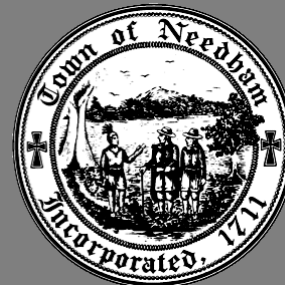


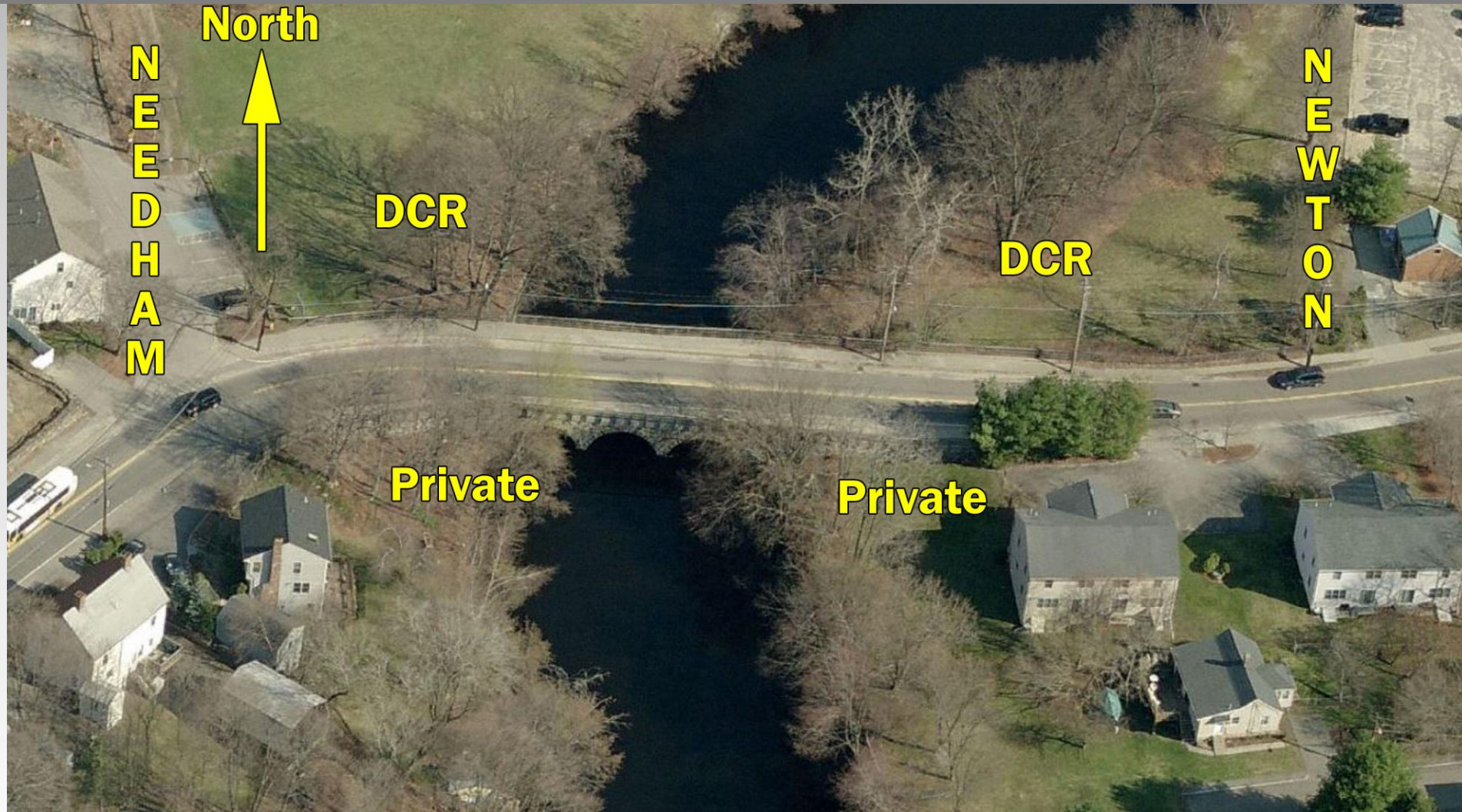
Rehabilitation of Central Avenue / Elliot Street Bridge



