



PROJECT NO. 137-164
BRIDGE NO. 03906

Alpha Avenue over Amtrak and Local Roads (Frank Turek Viaduct)

Stonington, Connecticut

June 6, 2023



Project Introduction

- Project Team:
 - Derick Lessard, CTDOT Principal Engineer
 - Francisco Fadul, CTDOT Project Manager
 - Isuf Vlashi, CTDOT Project Engineer
 - Donald Wurst, CHA Program Director
 - Stan Juber, CHA Project Manager

 - Designer of Record: Hardesty & Hanover

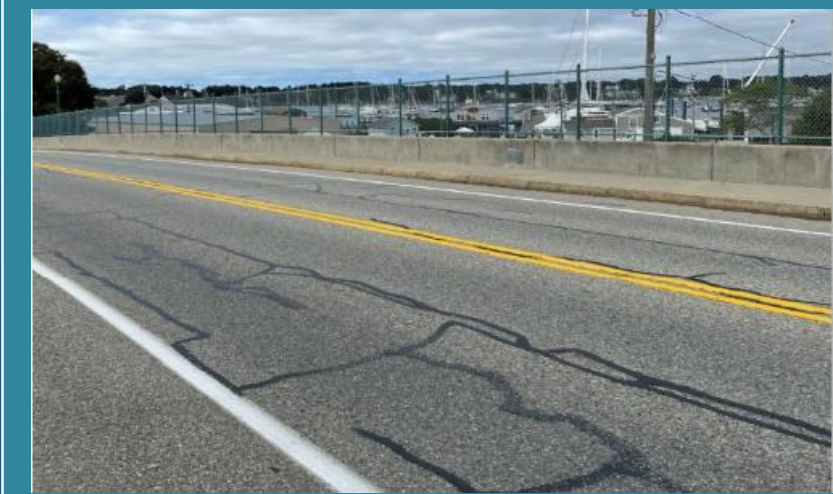
PROJECT LOCATION



BRIDGE HISTORY

- 1940: Bridge No. 03906 built to eliminate grade crossings over the New York, New Haven and Hartford Railroad. (Bridges over railroads are generally owned by the railroad).
- 1970: Penn Central goes bankrupt, leaving ownership of the bridge legally indeterminate.
- 1983: Mianus River Bridge collapses, drawing attention to lack of funding and inspection of bridges in Connecticut.
- 1984: CT General Assembly passes the Infrastructure Renewal Program, which includes provisions for an “Orphan Bridge” Program.
- 1985: Lists of bridges needing work are compiled. Bridge No. 03906 is identified as being in poor condition.
- 1986: Orphan Bridge Program Regulations (RCSA Sec. 13b-283) adopted.
- 1991-1993: Major rehabilitation of Bridge No. 03906 performed under the Orphan Bridge Program.
- 2020: Bridge No. 03906 is found to be in poor condition. CTDOT Bridge Management unit initiates a project.

EXISTING FIELD CONDITIONS – BRIDGE DECK



Condition of deck overlay showing transverse and longitudinal cracks.



Condition of bridge parapets and sidewalks.



Condition of concrete deck showing random transverse cracks, efflorescence and isolated spalling (Span 6 shown).

EXISTING FIELD CONDITIONS –SUPERSTRUCTURE



Close up of expansion bearings over Pier Bent 4.



Electrical arcing over Amtrak Rail lines. Typical condition for Span 4 Girders.

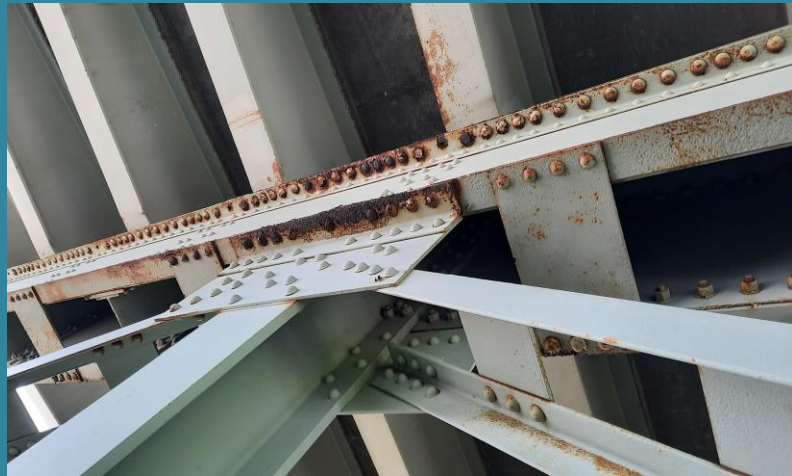


View under Span 8 showing flange transition and field splices adjacent to Pier Bent 7.

