EARTHQUAKE READY BURNSIDE BRIDGE

Stakeholder Representative Group Meeting

Department of Community Services
Transportation Division

April 16, 2018

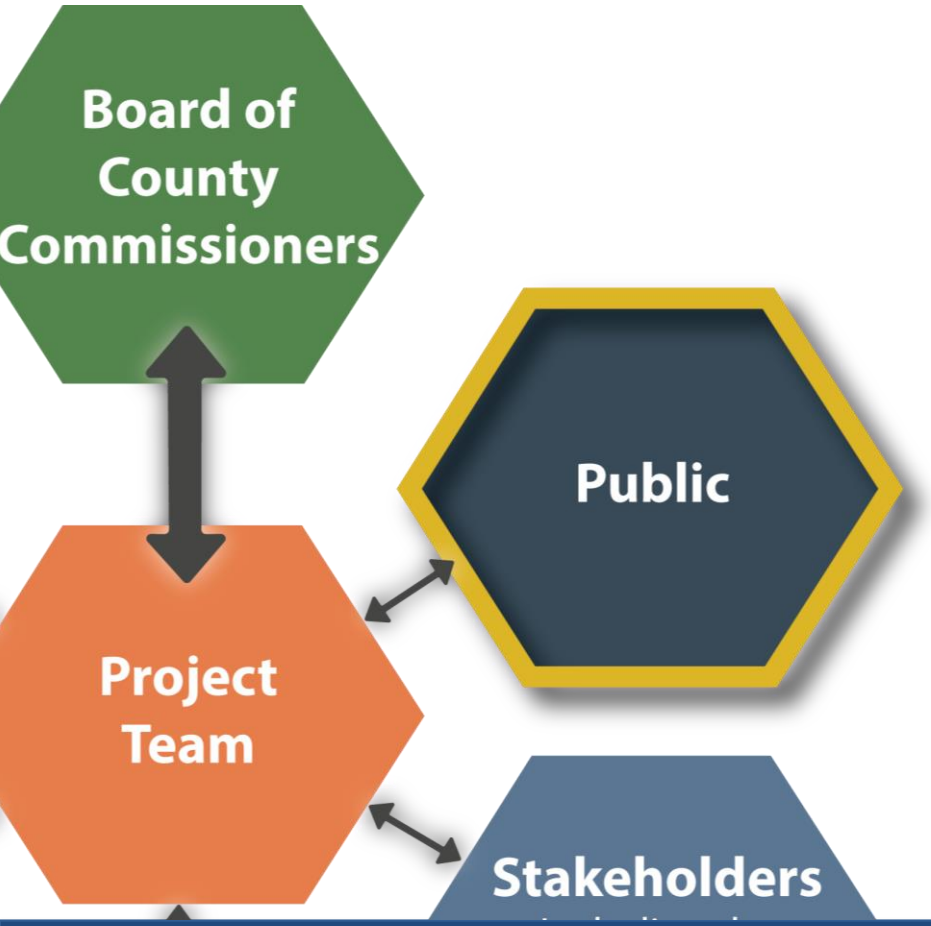
Agenda

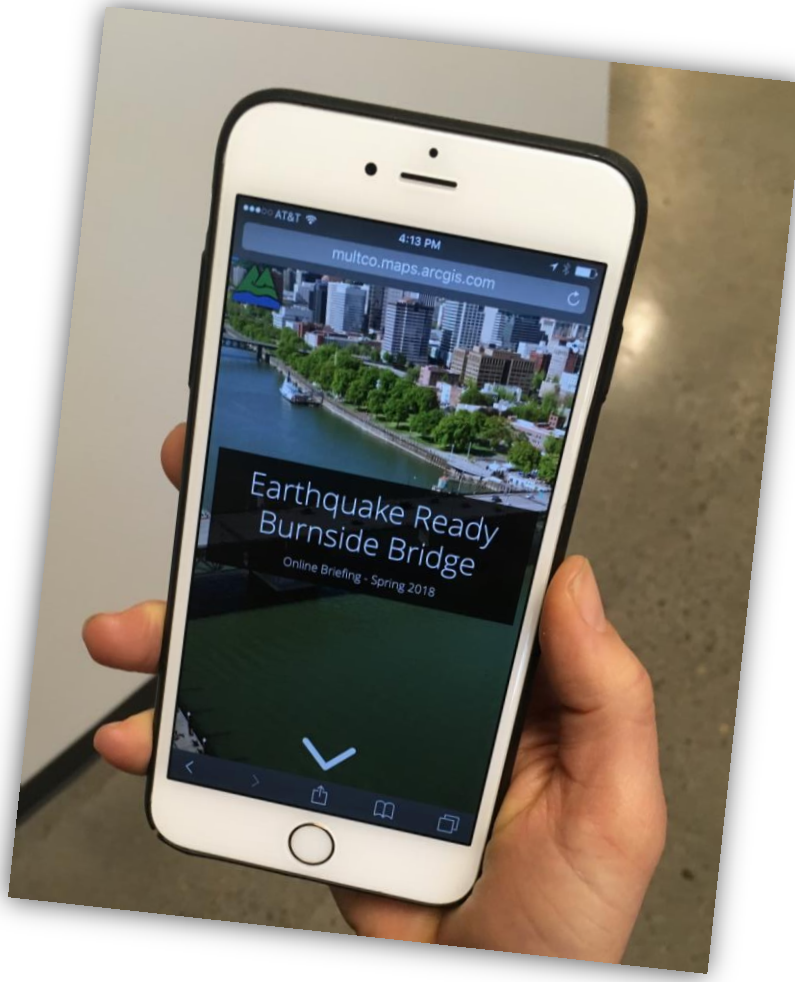
1. Project Update
2. Project Milestones
3. Options Evaluation
4. Public Comment
5. Next Steps
6. Closing Remarks

1. Project Update

