting next to active railroad (6 - 8 trains a day)
- Construction Phasing
- Mildly Contaminated Materials – Railroad Ballast
- Construction Schedule (min of 4 years)
- Cost - $33 + Million (Department’s Program cannot support the cost of this project as designed).
Proposed Design Constraints

- No impacts to the railroad tracks.
- No impacts to the NH Route 12A Bridge.
- No impacts to archaeological area No. 10.
- Minimize traffic impacts.
- Consider Utility relocations.
Features Investigated for the Proposed Design

• Design of an alignment that minimizes a westerly shift to the existing roadway alignment to an offset that is required for roadway reconstruction (without impacting the railroad tracks) and also allows for traffic control during construction.
• Minimize traffic impacts.
• Revised the proposed roadway profile to maintain existing railroad drainage.
• Construction Costs.
• Two riverside design features were investigated:
  • Armored Slopes with Surface Vegetation
  • Retaining Walls
Proposed Alternative Design

• Western Alignment Shift (Alternative 2)
• Minimizes impacts to the railroad (encroachment only), no impacts to the railroad tracks.
• Minimizes overall volume of blasting and the release of nitrates into the environment.
• Avoids a pre-split rock cut and tree clearing east of the railroad tracks.
• Minimizes the construction schedule (2 years).
• Eliminates impacts to the Fall Mountain State Forest.
• Minimizes construction costs.
## Construction Costs

<table>
<thead>
<tr>
<th>Estimated Construction Costs</th>
<th>Southern Segment</th>
<th>Northern Segment</th>
<th>Estimated Total Project Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative 3-2-3</td>
<td>$22,696,000</td>
<td>Current Design</td>
<td>$10,010,000</td>
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<tr>
<td>Alignment w/o Impacts to the RR (Retaining Wall)</td>
<td>$15,610,000</td>
<td>Alignment w/o Impacts to the RR (Retaining Wall)</td>
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<td>Alignment w/o Impacts to the RR (Armored Riverbank)</td>
<td>$9,837,000</td>
<td>Alignment w/o Impacts to the RR (Armored Riverbank)</td>
<td>$7,192,000</td>
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</tbody>
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Proposed Armored Slopes with Surface Vegetation - Southern Typical
Proposed Armored Slopes with Surface Vegetation - Northern Typical
Advantages of Armored Slopes with Surface Vegetation.

- Can be designed to allow for quick reestablishment of the riparian buffer.
- Stabilizes the riverbank slope (southern segment) against failure.
- Provides more natural views from the Connecticut River.
- Provides habitat for wildlife.
- Prevents future impacts to the slopes for retaining wall maintenance and repair.
- Lowest estimated construction cost.
Example of Armored Slopes with Surface Vegetation

NH Route 63 – Chesterfield (Spofford Lake)
Example of Armored Slopes with Surface Vegetation

I-93 Southbound at Exit 2
South of Brookdale Road
in Salem, N.H.
Proposed Retaining Wall Typical
Retaining Wall Disadvantages

- Greater duration for construction and impacts to traffic.
- Significant increase in construction cost compared to the armored slope with surface vegetation option.
- Potential failure of the existing 1:1 slope (southern segment) below the wall before, during and after construction.
- Need for future maintenance and replacement.
- Vandalism/graffiti.
- Prevents wildlife passage.
- Aesthetics.
Example of Retaining Wall

I-293 – Manchester (Merrimack River)
Recommendation: Armored Slope with Surface Vegetation Design

- Stabilizes the Existing Riverbank Slopes
- Eliminates Future Impacts to the Riverbank Slopes due to Retaining Wall Maintenance/Repair
- Balances Environmental Impacts
- Minimizes Impacts to the Traveling Public
- Minimizes Construction Duration
- Minimizes Costs ($10 + Million less than Retaining Wall Option)
Preliminary Permanent Impacts for Proposed Armored Slope with Surface Vegetation Design

- 2.5 AC of ACOE jurisdictional wetland impacts
- 3.4 AC of NHDES jurisdictional bank impacts
- Increase of 2.4 AC of impervious area due to proposed paved shoulders (same for all options).
- A Hydrologic and Hydraulic study is required. Impacts are anticipated to be negligible.