EXISTING FIELD CONDITIONS –SUBSTRUCTURE



Tree growing beside bearing pedestal under Pier Bent 5.



Pier Cap 6 top and bottom flange deterioration over center column.



Abutment 2 adjacent to Cutler Street. 13'-10" vertical under clearance sign.

PROJECT PURPOSE AND NEED

BRIDGE DEFICIENCIES:

- Bridge Substructure in poor condition:
 - Deterioration and section losses in critical areas of pier caps.
 - Pier columns exhibit section losses.
- Load Rating factors below 1.0 (should be at least 1.2).
- Other considerations:
 - Existing 18'-6" vertical clearance in Span 4 over Amtrak is inadequate: Standards require 22'-6".
- Fracture-Critical (piers): Failure of a fracture-critical member can result in the failure of the entire structure



BRIDGE DEFICIENCIES (continued)

- The superstructure is only rated 5 (fair) and is likely to become poor in about 10 years.
- More than 50% of the Pier Caps are in poor or serious condition.
- Bridge roadway width is less than desirable.
- Vertical clearances for Mathews Street/Main Street (13'-5") and Cutler Street (14'-0") are below the minimum standard section of 14'-3" to remain in place.
- Clear zones are not met at Matthew Street or Cutler Place.
- The approach rail systems at all approach corners do not meet current R-B MASH standards, and the transitions and the approach guiderail ends also do not meet current standards.

PROJECTS BEGIN WITH AN RSR

- The purpose of Rehabilitation Study Report (RSR) Alternates are to give options to establish project direction and budget for CTDOT Management.
- The engineer who prepares the RSR presents it at a meeting to a collection of DOT units who weigh in on the recommendations. Questions may come out of an RSR meeting that require more research and may alter the final approved alternate.
- The Alternate which is approved at the RSR meeting is then further developed during the design process.
- During the design process, discoveries are sometimes made that make major changes to the final design.

PROJECT DEVELOPMENT

- May 24, 2022 – Presented RSR; DOT requested further development of Alternates: bringing the bridge up to a 7 (Good), improving Load Rating, and improving railroad clearance.
- June-July 2022 – Further developed alternates based on requests at the RSR meeting.
- August 18, 2022 – Presented revised Alternates (3A, 3B, and revised 4/full replacement); Alternate 4 is the clear choice based on Life Cycle costs. DOT Finance to be consulted about additional funding.
- November 3, 2022 – Follow-up RSR Meeting to finalize decision to go with Alternate 4 (new 2-span bridge).
- January 20, 2023 – Town Notification Letter
- January 23, 2023 – Meeting with Town of Stonington.
- February 16, 2023 – Town sends questions about project to DOT; response sent March 15.
- March 2023 – Initial contacts with Borough, Dodson's Boatyard, COMO; continued review of bike/pedestrian impacts.

Current Anticipated Project Schedule Key Dates

- Spring 2024: Public Information Meeting.
- Summer 2024: Preliminary (30%) Design Approval; semi-final design development begins.
- Fall 2026: Final Design Plans completed; project advertised for construction.
- Spring 2027: Begin construction.

Dates are subject to change as project progresses.

RSR Alternative Highlights

Alternative 1 – Pier Cap Replacement and Strengthening

- Pier caps filled with concrete, bearings cleaned and painted, Pier 4 replacement, Span 8 Girder strengthening

Alternative 2 – Pier Replacement and Strengthening

- Replace all piers and bearings, Span 8 girder strengthening

Alternative 3 – Pier Replacement, Strengthening, Deck Patching

- Replace all piers and bearings, Span 8 girder strengthening, parapet replacement, minor deck patching - was further developed into 3A & 3B:

Alternative 3A – Pier Replacement, with Structural Repairs/Strengthening

- Bring bridge condition up to a “7”
- All load rating factors at least 1.2

Alternative 3B – Major Reconstruction, Raise Roadway Profile

- Replace all bridge spans and piers, profile adjustment to meet MVC over railroad

Alternative 4 – Bridge replacement and Span Removal

- Replace entire bridge, remove 6 spans, increase profile to achieve MVC over railroad