Public Outreach

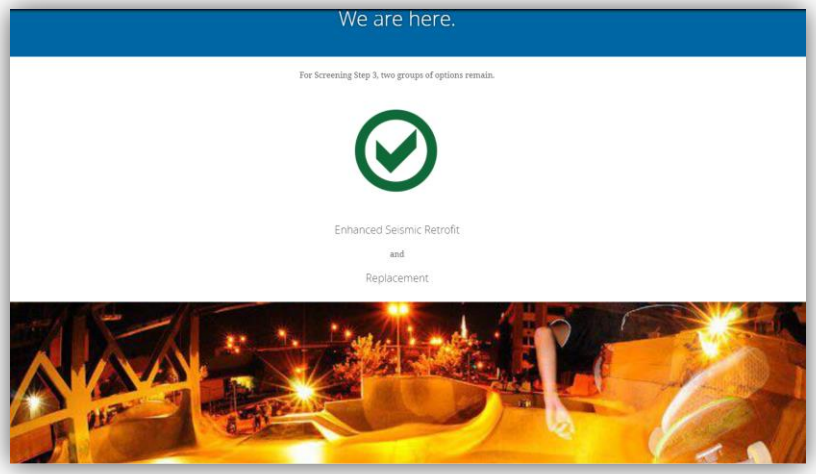
- **Online Briefing**

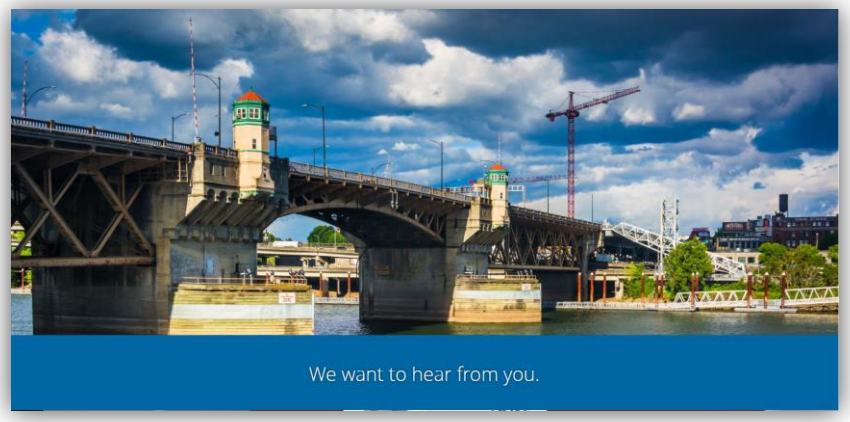




1. Project Update

Public Outreach – Online Briefing





1. Project Update

Online Briefing – What we are hearing…

1. Project Update

Online Briefing – What we are hearing…

What you would like us to consider as we evaluate options further...

