Baring Bridge Replacement Project

Baring Community Public Open House
Project Presentation
January 26, 2019

King County
Department of Local Services
Road Services Division

Project Location

Baring Bridge is located on NE Index Creek Road over the South Fork of the Skykomish River near Baring, Skykomish and US Route 2.

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Baring Bridge Information

- **King County-owned** and maintained single lane timber and cable suspension bridge
- Provides sole **access to about 170 properties**, including over 40 residences, in the unincorporated community of Baring, WA
- **Built in 1930** and designated a Historic Landmark by King County in 1999
- 340 feet long & 8.2 feet wide, has a **weight limit of 20,000 lbs,** and **speed limit of 5 mph**
- A portion of the existing bridge is **in the FEMA 100-year flood plain**

Aerial View of Baring Bridge

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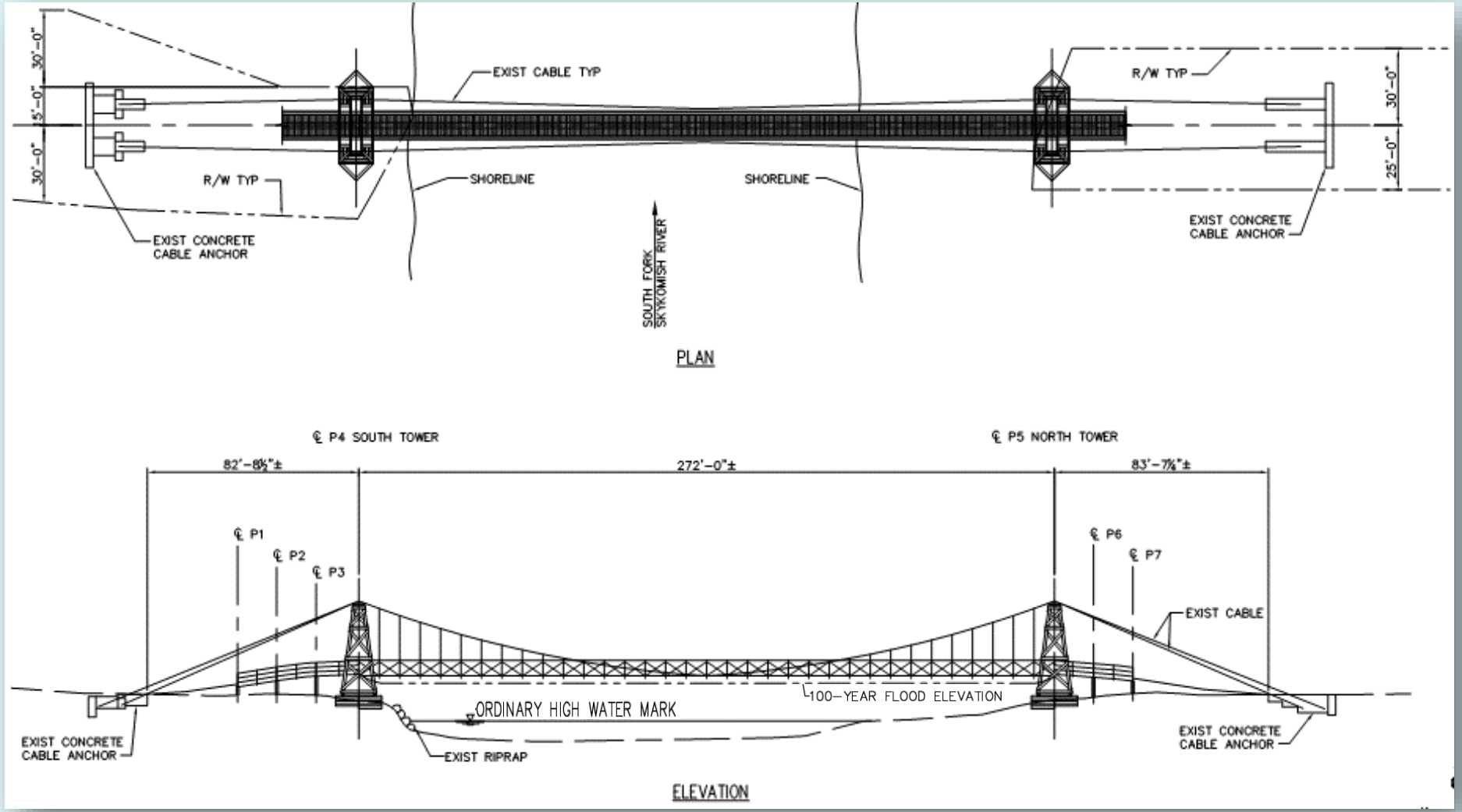
Current Baring Bridge Plan & Elevation