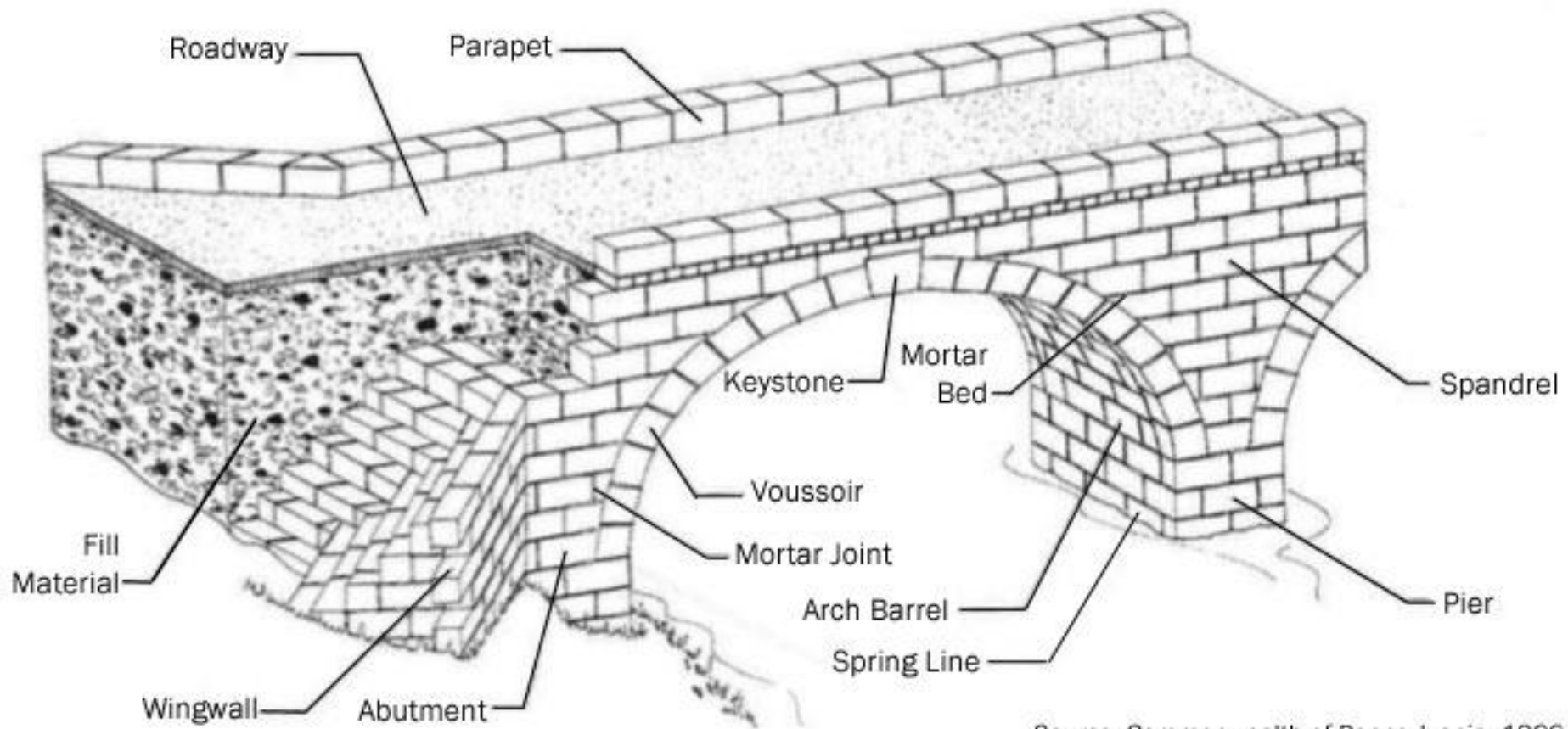
October 29, 2015



Overview



Arch Bridge Construction



Source: Commonwealth of Pennsylvania, 1986

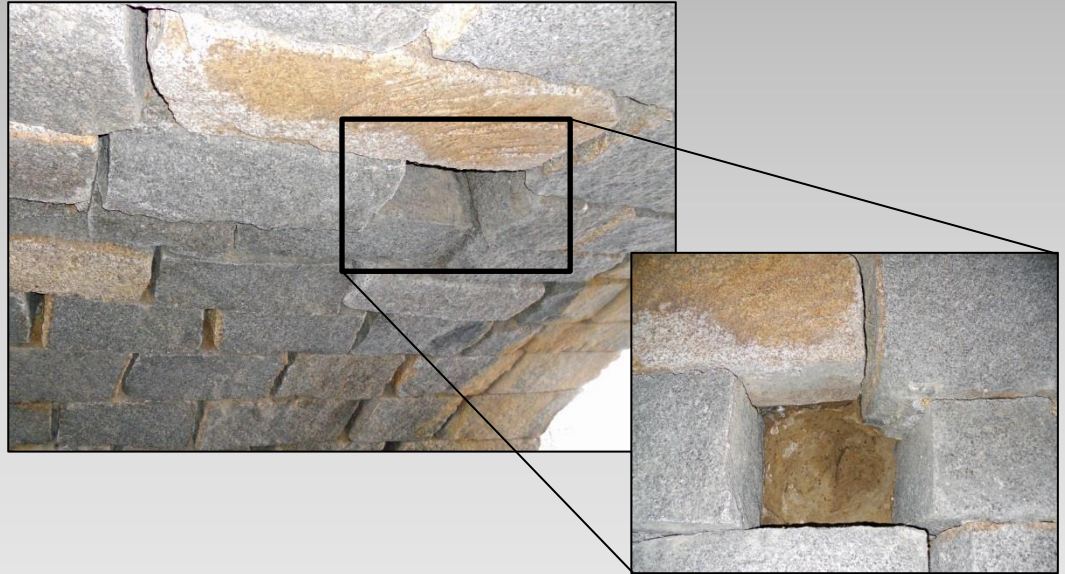
History



Cook's Bridge

- Newton Upper Falls Historic District Contributing Element
- Unknown Construction Date
- 1844: First Repair Records
- 1897: Widened from 25 ft to 40 ft
- 1970: North Sidewalk and Piers
- 1991: Roadway & Sidewalk Replaced, South Sidewalk Added

Deficiencies



Arch Barrel

- Deteriorated Stones along Spring Line
- Movement of Stones
- Large Gaps Between Stones
- Main Stones Fallen Out
- Reduced Load Capacity by MassDOT

Deficiencies



North Spandrel Wall

- Loose Stones Throughout
- Moveable by Hand
- Large Voids Behind Stones
- Soft/Breakable Stones



