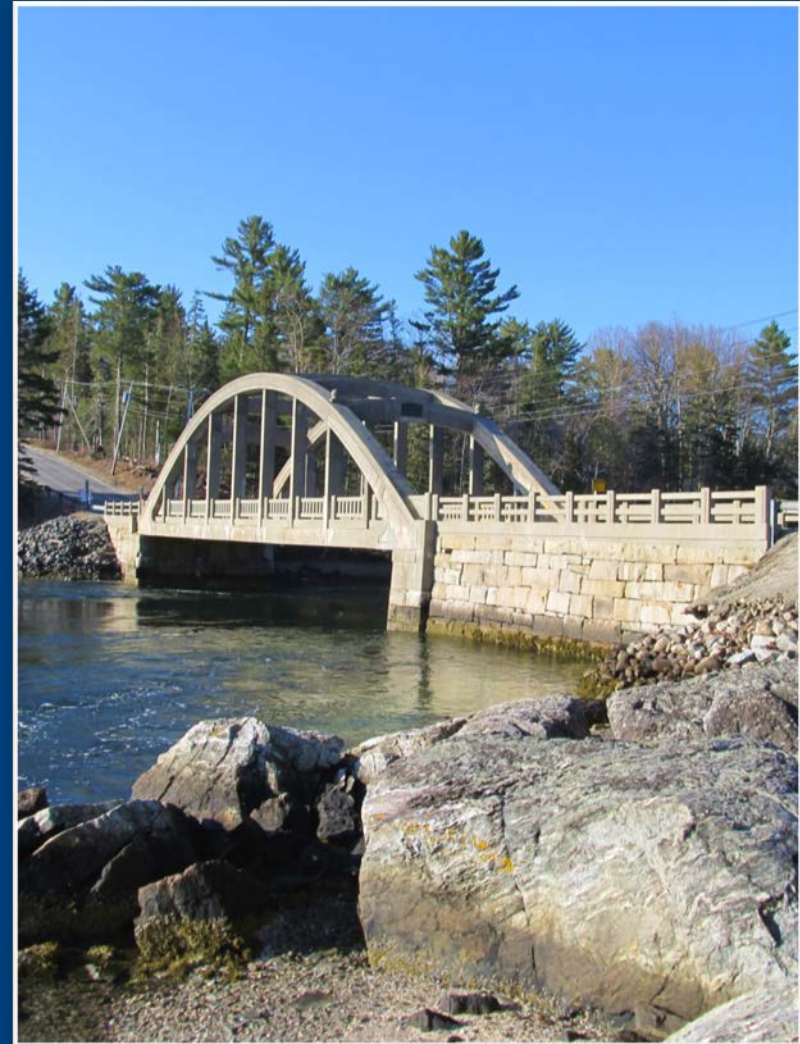


Falls Bridge Renewal Project Design Alternatives Summary



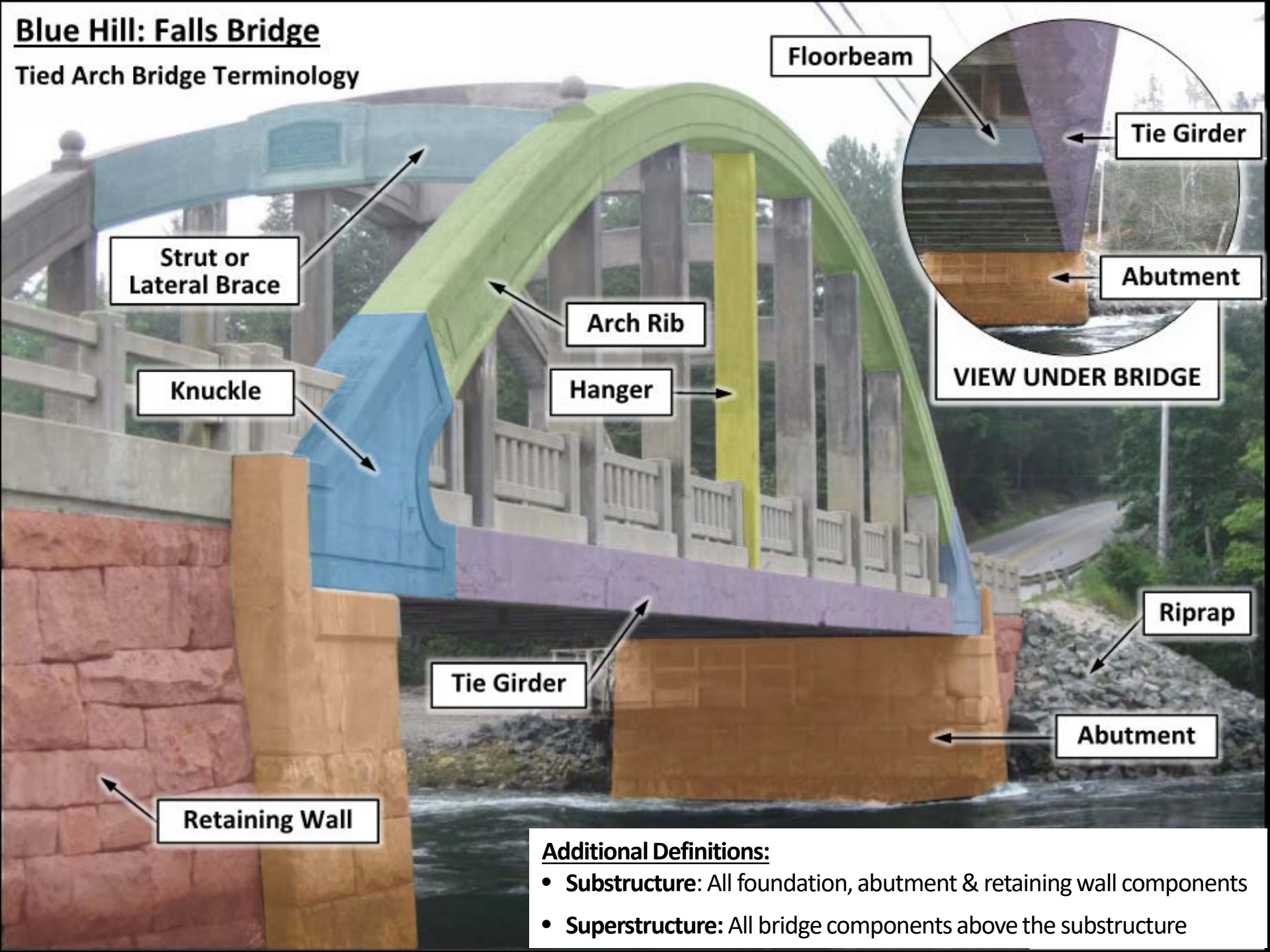
Index

1. Bridge Terminology
2. Existing Conditions
3. Rehabilitation Alternatives
 - Alternative Concepts
 - Construction Schedule
4. Replacement Alternatives
 - Alternative Concepts
 - Construction Schedule
5. Alternate Route
6. Temporary Bridge



Blue Hill: Falls Bridge

Tied Arch Bridge Terminology



Floorbeam

Strut or Lateral Brace

Tie Girder

Knuckle

Arch Rib

Abutment

Hanger

VIEW UNDER BRIDGE

Tie Girder

Riprap

Abutment

Retaining Wall

Additional Definitions:

- **Substructure:** All foundation, abutment & retaining wall components
- **Superstructure:** All bridge components above the substructure

Blue Hill: Falls Bridge

Tied Arch Bridge Terminology

Additional Definitions:

- **Fascia:** Exterior / Outside face of the bridge
- **Gutterline:** Intersection of the roadway surface and curb



Bridge Deck & Wearing Surface

Approach and Approach Pavement

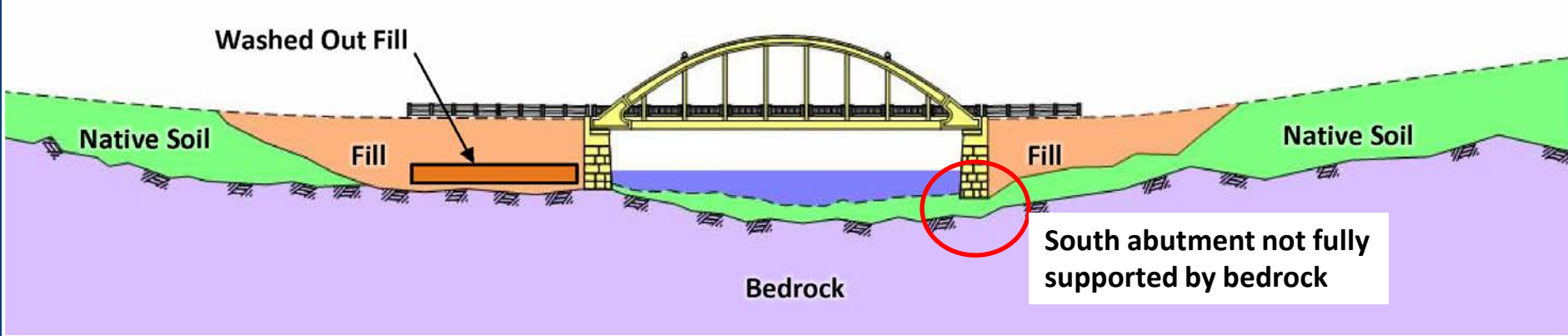
Bridge Drain

Bridge Curb

Bridge Railing

Approach Curb and Railing

2. Existing Conditions - Subsurface Soil



2. Existing Conditions - Hydraulics

Salt Pond Tidal Basin

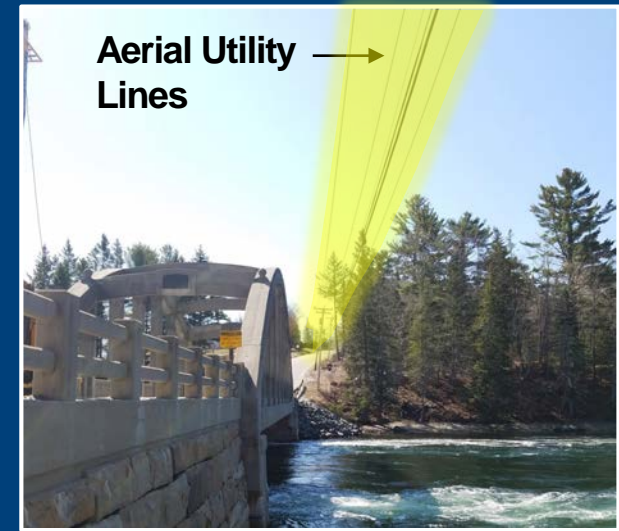
- Large tidal basin ~1.1 sq. mile
- Tidal variations of ~10.5' to 11.5' in Blue Hill Bay
- Tidal variations in Salt Pond somewhat less
- Falls bridge is only major inlet
- Tides create reversing falls beneath the bridge