RSR Alternative Negatives

Alternative 1 – Pier Cap Replacement and Strengthening

- Most problematic features remain (limited clearances, low load ratings, fracture criticality, future repair needs) leading to limited life and high future costs

Alternative 2 – Pier Replacement and Strengthening

- Many problematic features remain (limited clearances, future repair needs) leading to limited life and high future costs

Alternative 3A – Pier Replacement, with Structural Repairs/Strengthening

- Retains limited clearances, highest future costs

Alternative 3B – Major Reconstruction, Raise Roadway Profile

- Most expensive initial cost; retains existing abutments which will limit service life and retains substandard clearances over Cutler Street and Main Street; more expensive maintenance than Alternative 4

Alternative 4 – Bridge replacement and Span Removal

- Closes Cutler Street and Main Street

2022 COST ESTIMATES - (ALL ALTERNATES)

Rehabilitation Alternates	Structure Cost	Highway Cost	Rounded Total Cost (Including other & incidentals)	Cost Difference
1- Pier Cap Rehabilitation, Pier 4 Replacement and Girder Strengthening	\$2,889,000	\$185,500	\$8,008,000	N/A
2 - Pier Replacement and Girder Strengthening	\$3,142,300	\$185,500	\$8,640,000	+\$632,000
3- Pier Replacement, Girder Strengthening and Deck Patching	\$5,787,000	\$589,200	\$15,843,000	+\$7,203,000
3A - Pier Replacement, with Structural Repairs/Strengthening to bring up to a "7" and 1.20 RF's	\$7,138,000	\$589,200	\$19,108,000	+\$11,100,000
3B - Pier Replacement, Full Bridge Replacement, Raise Roadway Profile	\$9,875,000	\$1,389,000	\$27,651,000	+\$19,643,000
4 - Bridges Replacement with Removal of 6 Spans	\$9,034,700	\$1,389,000	\$25,483,000	+\$17,475,000

Funding Sources

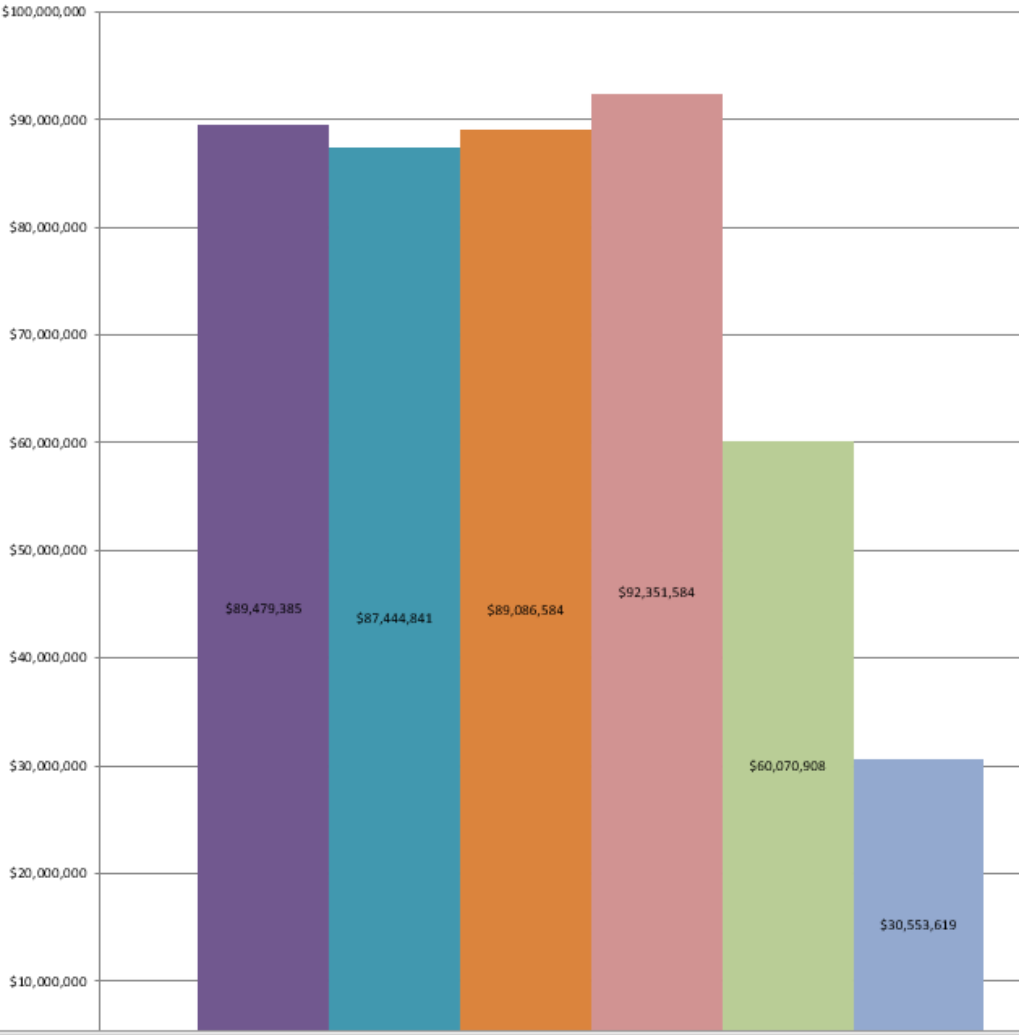
- Per Conn. Agencies Regs. § 13b-283-5 / E&C – 24 Orphan Bridge Funding:

	Total Cost	80% Federal	5% State	15% Town
Alt 1	\$ 8,008,000.00	\$ 6,406,400.00	\$ 400,400.00	\$ 1,201,200.00
Alt 2	\$ 8,640,000.00	\$ 6,912,000.00	\$ 432,000.00	\$ 1,296,000.00
Alt 3	\$ 15,843,000.00	\$ 12,674,400.00	\$ 792,150.00	\$ 2,376,450.00
Alt 3A	\$ 19,108,000.00	\$ 15,286,400.00	\$ 955,400.00	\$ 2,866,200.00
Alt 3B	\$ 27,651,000.00	\$ 22,120,800.00	\$ 1,382,550.00	\$ 4,147,650.00
Alt 4	\$ 25,483,000.00	\$ 20,386,400.00	\$ 1,274,150.00	\$ 3,822,450.00
Alternate Cost Breakdown:				
	Total Cost	80% Federal	State (Remaining)	Town (15% of Alt 1)
Alt 4	\$ 25,483,000.00	\$ 20,386,400.00	\$ 3,895,400.00	\$ 1,201,200.00

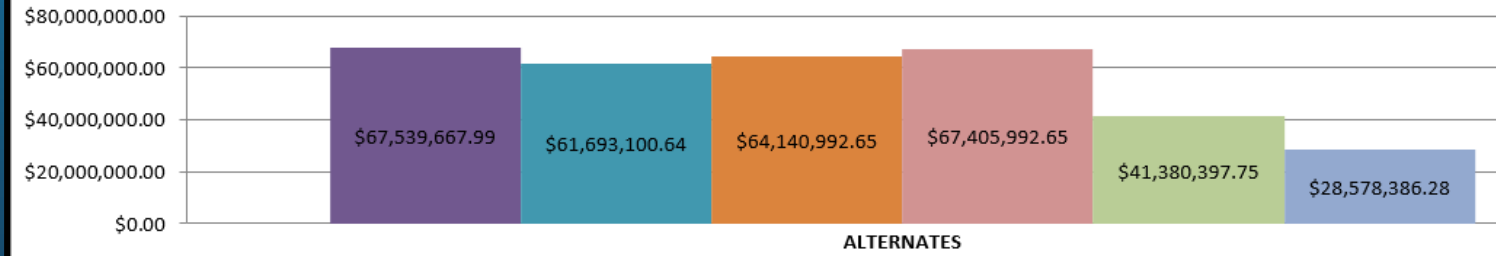
- DOT will seek other funding to limit Town share to 15% of Alt. 1 (\$1.2M) even if another Alternate is selected.

Life Cycle Cost Analysis

DOLLARS SPENT PER APPLICABLE YEAR INFLATION AT YEAR 75
(ASSUME NO DISCOUNT WITH A 2% INFLATION RATE)



PRESENT VALUE OF ALTERNATES
(WITH REAL DISCOUNT RATE OF 0.78%)



- Alternate 1
- Alternate 2
- Alternate 3
- Alternate 3A
- Alternate 3B
- Alterntate 4