Northwest Wingwall

- Bulging Stone Wall
- Increased Fill and Loads from Sidewalk

Proposed Rehabilitation



Project Goals

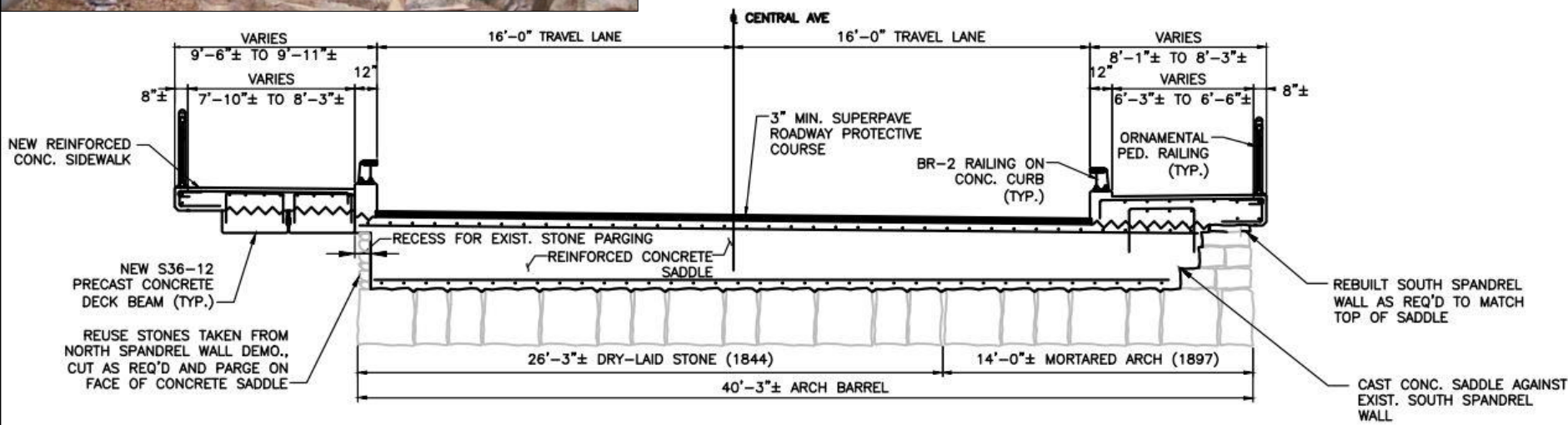
- Restore Load Capacity
- Stop Movement of Stones
- Repair Voids
- Stop Water Infiltration/Loss of Fill
- Long Term Fix (75+ Year Service Life)
- Comply with Section 106 of Historic Preservation Act

Proposed Rehabilitation

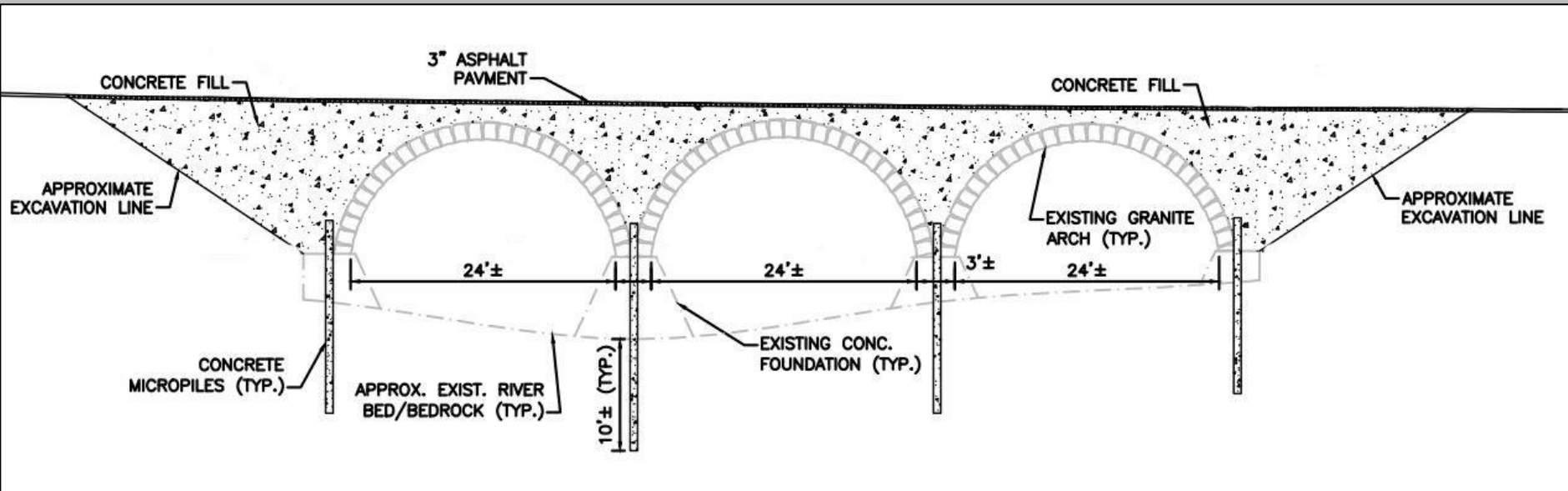
Concrete Arch Saddle

- Remove Gravel Fill and Replace with Reinforced Concrete
- Remove North Spandrel Wall / Reuse Stones as Veneer