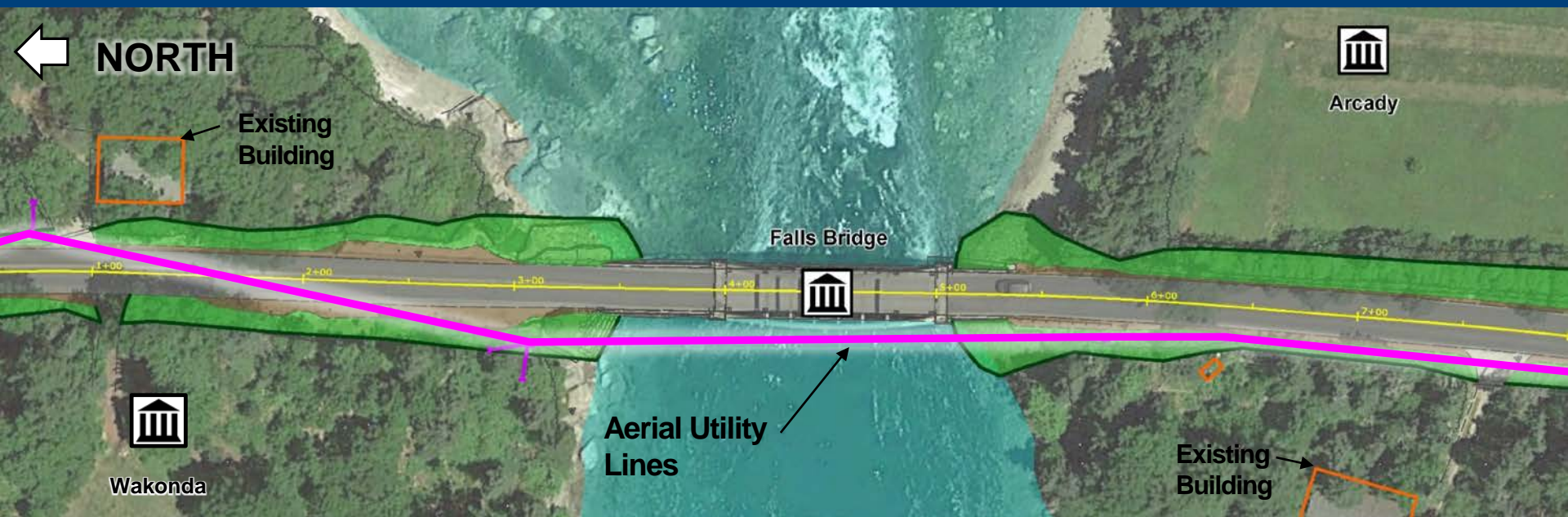
2. Existing Conditions - Utilities

Aerial Utilities Present:

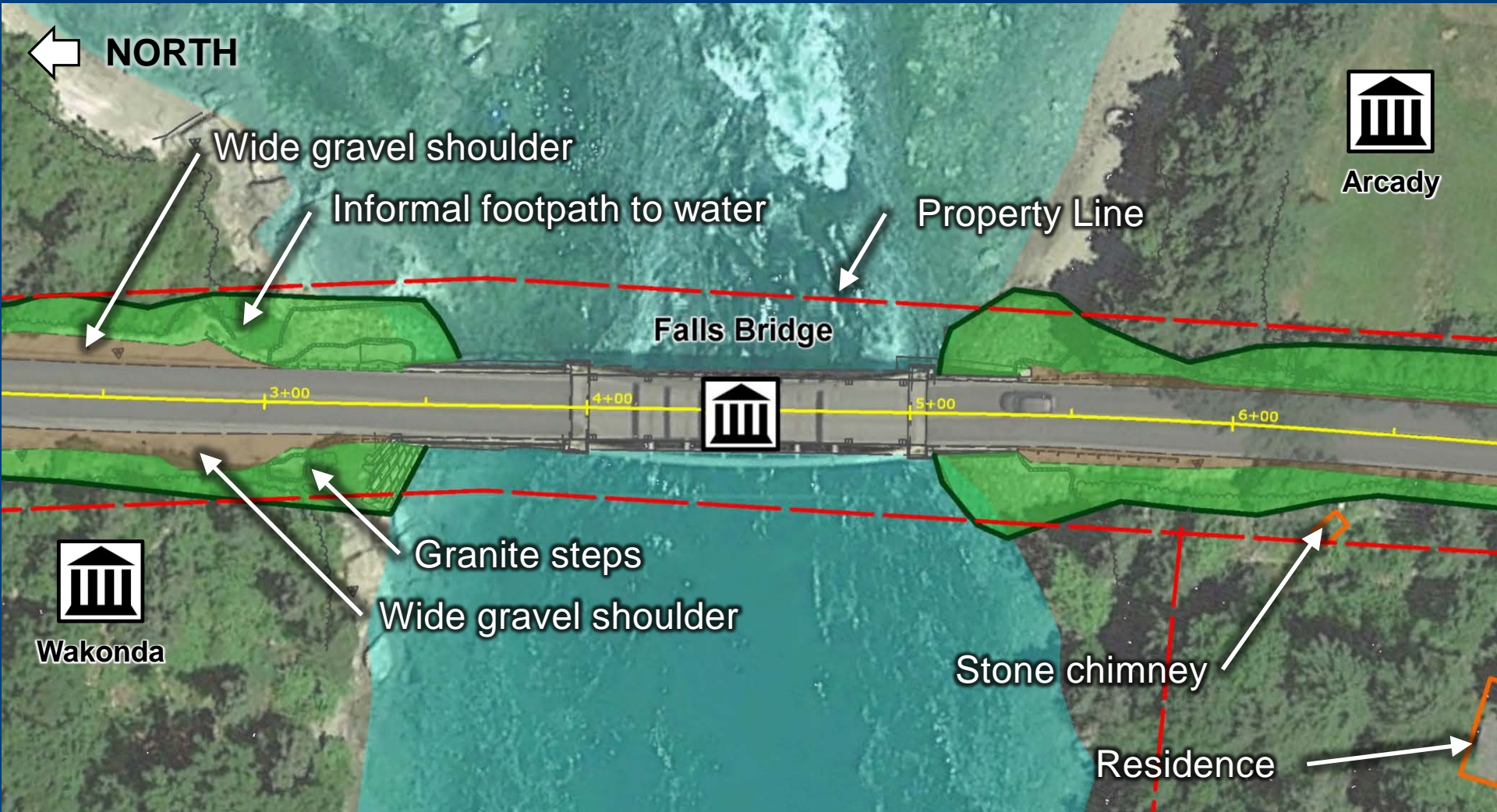
- Bangor Hydro Electric Company
- FairPoint Communications
- Time Warner Cable
- Temporary relocation required



Utility Lines West of Bridge



2. Existing Conditions - Site Features



2. Existing Conditions - Bridge Deck



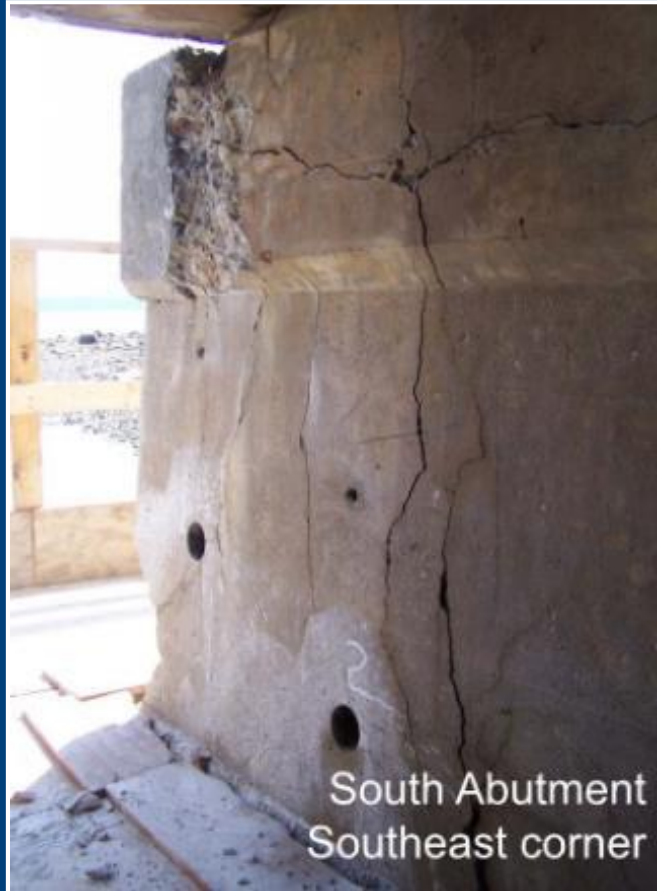
Concrete cracking

Area of previous repair

Exposed reinforcing

Deterioration on Underside of Deck

2. Existing Conditions – Bridge Substructure



Concrete Spalling at Abutment



Settling & Shifting Masonry

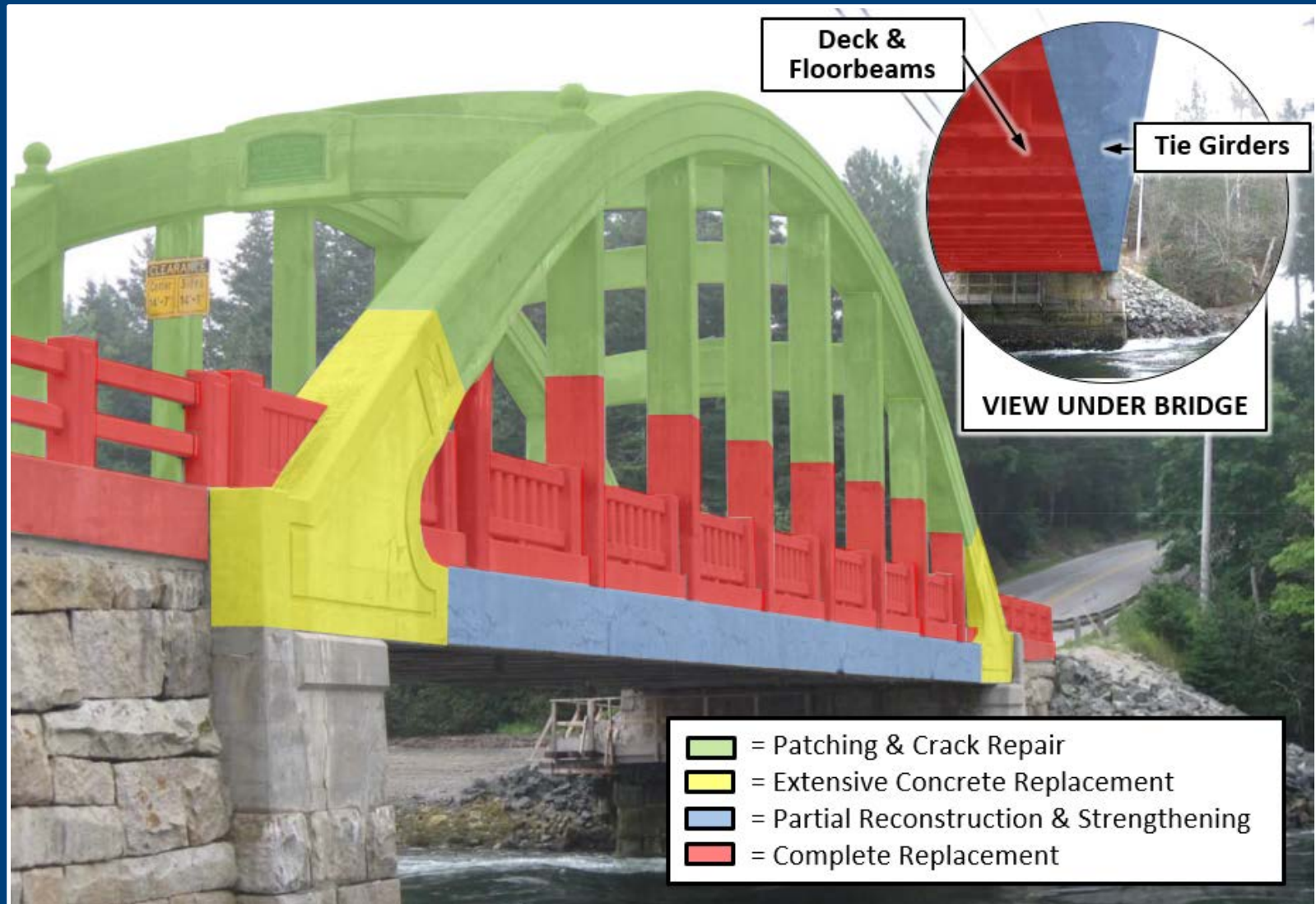
2. Existing Conditions - Bridge Superstructure