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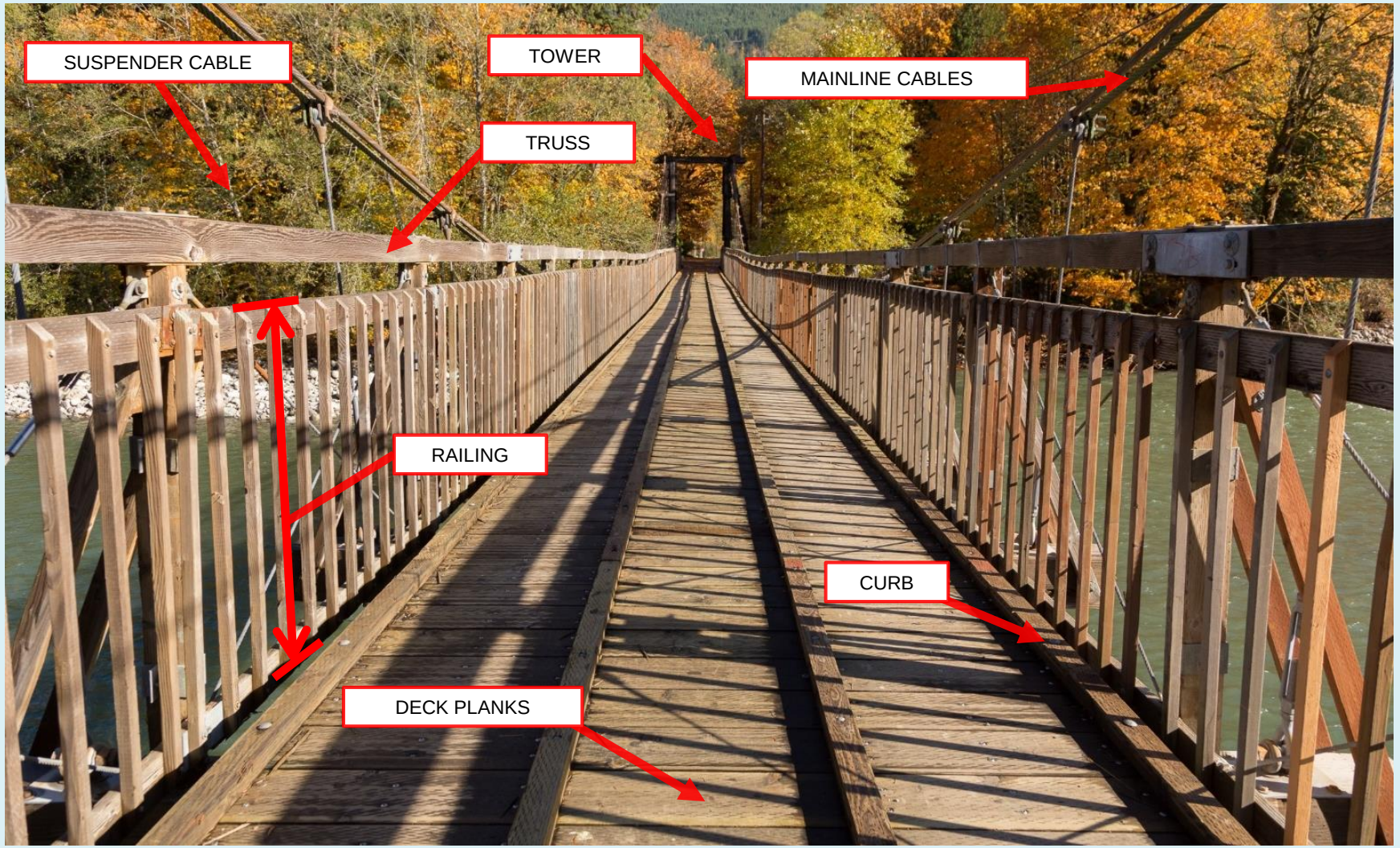