Photo: New York Department of Transportation, 2010



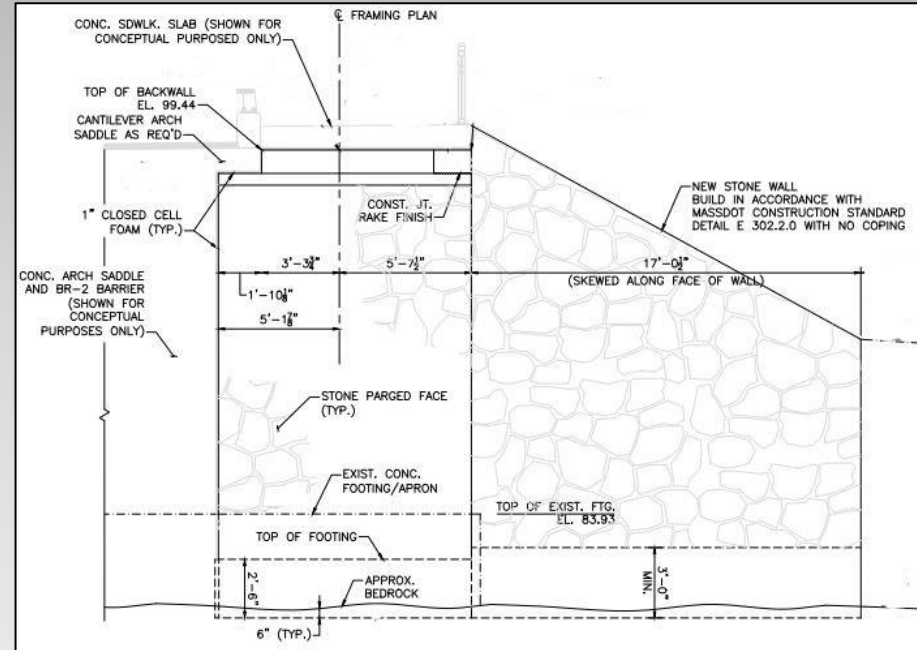
Proposed Rehabilitation



Concrete Filled Micropiles

- Drilled Through Existing Piers and Abutments
- Supports Arch Saddle
- Relieves Deteriorated Stones at Spring Line

Proposed Rehabilitation



Northwest Wingwall

- Replace Wall
- Concrete Wall with Stone Veneer
- Reuse Original Stones

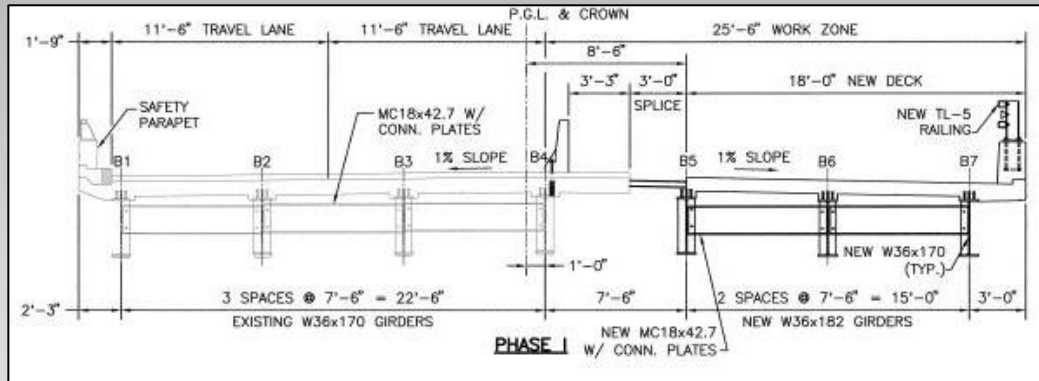
Pedestrian Amenities

Pedestrian Amenities

- Wider Sidewalks
- Ornamental Railings
- Vehicle Railing at Curb
- Benches
- Ornamental Lighting
- Banners
- Interpretive Panel
- Removal of Aerial Wires



Why Must Bridge Be Closed?