West Arch Tie Girder

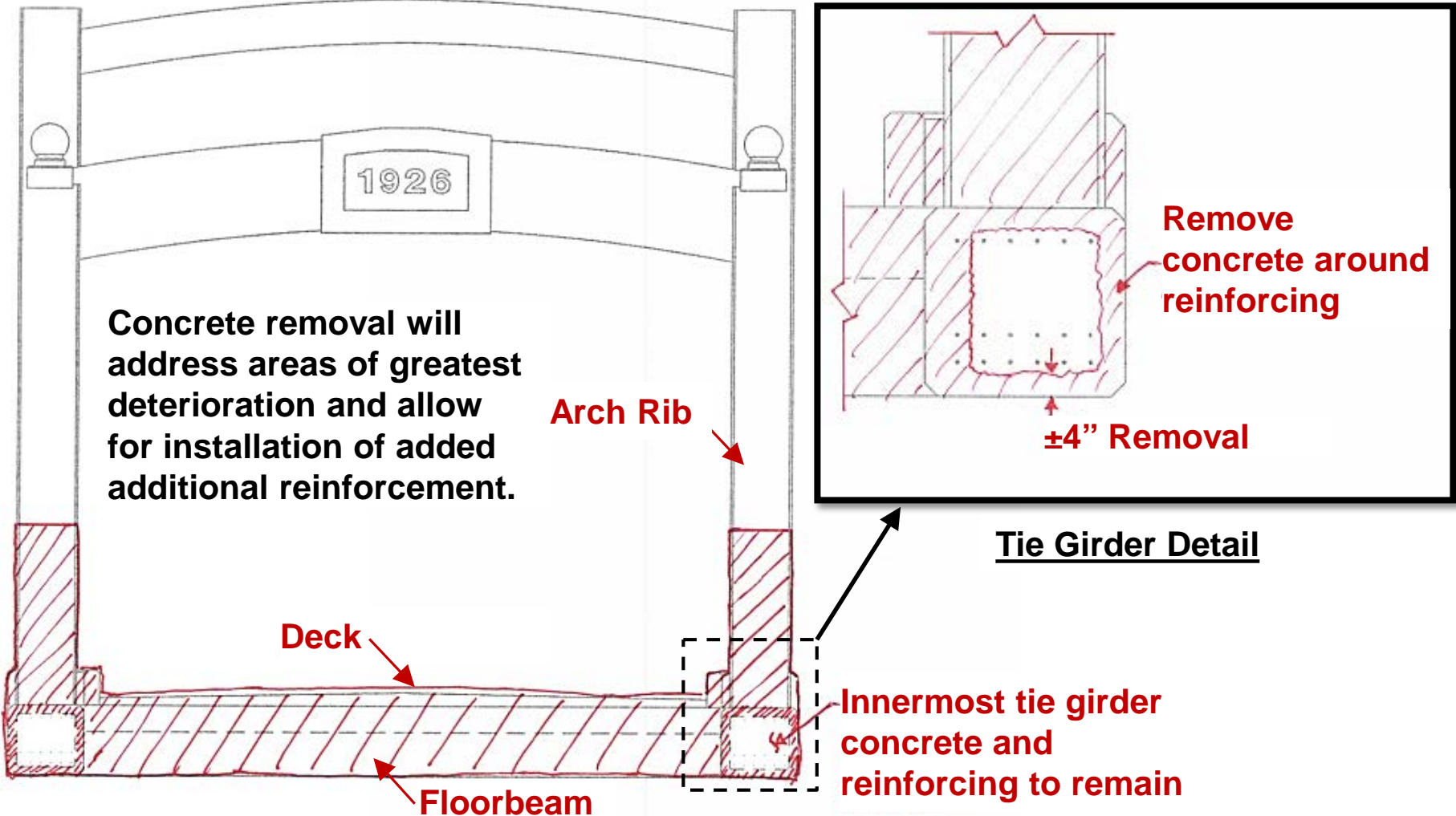
3. Rehabilitation Alternatives

Anticipated Scope of Superstructure Rehabilitation



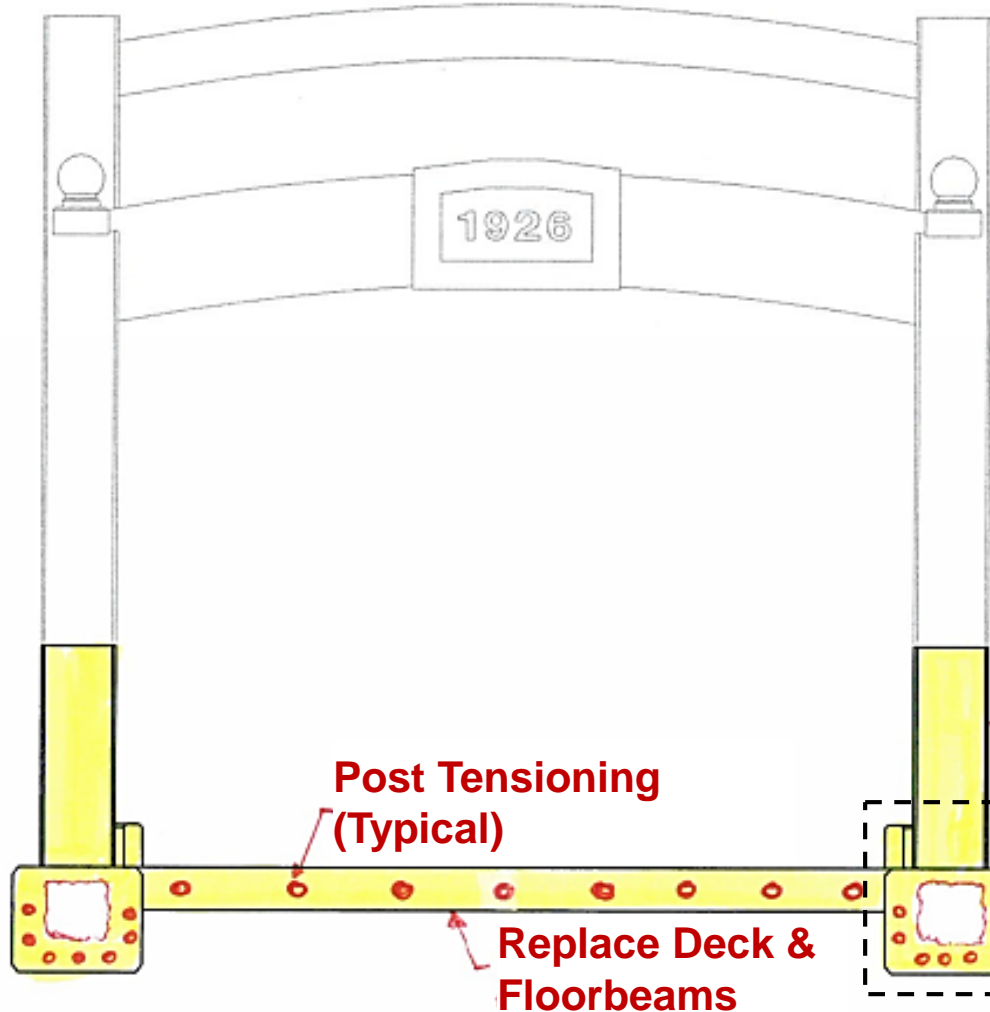
3. Rehabilitation Alternatives

Superstructure Rehabilitation - Demolition

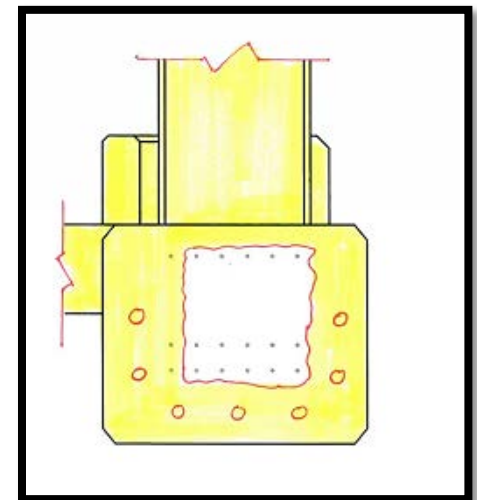


3. Rehabilitation Alternatives

Superstructure Rehabilitation - Strengthening



The addition of post-tensioning and extra reinforcing is necessary to carry modern design loads.



Tie Girder Detail

3. Rehabilitation Alternatives

Anticipated Scope of Substructure Rehabilitation



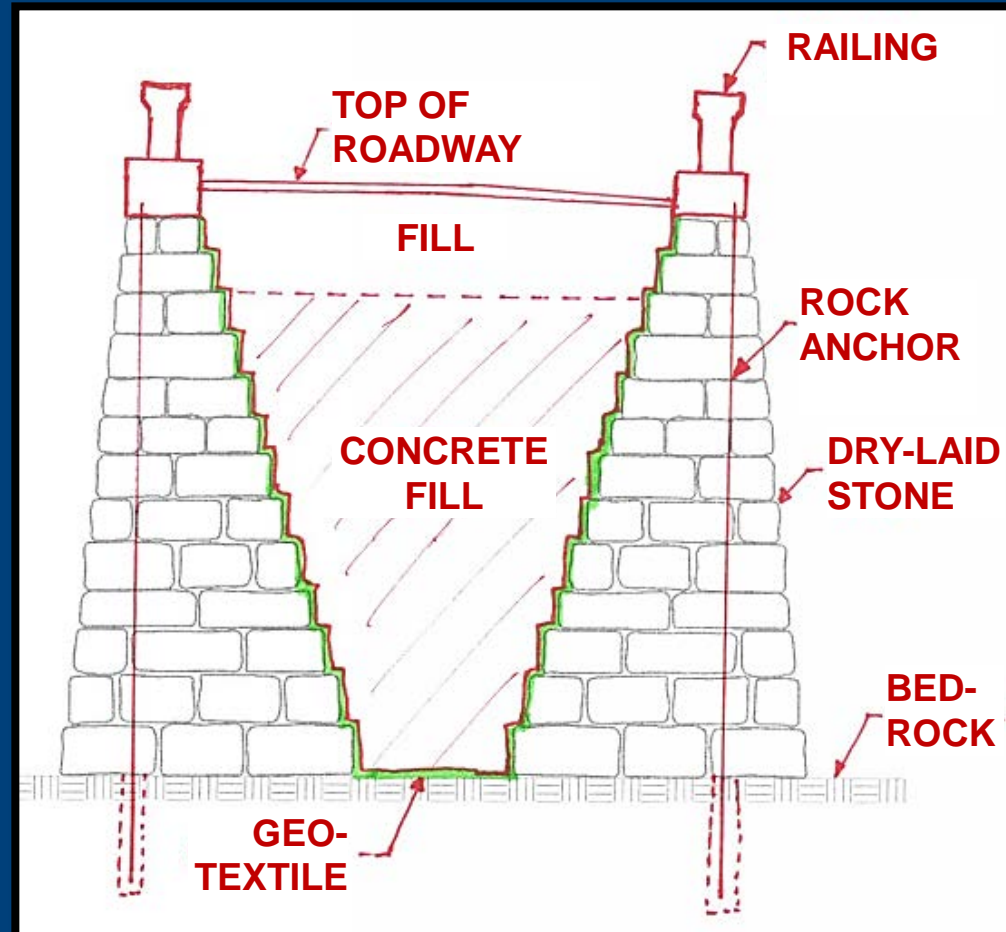
3. Rehabilitation Alternatives

Substructure Rehabilitation

Approach Walls: Address wall stability and water infiltration through the installation of rock anchors and placement of concrete fill.