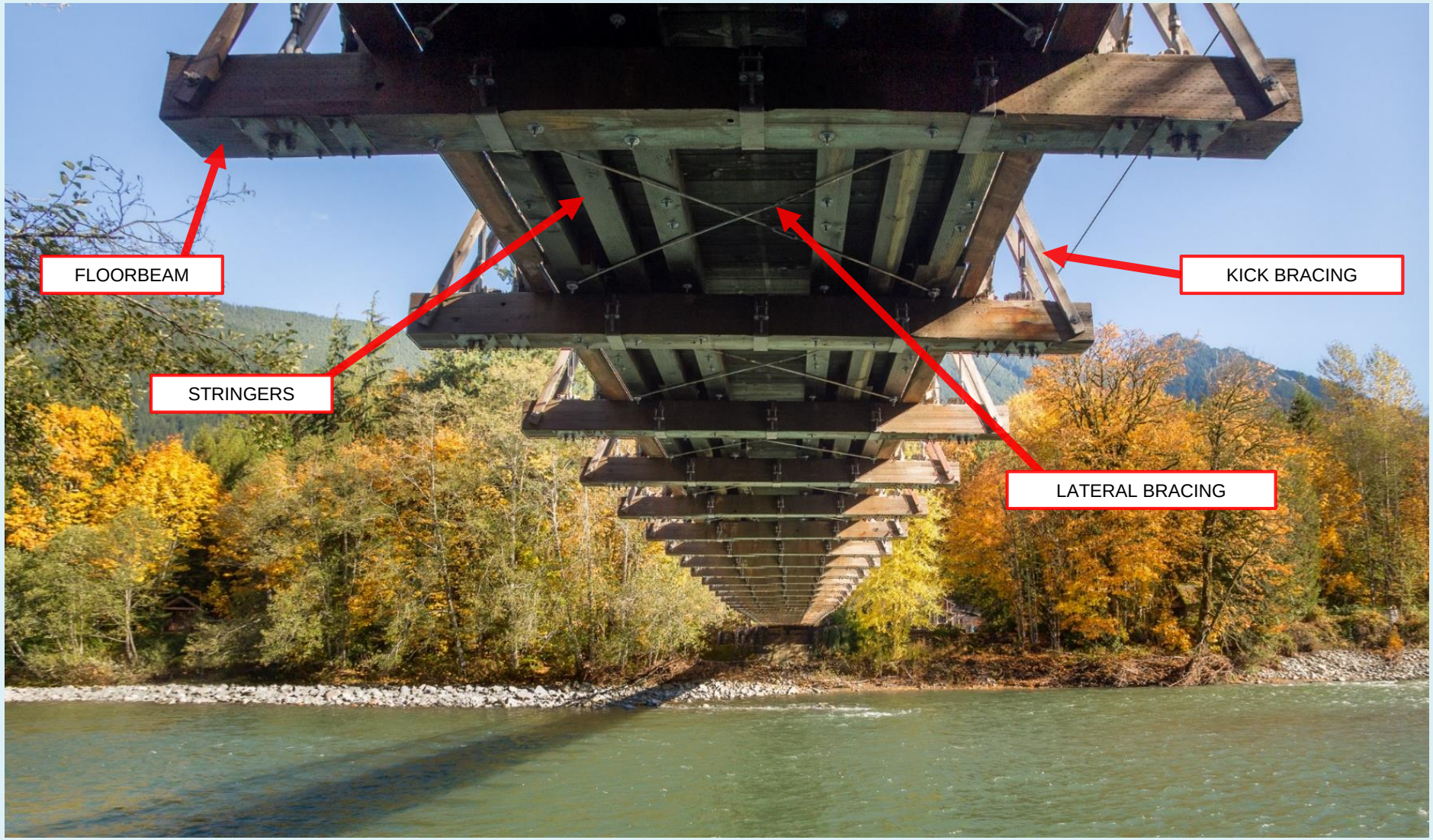
Bridge Element Terminology