Conventional Bridge

- Concrete Deck on Beams
- Beams Support Strip of Deck
- Cut Deck without Impacting Adjacent Section



Stone Arch Bridge

- Fill Cannot be Excavated Vertically Without Temporary Sheet piling
 - Not Possible on Bridge
- Unloaded Sections of Arch would be Vulnerable to Unbalanced Loads and Vibrations from Traffic

Photo: Washington County DPW, Maryland, 2009

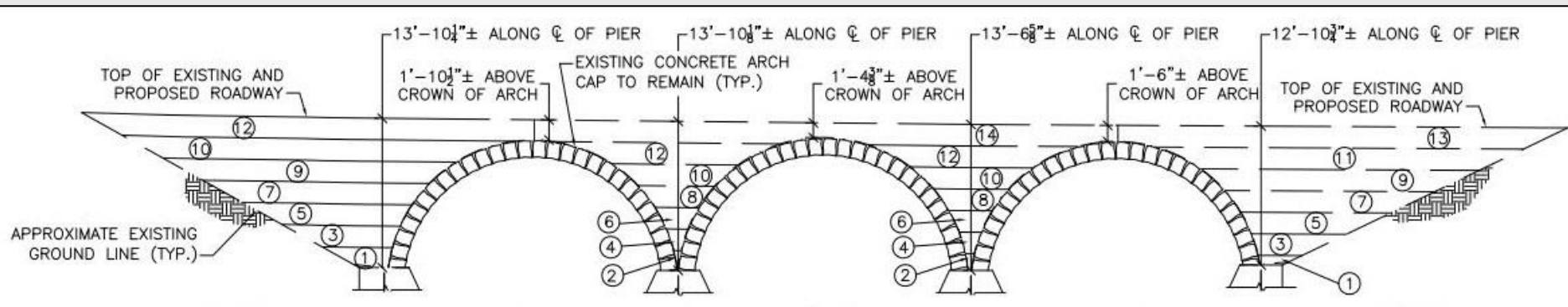
Closure Period

Bridge Closure