Construction Sequence:

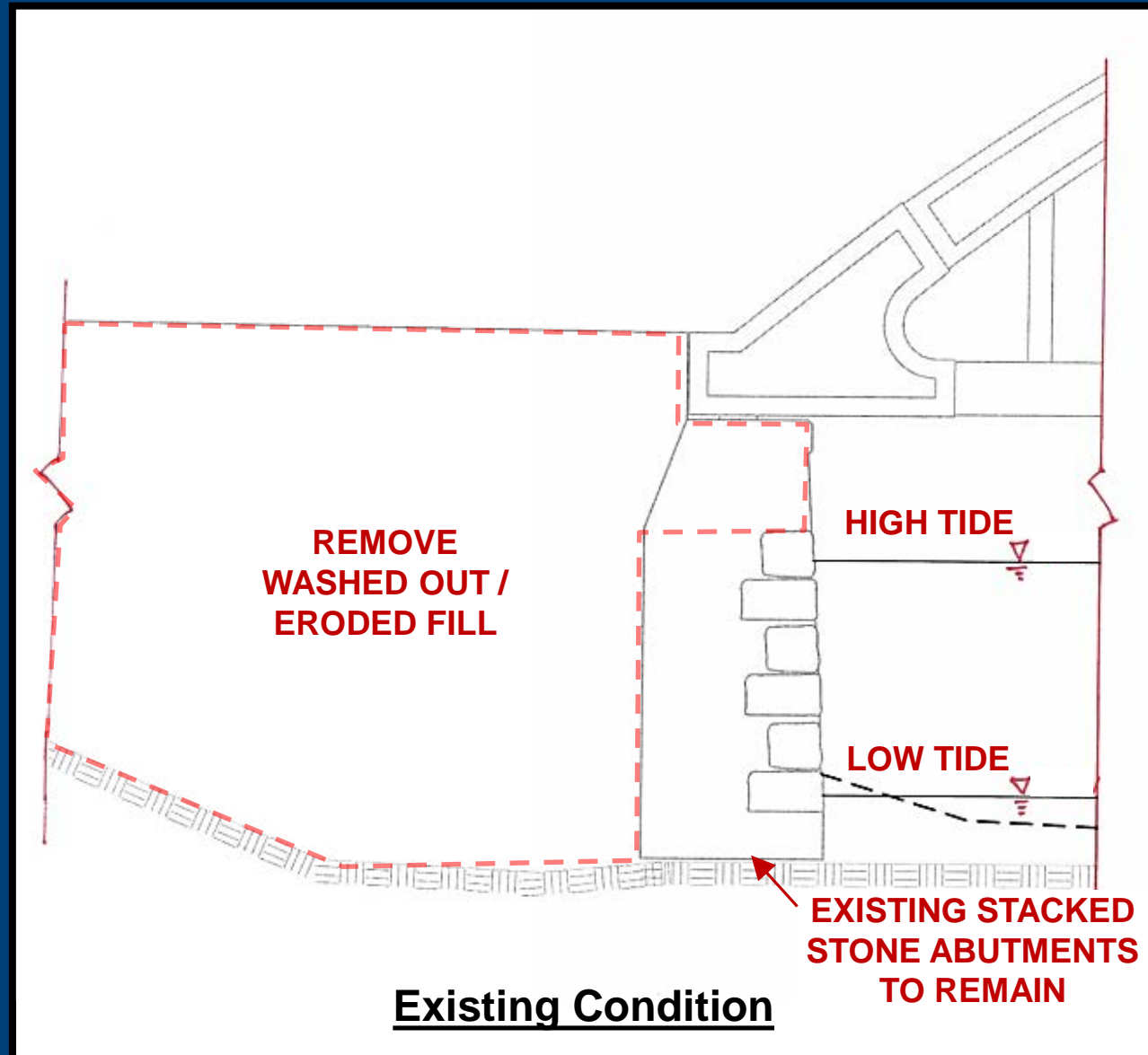
1. Install rock anchors
2. Excavate existing fill at low tide
3. Place geotextile layer
4. Place concrete in layers
 - Approx. 1,000 CY of concrete
5. Perform superstructure rehab.
6. Place fill, pavement, and barrier



3. Rehabilitation Alternatives

Substructure Rehabilitation

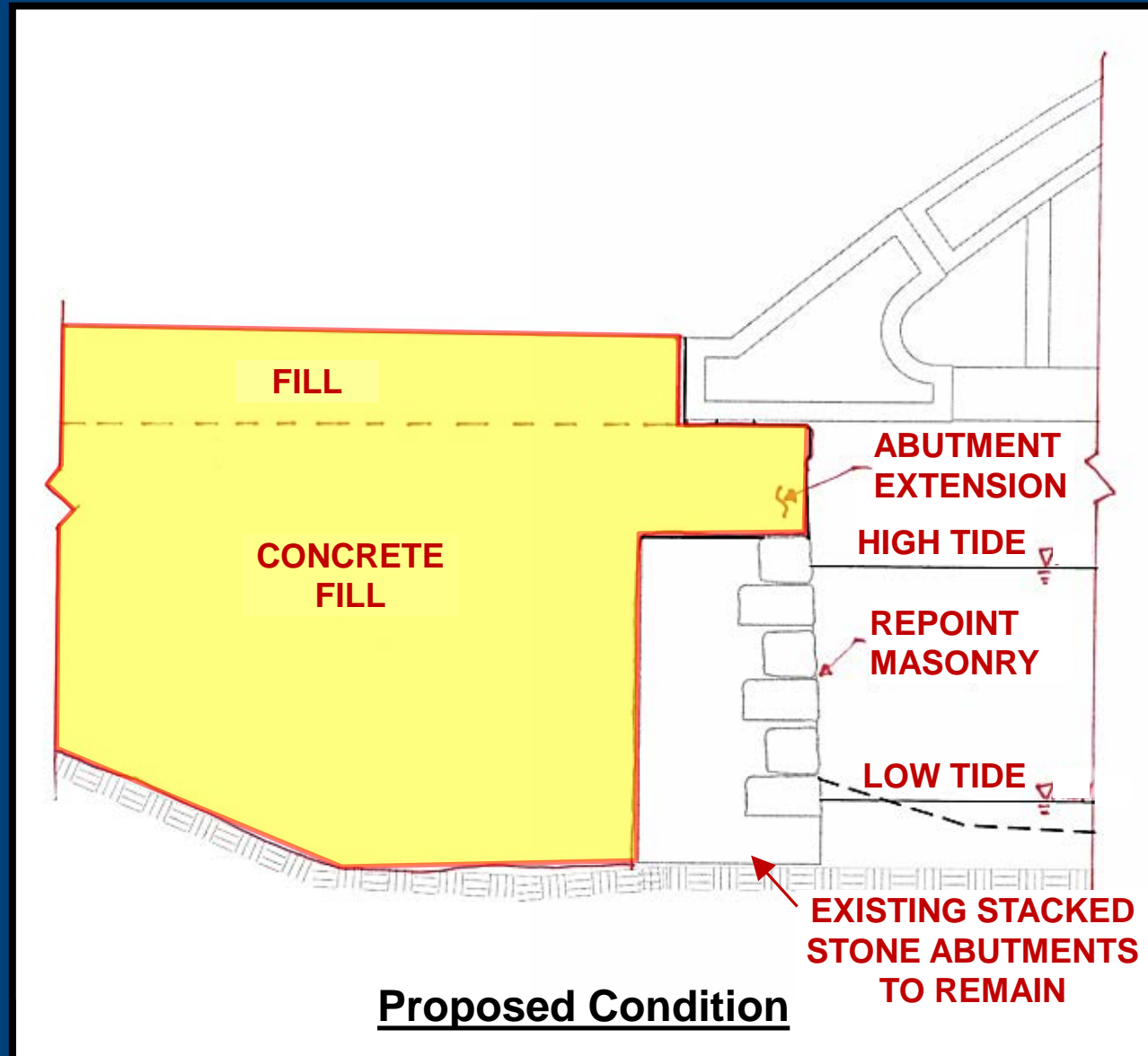
Abutments: Address masonry shifting, concrete condition and potential stability by replacing the existing concrete abutment cap.



3. Rehabilitation Alternatives

Substructure Rehabilitation

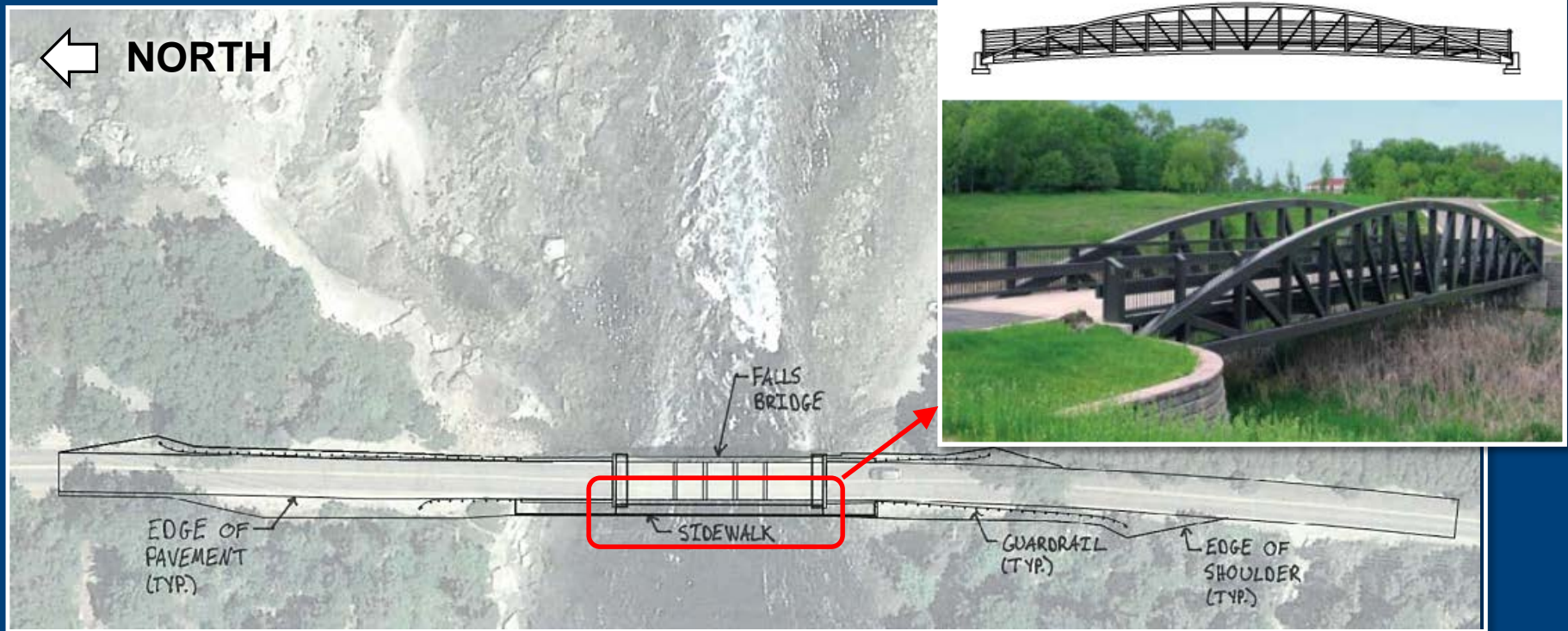
Abutments: Address masonry shifting, concrete condition and potential stability by replacing the existing concrete abutment cap.