Bridge Element Terminology, cont.



Bridge Needs to be Replaced

- Timber towers continue to rot
- Repairs are difficult and expensive

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Why is a replacement necessary for Baring Bridge?

Sole Access for Residences

- Provides sole access to about 170 properties, including more than 40 residences.
- Alternative route is a washed-out Forest Service road that remains closed due to unstable conditions.
- At risk of being closed due to age/condition - major impact to the Baring community

Safety Concerns

- The existing bridge is weight and speed restricted.
- Existing bridge is structurally deficient
- Many components of the bridge are continuing to age.
- The existing bridge scores a Sufficiency Rating of 10.43 out of 100 (National Bridge Inspection Standards)

Extensive Maintenance Requirements

- The existing bridge towers are 89-years-old.
- The timber and steel cable elements are continuing to age.
- Frequent and major repairs come at a high cost.
- Permanent solution is necessary.
- Key elements - towers - are worn out and it is not feasible to repair or refurbish – need to replace the bridge

Significant Repairs on Baring Bridge (1976 – Present)

- In **1976**, two new cables were added to the bridge, and the North Approach was replaced
- In **1995**, new floor-beams, decking, concrete anchors, high strength hangers, and bridge rail system were added.
- In **2010**, a column and foundation sills were replaced on the North Tower of the bridge.
- In **2017,** new main span stringers and decking were added to the bridge. Retrofits were made to the floor-beams, South Tower, and timber at ground line.