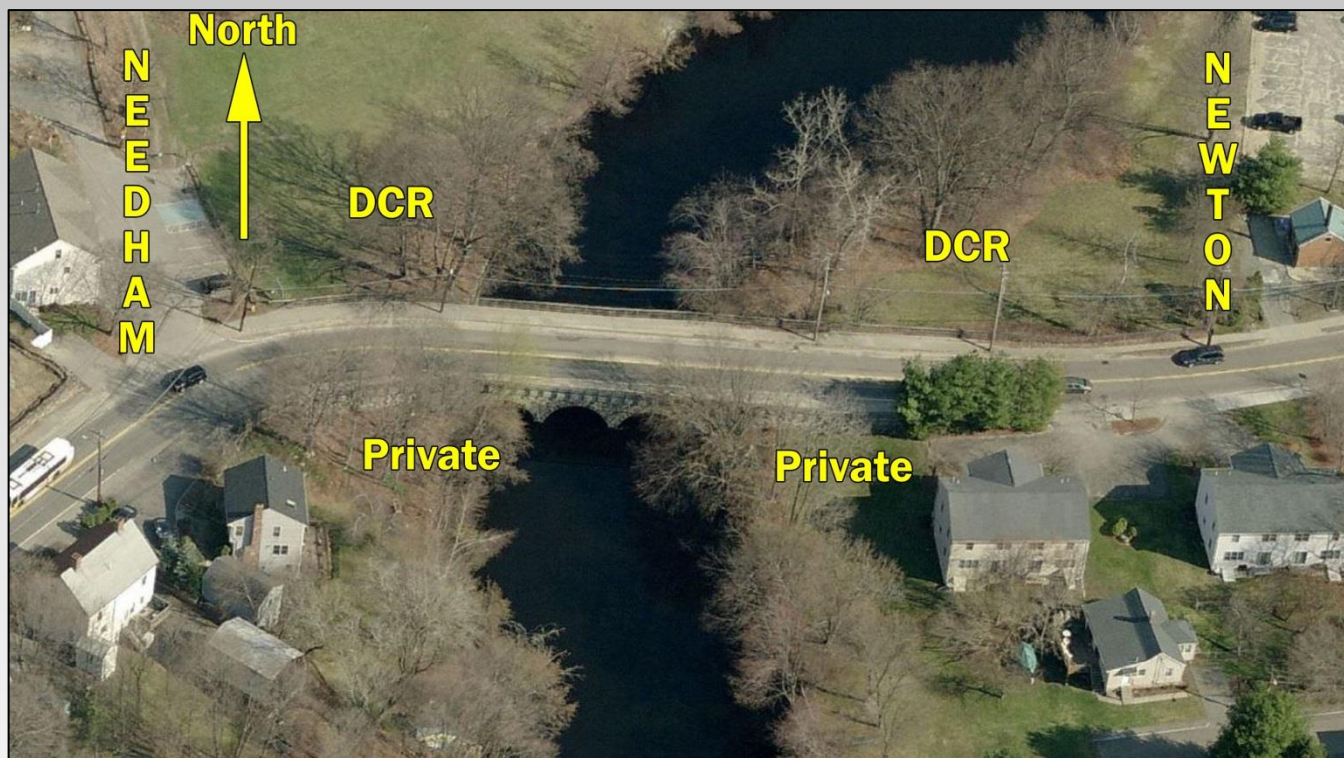
- Anticipated July to Dec. 2016
 - Preliminary Analysis
 - Detailed Analysis to Come
- Delicate Excavation and Concrete Pour Sequences
- Concrete Cure Times
- Utility Coordination

Efforts to Minimize Closure

- Don't Close Until Prep Work Finished & Contractor Ready
- Reopen ASAP
- Reduced Lanes Before & After
- Incentive/Disincentive Clauses
 - Use of Extended Work Shifts
 - Preliminary Analysis Indicates Approx 1.5 Month Reduction