3. Rehabilitation Alternatives

Sidewalk Addition

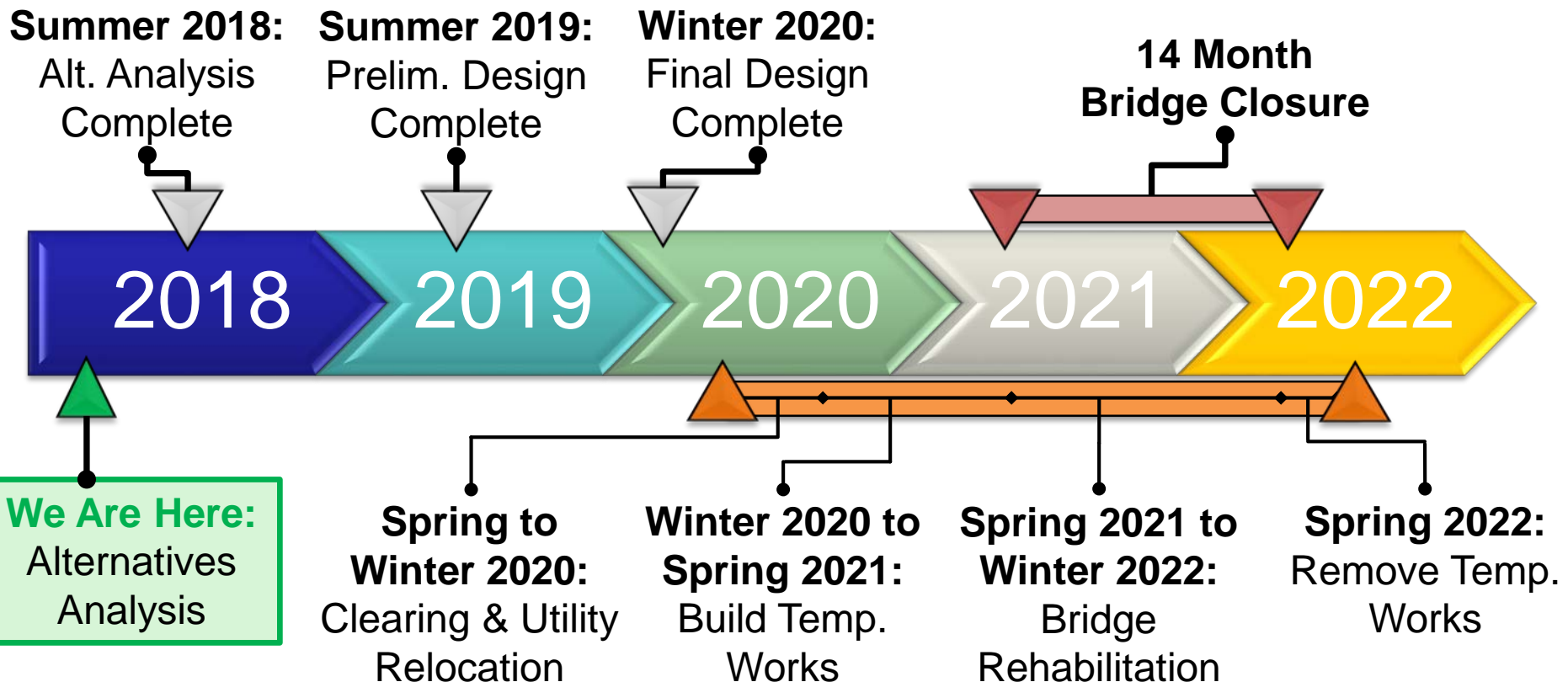
- Alongside Bridge: 5' Wide independent pedestrian bridge, prefab. steel.
- Location on salt pond side minimizes impacts to archeological resources.



3. Rehabilitation Alternatives

Estimated Construction Schedule

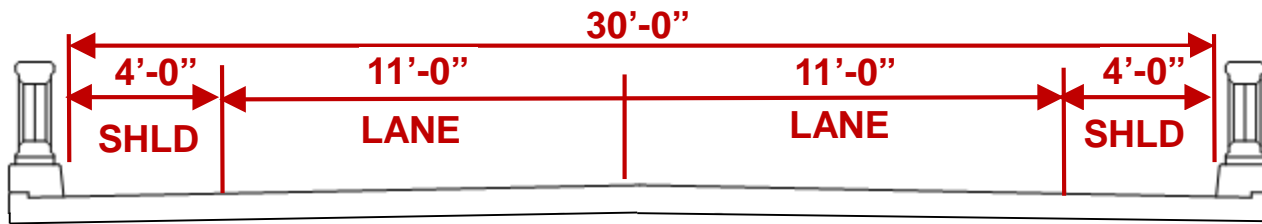
- Approximately 18-24 months of construction, bridge closure of 18-24 months
 - Assumes November to March in-water work windows with no winter shutdown
 - Excludes construction of a temp. bridge. Adding a temp. bridge would add 5-6 months
 - Schedule does not account for archeological remediation which may be required
 - All durations and dates are conceptual and are subject to change



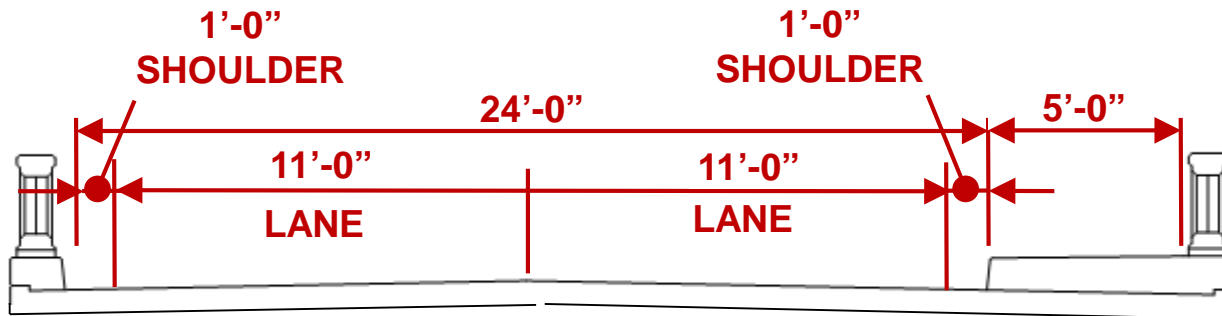
4. Replacement Alternatives

Design Criteria

- 100 Year service life, designed to carry modern design loads
- Modern typical section used as a starting point for replacement alternatives