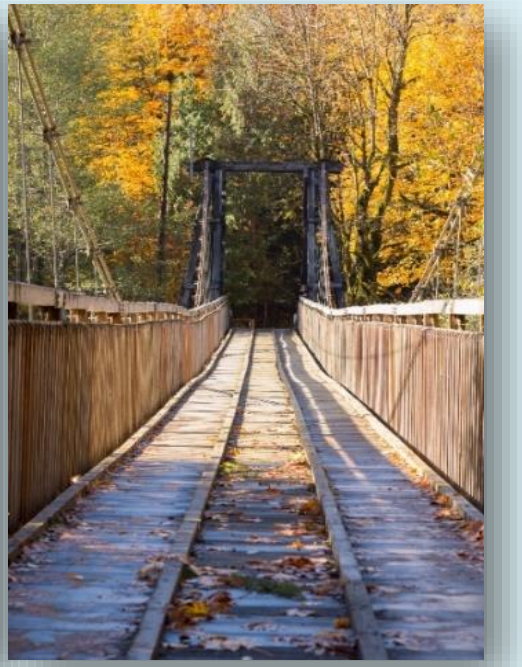
Column replacement in 2010

2017 Emergency Repairs

Suspended Work Platform

Repaired railing elements

Replaced Stringers



New Deck

2017 Emergency Repairs Cont.

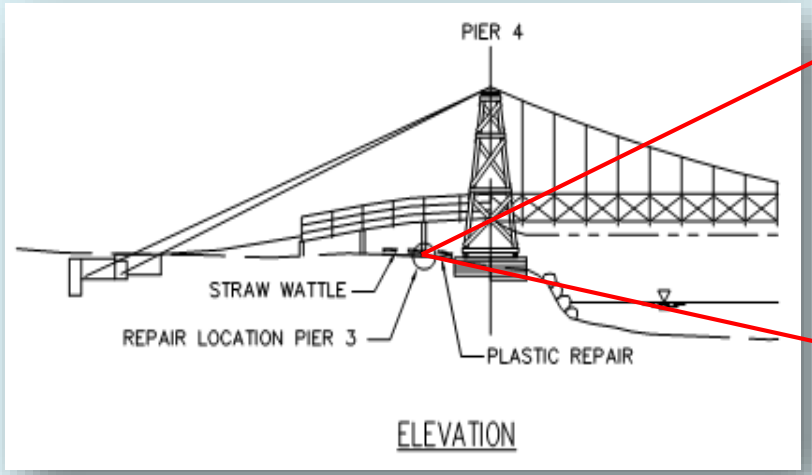
Tower Strengthening Retrofit

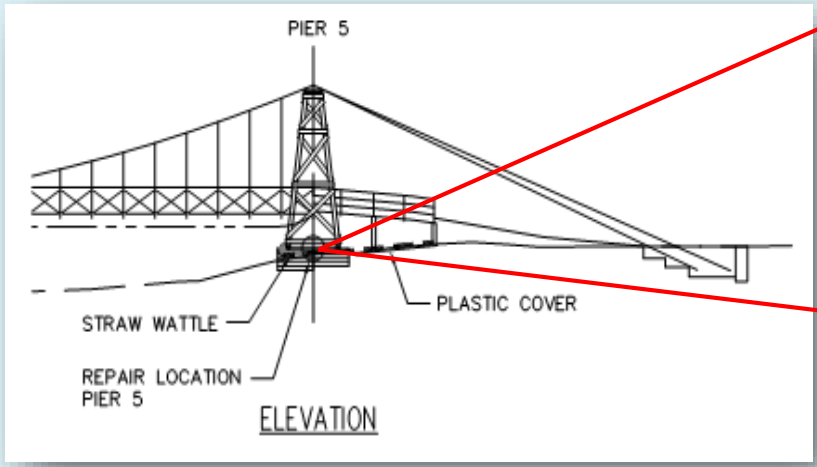
Steel Straps on Floor Beams

Timber Repairs at Ground Line

2018 Repairs

- Timber repairs at ground line





Future repairs (2019 onward)

- A scour pocket is developing at the South Tower of the bridge that will be addressed between 2019 – 2020.

Scour pocket


Scour pocket

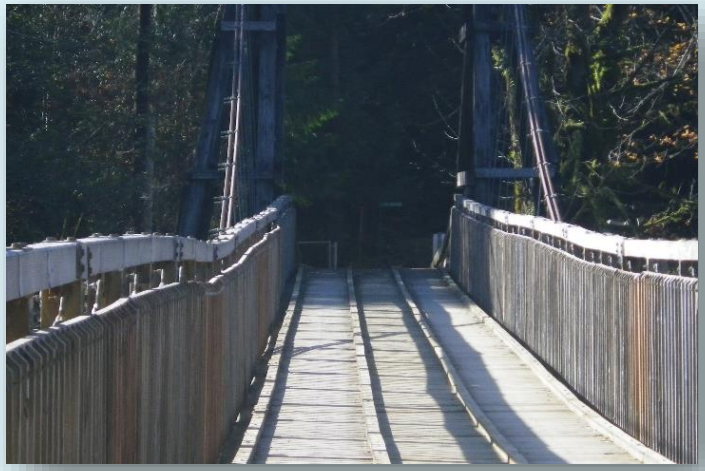
- Future maintenance on the top of the deck is required to repair the bridge truss and railing.


Split beam


Broken fence posts

Future repairs (2019 onward)

- Tighten cables to prevent the deck from sagging
- Clean and paint metal components
- Repair damaged anchor box
- Retrofit and/or replace aging timber members and other components of the bridge



Deck sags under dead load

Bridge Tower

Aging timber member

Damaged anchor box

Design Considerations for Baring Bridge

- Sole access
- King County Historic Landmark
- Community and Stakeholder Input
- Aesthetics, Architecture, and Art elements
- Potential cultural issues
- Posted weight limit of 20,000 lbs
- Challenging geotechnical and artesian aquifer conditions
- Hydraulic (floodplain) constraints
- Right-of-way and permitting
- Construction methodology
- Posted speed limit of 5mph

Once a Bridge Type is Selected, then Alternatives will be further studied:

Alternative 1: No Action

Alternative 2: Existing Bridge Rehabilitation

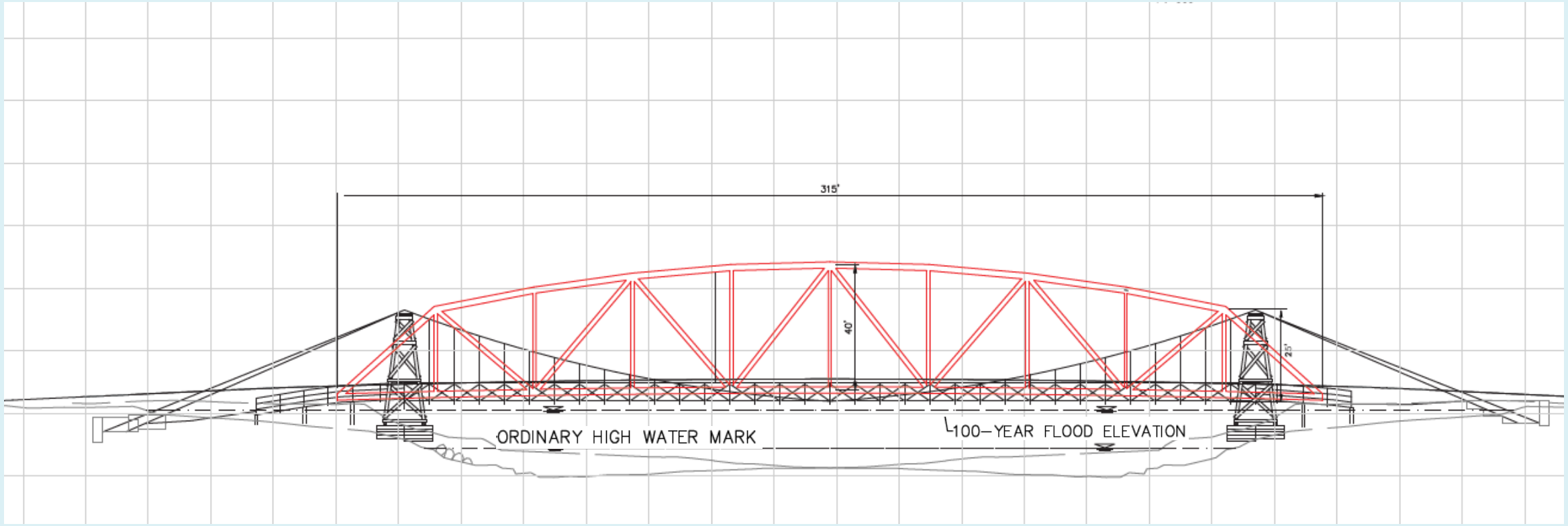
Alternative 3: New bridge – downstream location – potentially keep existing bridge structure