CURRENTLY SELECTED ALTERNATIVE – ALTERNATE 4

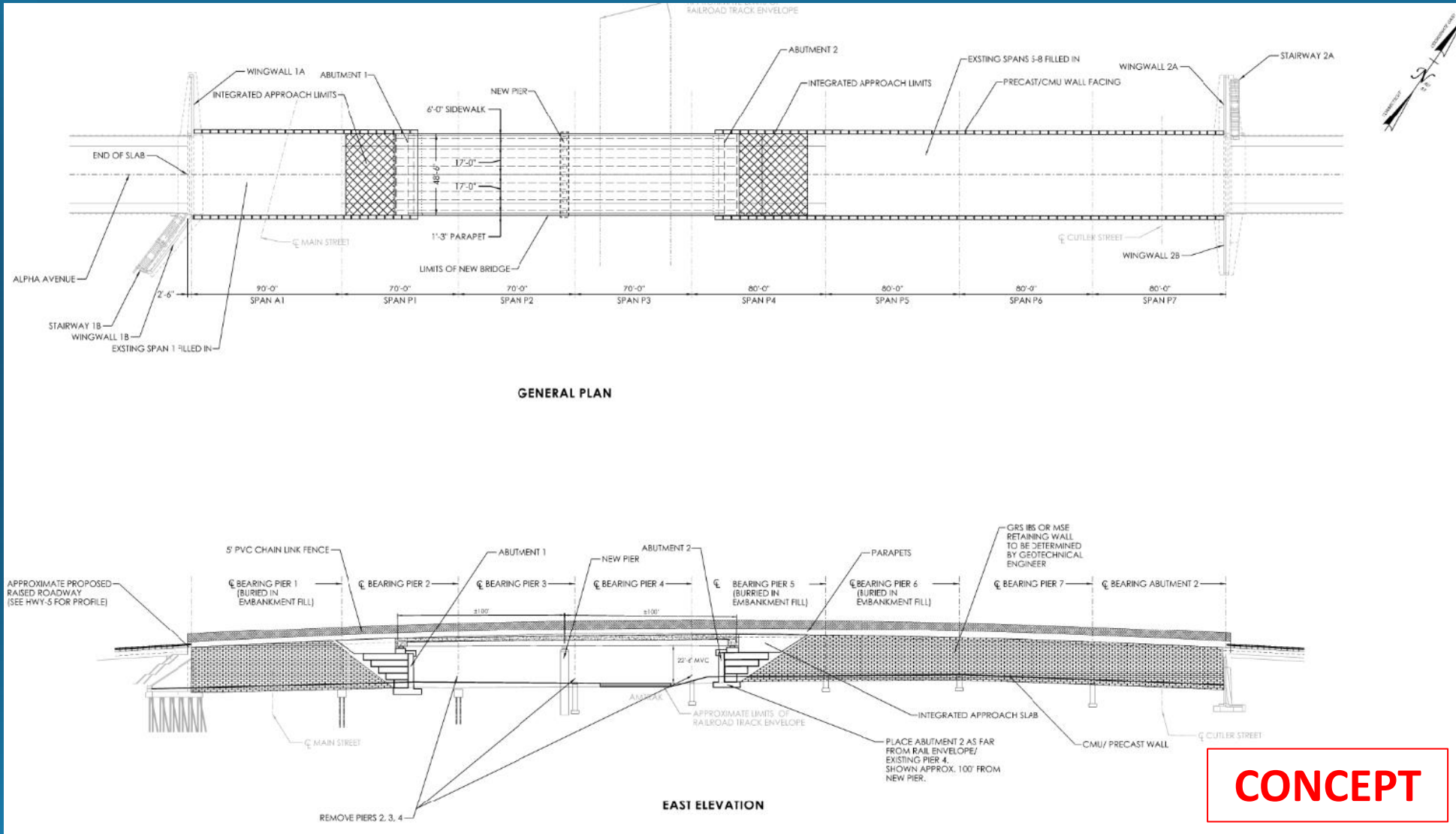
Major Reconstruction, Raise Roadway Profile

- Replace entire bridge with a new 2 span bridge, eliminate 6 existing spans (north of Amtrak & south of boatyard), increase vertical clearance over Amtrak.