TYPICAL SECTION WITH WIDE SHOULDERS



TYPICAL SECTION WITH SIDEWALK

4. Replacement Alternatives

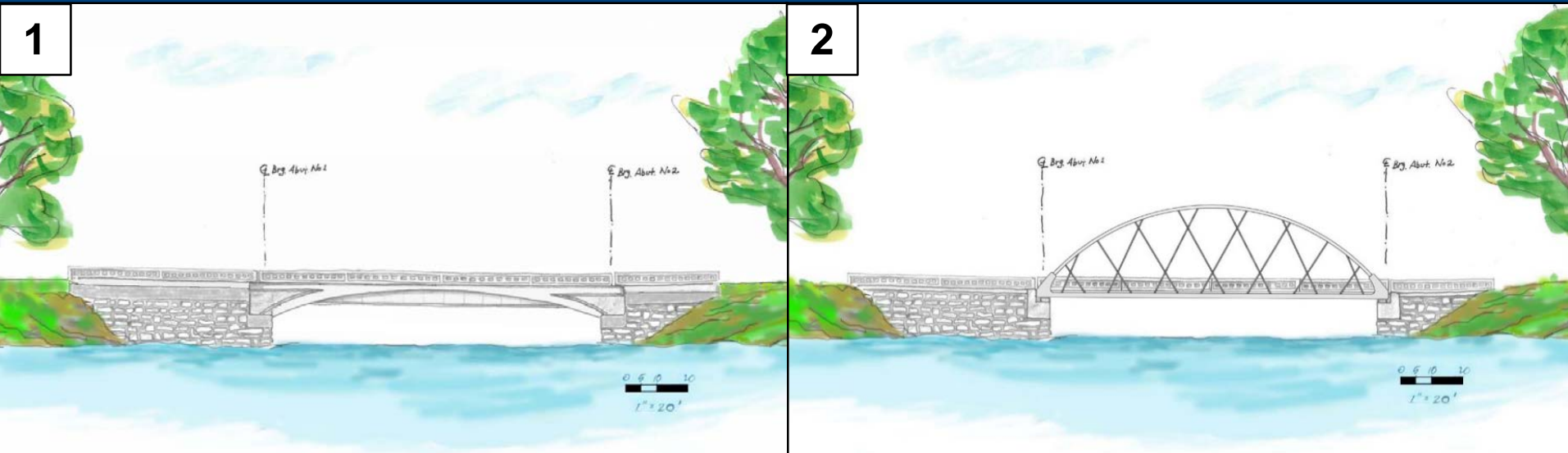
Superstructure Options Evaluated

Precast Concrete Girders

1. Prefabricated standard girder shape with aesthetic fascia panel

Tied Arch

2. Tied arch with steel arch rib and concrete tie-girder



4. Replacement Alternatives

Substructure – Stone masonry to remain in place



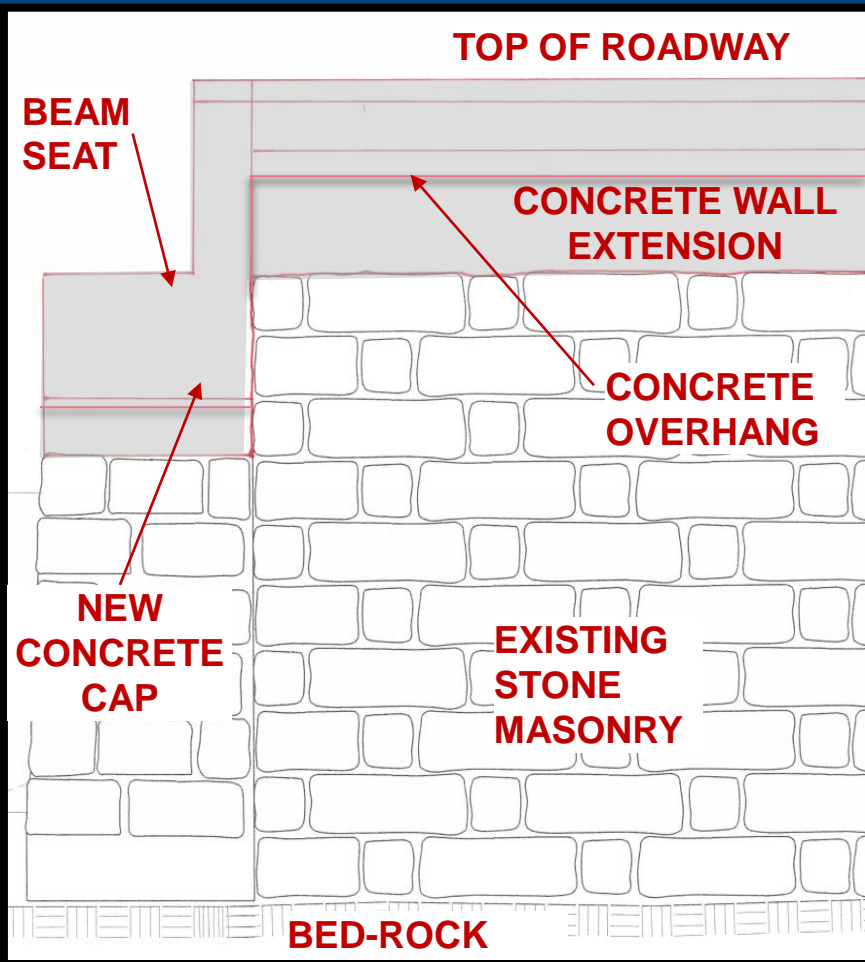
**CONCRETE
CAP**

**STONE
MASONRY**

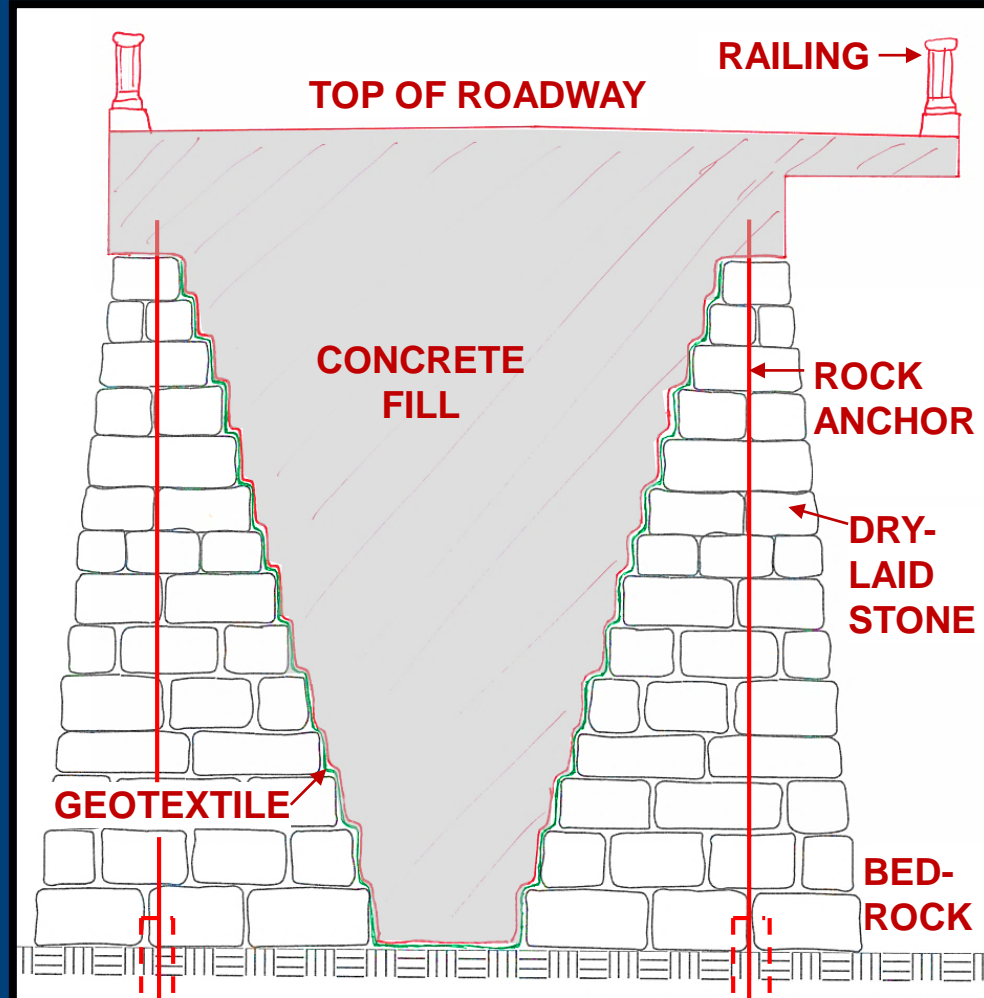
4. Replacement Alternatives

Substructure – Repairs similar to rehabilitation option

Elevation



Section



4. Replacement Alternatives

Construction Methods Evaluated

- Conventional Construction

This method is a typical construction approach utilizing cast-in-place concrete where the majority of work is completed on-site resulting in a longer construction season.

- Accelerated Bridge Construction (ABC)*

This method allows for more work to be completed off-site resulting in minimized traffic impact.

Evaluated multiple approaches to ABC

- Prefabricated Bridge Elements
- Bridge Movement Systems – Lateral Slide

** ABC less applicable to rehabilitation option given the nature of the work*

4. Replacement Alternatives

Conventional Construction Techniques

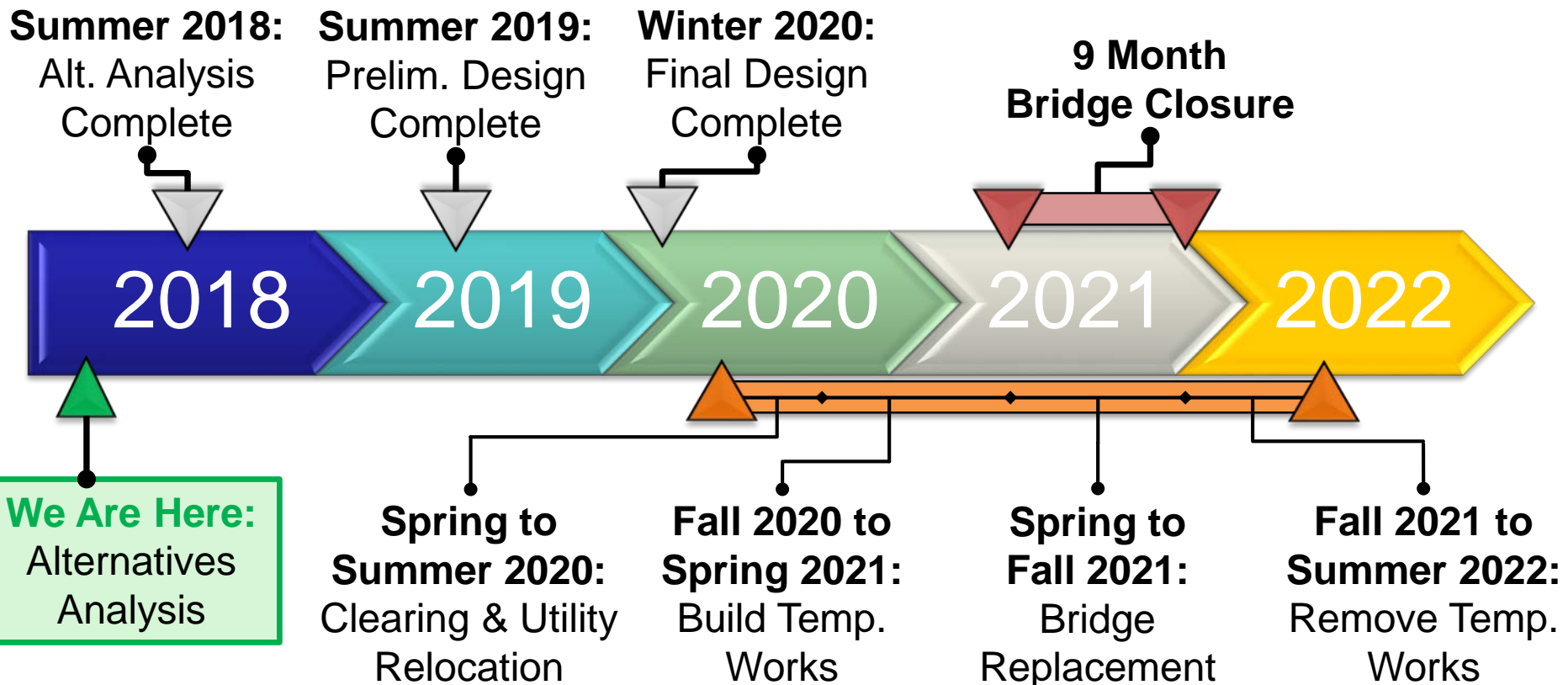
- Formwork is constructed on-site, typically with timber.
- Required for all concrete placed on-site.
- Formwork construction will occur after traffic is rerouted using a temporary detour located on-site and the existing bridge has been removed.



4. Replacement Alternatives

Estimated Conventional Construction Schedule

- Approximately 18-24 months of construction, bridge closure of 9 months
 - Assumes November to March in-water work windows with no winter shutdown
 - Schedule does not account for archeological remediation which may be required
 - All durations and dates are conceptual and are subject to change



4. Replacement Alternatives

ABC – Prefabricated Bridge Elements

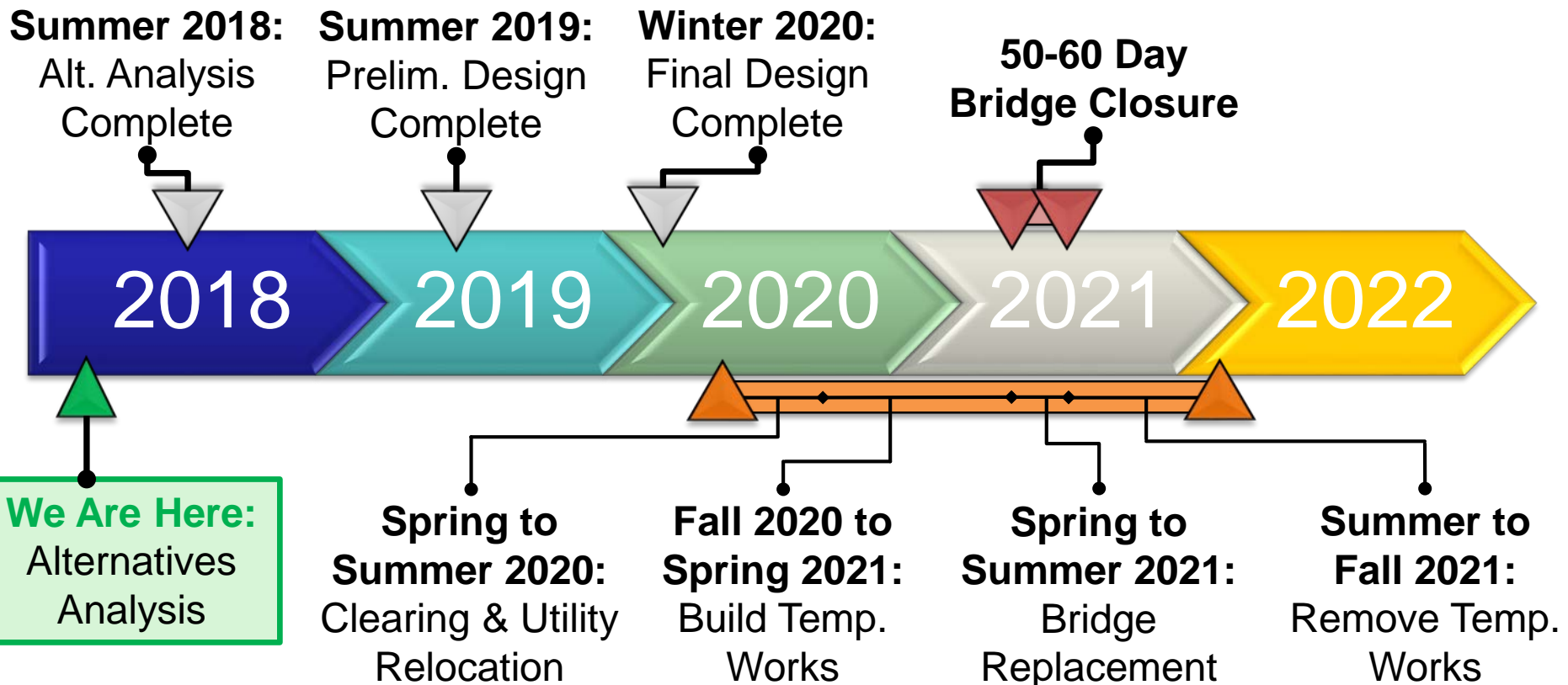
- Elements prefabricated off-site prior to on-site construction.
- Crews will work night and day shifts, possibly working around the clock.
- Would not include construction of a temporary bridge.
- A short duration road closure will be required (50 to 60 days).