Alternative 4 : New bridge – existing location

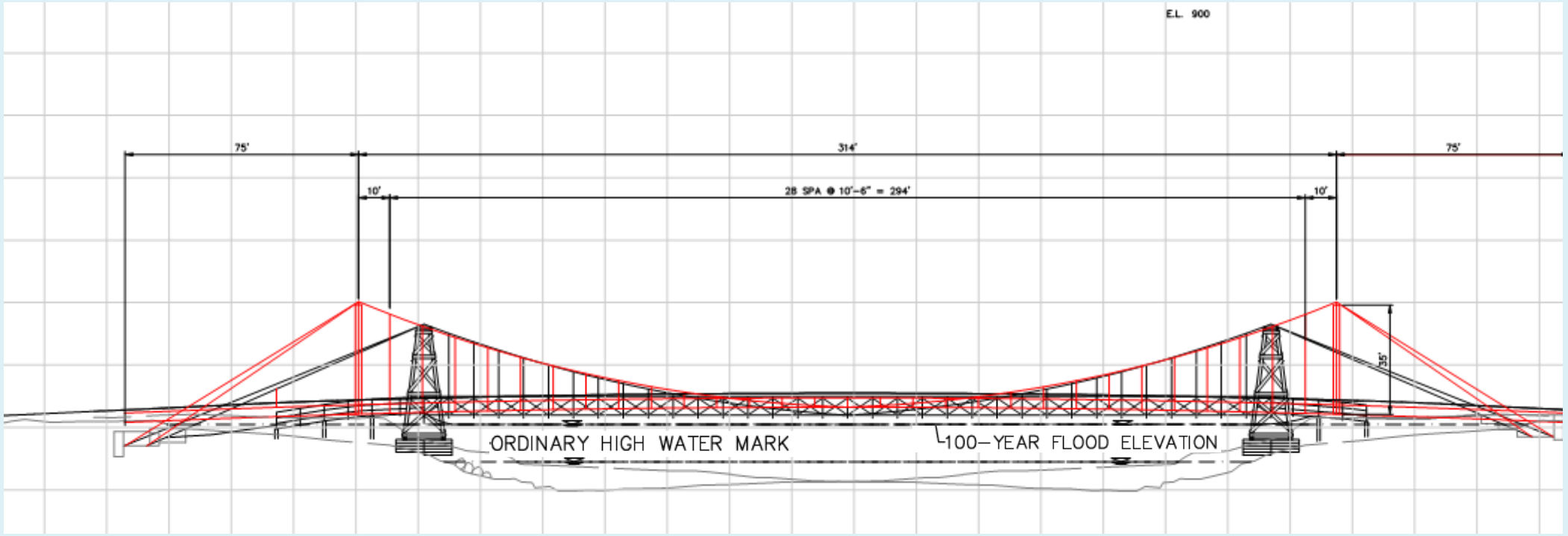
Pros & Cons of Potential Bridge Types

Bridge Type: Pros/Cons	**Steel Truss** 	**Suspension** 	**Two Tower Cable Stayed** 	**Steel Network Tied Arch** 
Foundation footprint	Medium	Large	Large	Medium
Structure Height (existing 30 ft above bridge deck)	30-40 ft at center	30-35 feet at towers	70-80 feet at towers	40-70 feet at center
Structural Performance				
Seismic	Average	High	Good	Average
Redundancy	Low	High	High	Low
Construction				
Cost	Low	High	High	Middle
Prefabrication	Yes	No	No	Yes
Anchorage from piers	Not required	Yes	Yes	Not required
In water piers	None	None	None	None
Falsework	Required	Not Required	Not Required	Required
Maintenance				
Painting and Upkeep Costs	High	Low	Moderate	High
Inspection Cost	Moderate	Moderate	High	High