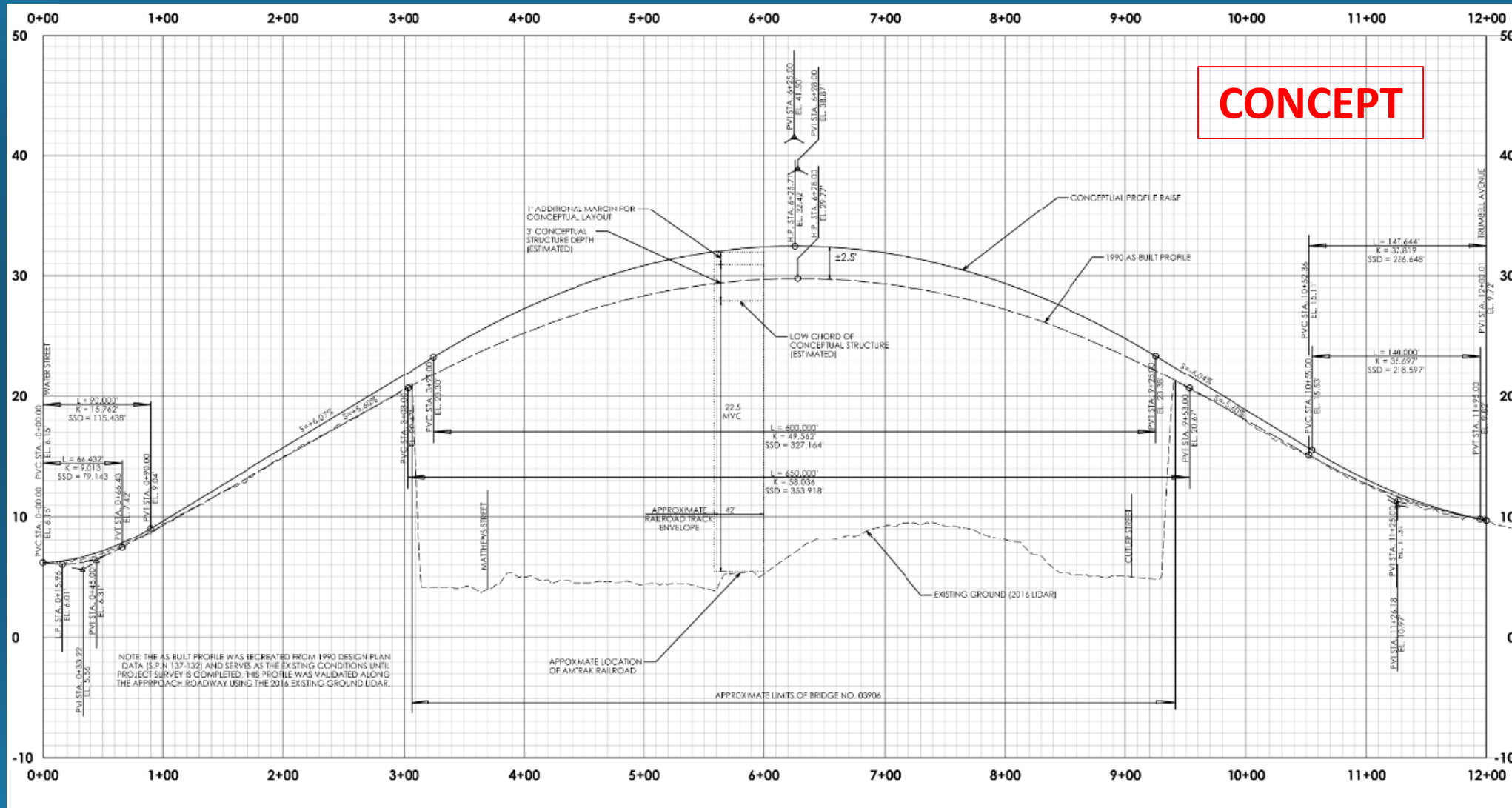
Reasons for Recommended Alternative:

- New structure provides long-term structural integrity of Bridge No. 03906
- Replaces substandard parapet and upgrades guiderail to MASH
- Longest Service life (75 years)
- Lowest Life Cycle Cost
- Minimizes future maintenance costs and bridge inspections by using low-maintenance materials and reducing the span length
- Minimizes future costs to Town (15% of all project costs)
- Achieves Vertical Minimum Under clearance to RR (22.5')

ALTERNATE 4 – CONCEPTUAL PROPOSED STRUCTURE



ALTERNATE 4 – Existing/Conceptual Proposed Profile



Development of the Replacement Structure Design

- The RSR development process focused primarily on rehabilitation alternates, with the full replacement option included for comparison purposes. (RSRs include do-nothing & complete replacement for benchmarks).
- When complete replacement became the preferred alternate, it became necessary to further develop the concept. Therefore, a structure type study phase was added to the design scope.
- The structure type study will look at several design alternatives, including the feasibility of partial “off-line” construction to reduce the duration of alternating one-way traffic.
- Now seeking Town input to determine the actual design.

THANK YOU FOR YOUR INVOLVEMENT.

QUESTIONS?