4. Replacement Alternatives

Estimated ABC Prefabricated Bridge Elements Schedule

- Approximately 12-18 months of construction, bridge closure of 50-60 days
 - Assumes November to March in-water work windows with no winter shutdown
 - Schedule does not account for archeological remediation which may be required
 - All durations and dates are conceptual and are subject to change



4. Replacement Alternatives

ABC – Lateral Slide

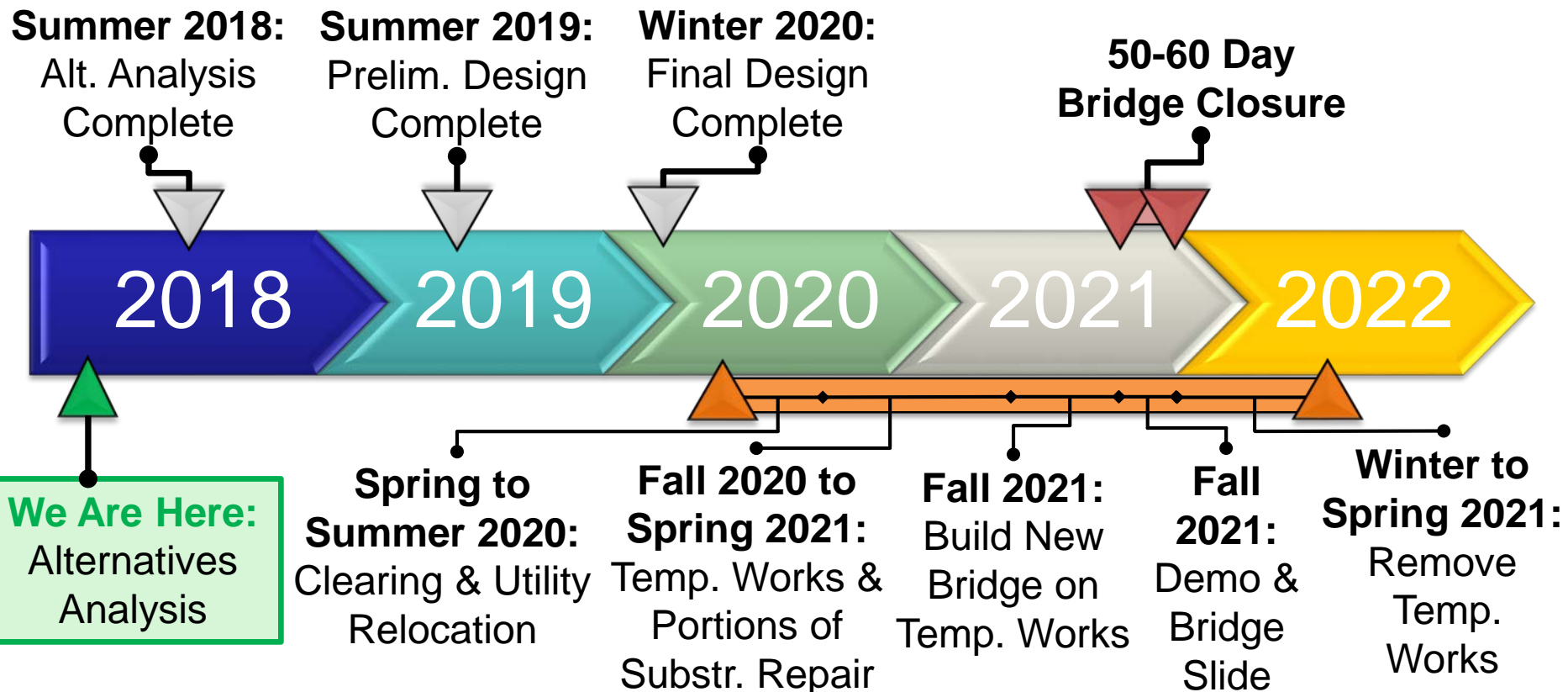
- New bridge constructed west of existing bridge, leaving existing bridge open to traffic.
 - Prefabricated bridge elements could be used as part of this approach.
- ABC methods require more labor, crews may be required to work 24-7.
- Eliminates need for temporary bridge with a short duration road closure (50 to 60 days).



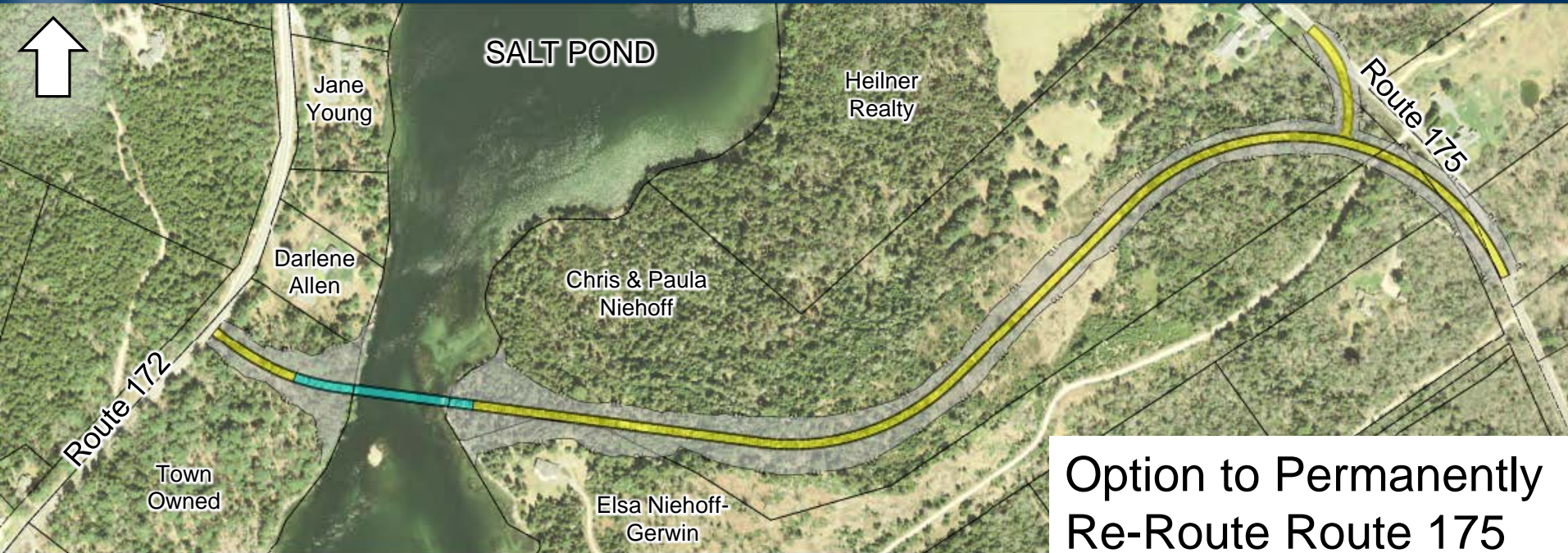
4. Replacement Alternatives

Estimated ABC Lateral Slide Schedule

- Approximately 18-24 months of construction, bridge closure of 50-60 days
 - Assumes November to March in-water work windows with no winter shutdown
 - Schedule does not account for archeological remediation which may be required
 - All durations and dates are conceptual and are subject to change