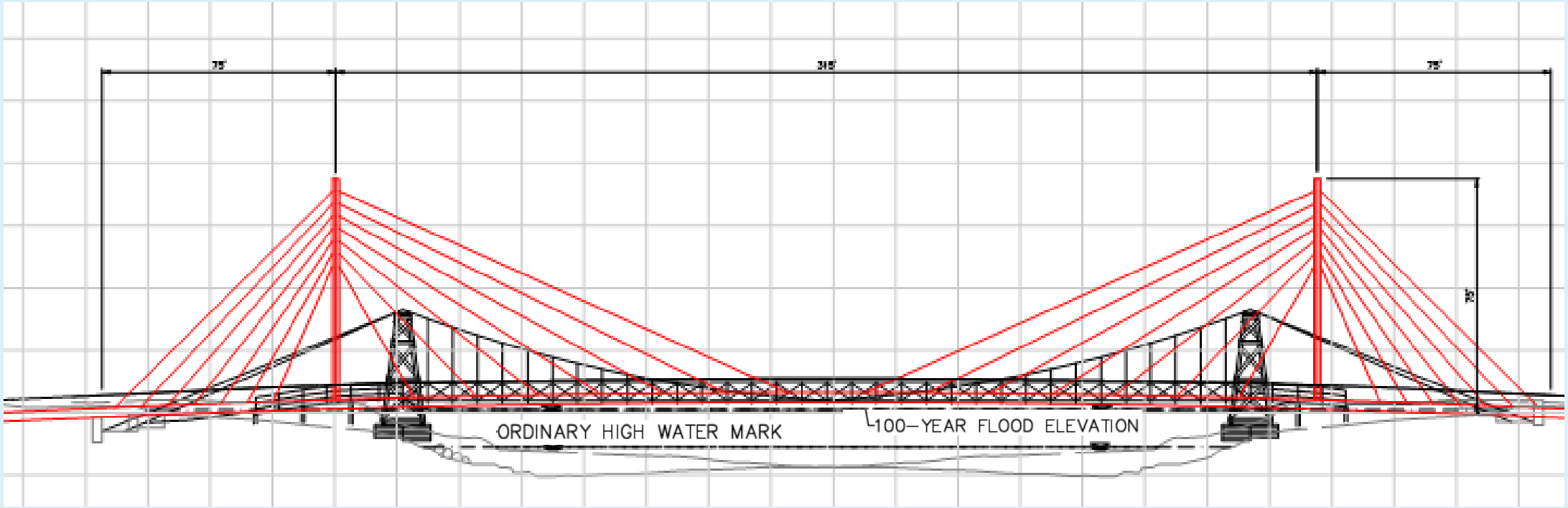
OPTION A: STEEL TRUSS



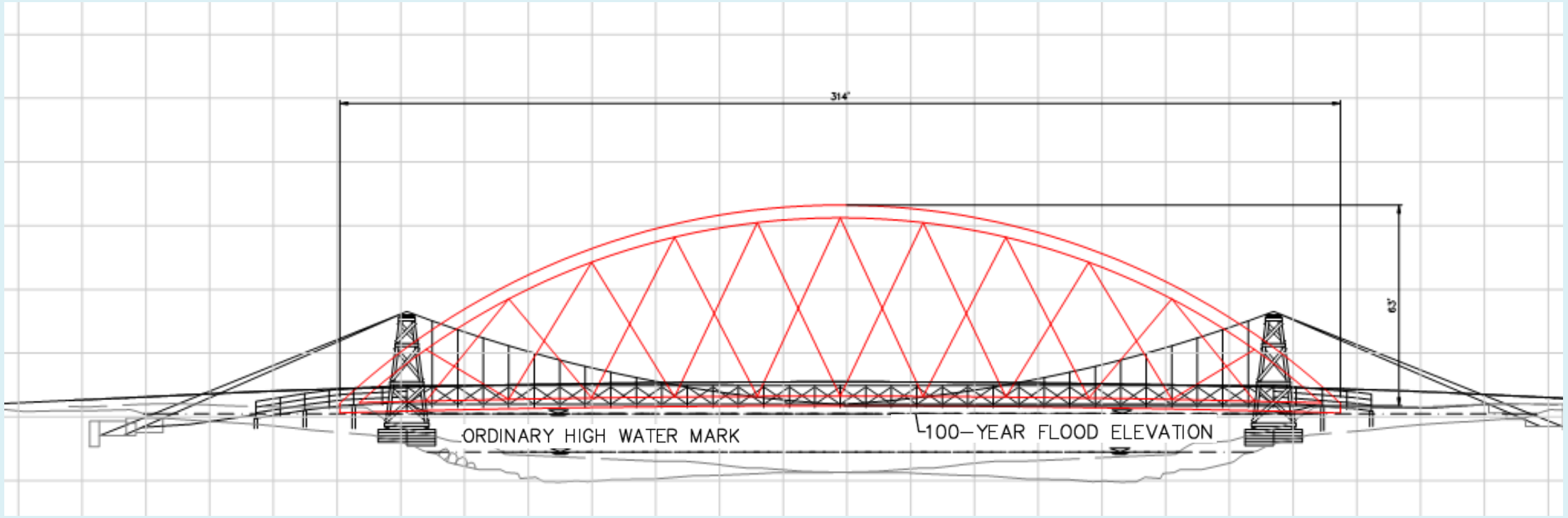
OPTION B: SUSPENSION



OPTION C: TWO TOWER CABLE STAYED



OPTION D: STEEL NETWORK TIED ARCH



NEXT STEPS…

- ❑ Incorporate Community input
- ❑ Recommend a preferred alternative
- ❑ Approve the preferred alternative
- ❑ Advance engineering design

Thank you for being here -Your Input is Very Important to Us!

Please consider:

1. Participating in an interview or filling out a survey today
2. Survey available online
3. Visiting the project website at www.kingcounty.gov/BaringBridge

QUESTIONS?

Project Representatives are here to help!

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