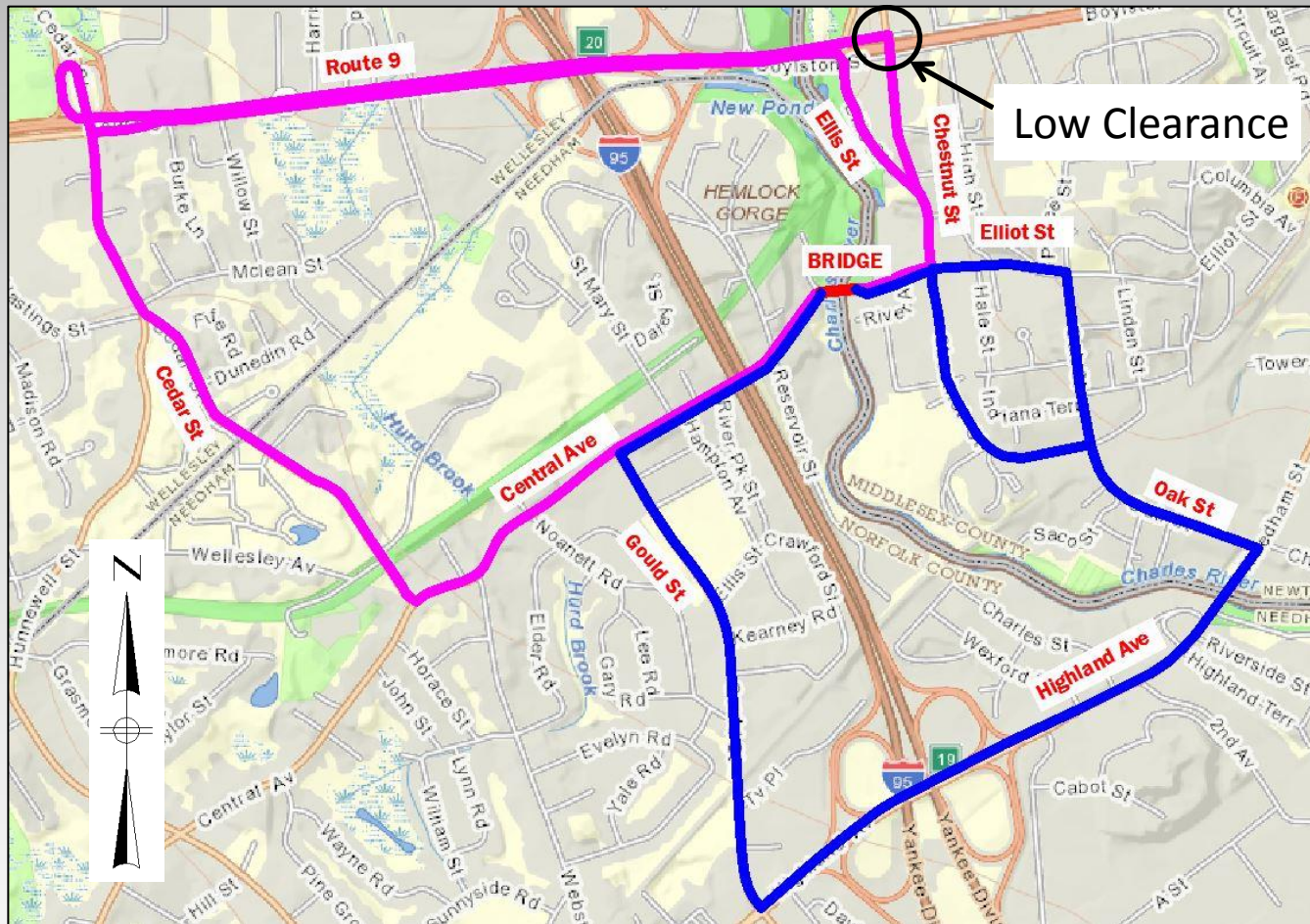
Why Not a Bypass Bridge?



Issues

- No Right-of-Way
- Environmental Impacts
- Historical Impacts
- Utility Impacts
- Schedule
- Cost

Detour Route



Detour

- Two Routes
- Northern (Pink): Cedar, Route 9, Ellis/Chestnut
- Southern (Blue): Gould, Highland, Oak/Chestnut
- Westbound Trucks Must Use Southern (Blue) Due to Low Clearance at Chestnut/Route 9

Why This Rehabilitation Method?

Meets Project Goals

- ✓ Restores Load Capacity
- ✓ Stops Movement of Stones
- ✓ Repairs Voids
- ✓ Stops Water Infiltration/Loss of Fill
- ✓ Long Term Fix (75+ Year Service Life)
- ✓ Complies with Section 106 of Historic Preservation Act

Investigated Alternatives

- ⊘ Bridge over Existing
- ⊘ Bridge within Confines of Spandrels
- ⊘ Slab-On-Grade
- ⊘ ARCHTEC Reinforcing
- ⊘ Rock Bolt Reinforcing
- ⊘ Lightweight Fill
- ⊘ Complete Replacement

What if Nothing is Done?

Future Concerns

- Continued Movement of Stones
- Loss of Stones and Deterioration
- Reduced Load Rating / Potential Truck Exclusion
- Liability to Town/City
- Sudden Failure
- Potential for Longer Closure and More Expensive Replacement

Conclusion

Questions?