5. Alternate Route

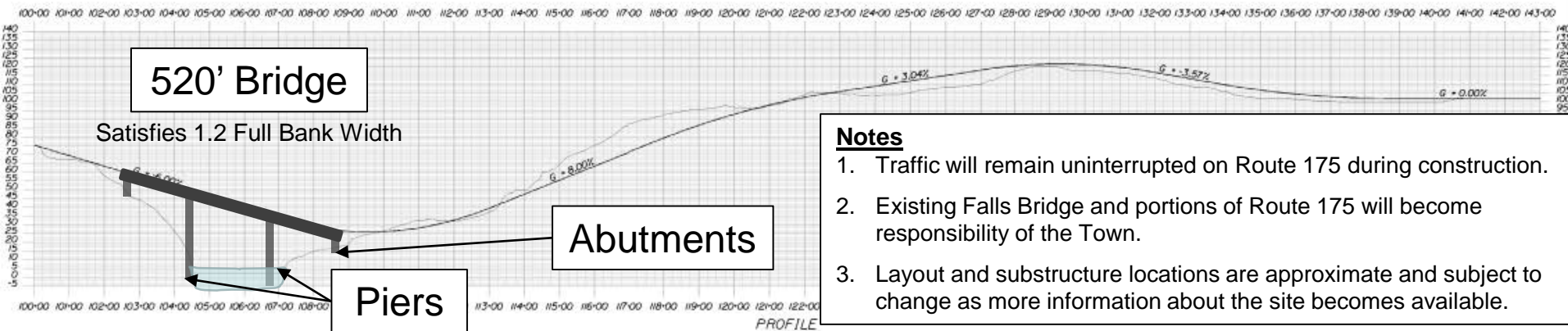


Option to Permanently Re-Route Route 175

PLAN VIEW ABOVE
PROFILE VIEW BELOW

← Route 172

Route 175 →

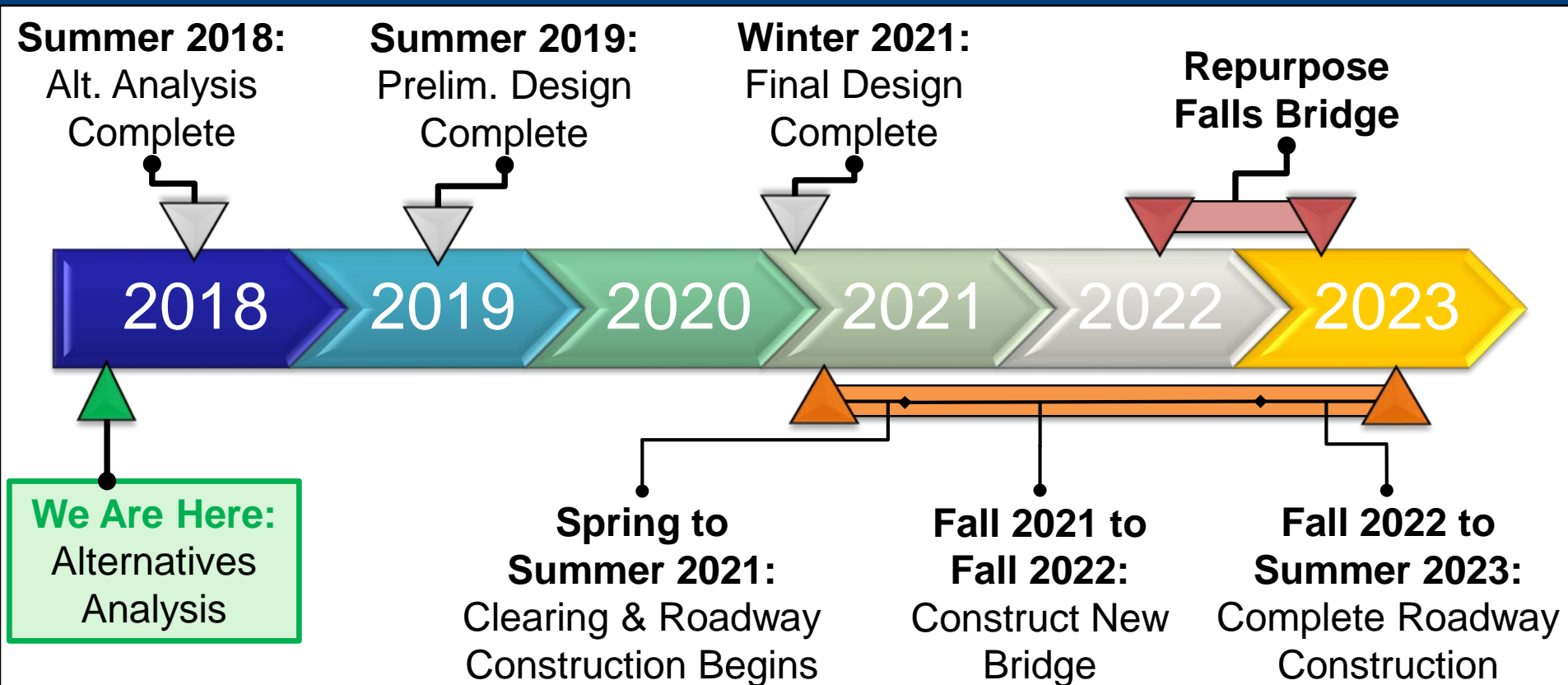


- Notes**
1. Traffic will remain uninterrupted on Route 175 during construction.
 2. Existing Falls Bridge and portions of Route 175 will become responsibility of the Town.
 3. Layout and substructure locations are approximate and subject to change as more information about the site becomes available.

5. Alternate Route

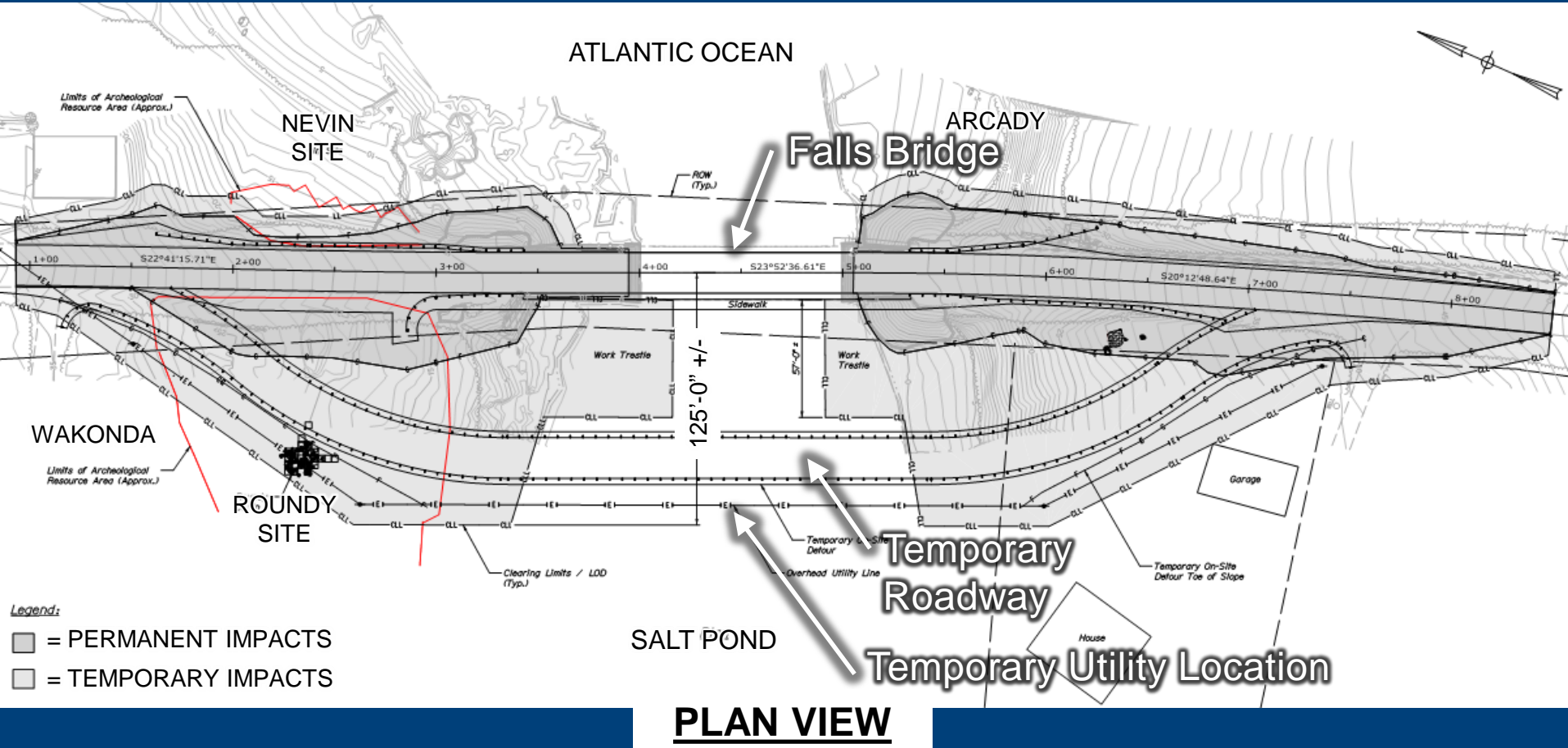
Estimated Construction Schedule for Concept #1

- Approximately 12-18 months of construction
 - Assumes November to March in-water work windows with no winter shutdown
 - Schedule does not account for archeological remediation which may be required
 - All durations and dates are conceptual and are subject to change
 - Assumes construction starts in 2021. Reflects need for add'l environmental assessments



6. Temporary Bridge

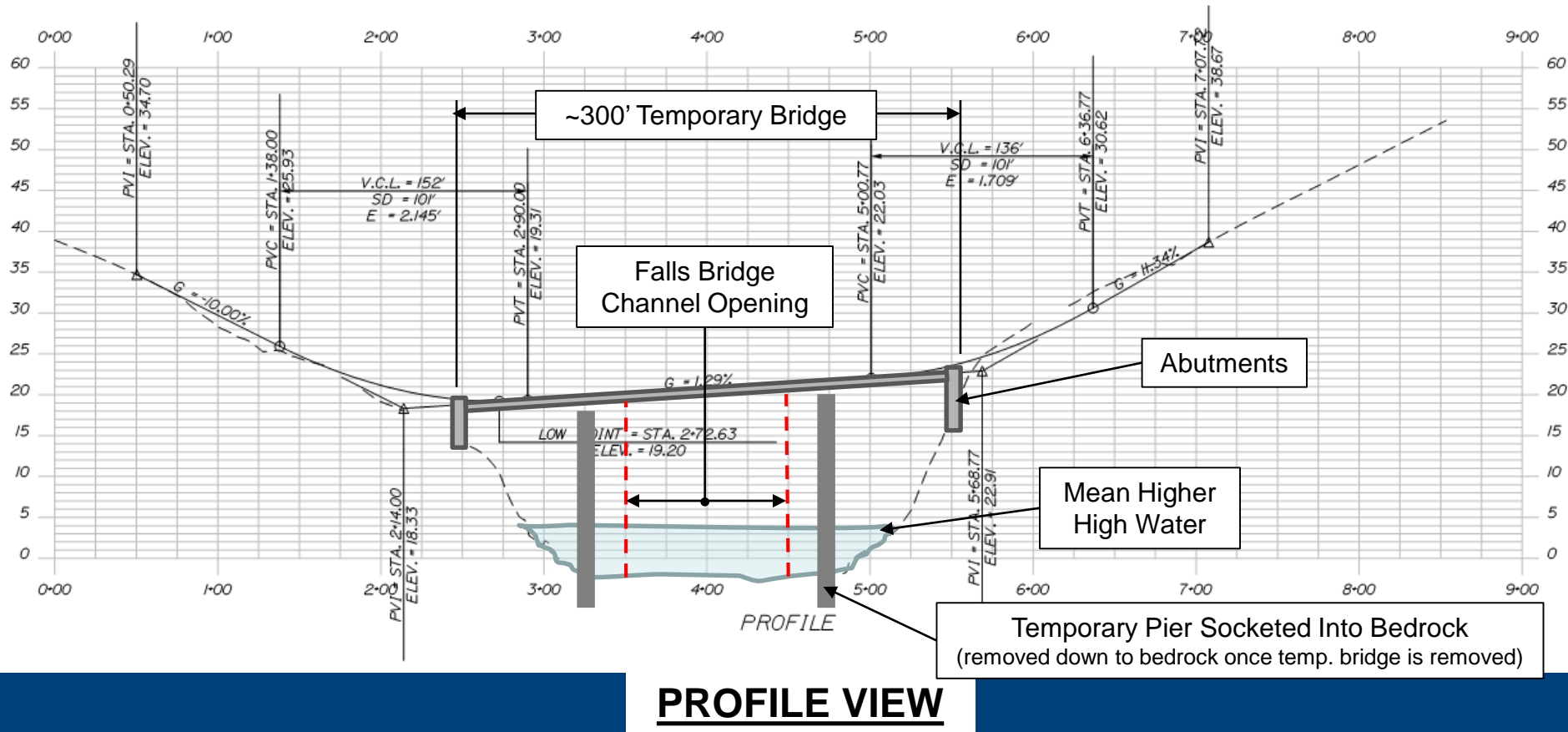
Rehabilitation or Replacement (Conventional Construction Only)



Note: Layout is approximate and subject to change as more information about the site becomes available.

6. Temporary Bridge

Rehabilitation or Replacement (Conventional Construction Only)



Note: Layout and foundation locations are conceptual, subject to change as information becomes available.

Summary Slide

Additional information is available online at:

www.townofbluehillmaine.org/falls-bridge-project

www.southbluehillmaine.org/falls-bridge-committee--open-mtgs.html

To submit questions or comments contact:

www1.maine.gov/mdot/projects/bluehill/fallsbridge/

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Andrew.w.lathe@maine.gov - (207) 441-7362