"Efficiency. Which plan can best be completed in the shortest amount of time."

"I would like to see world class pedestrian and cycle connections continue to remain one of the pillars of this project."

"Make sure that we have a bridge that can withstand a major earthquake and allow emergency responses to go between downtown and the east side."

1. Project Update

Online Briefing – What we are hearing…

Is there anything else we should know...

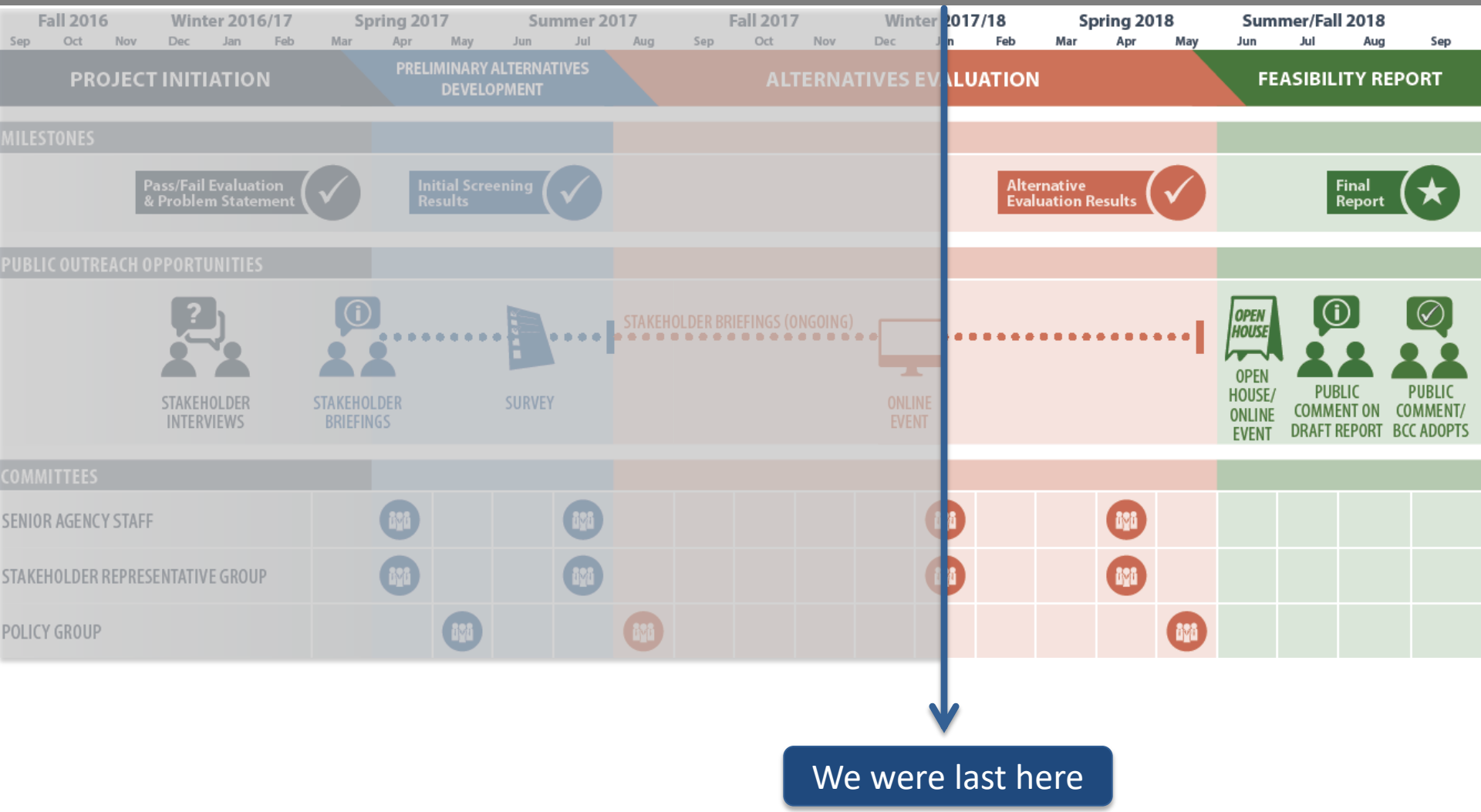
"Good choices so far. Move forward quickly."

"Re-doing the bridge will impact an area that serves a large portion of the houseless population in Portland. That impact must be mitigated through careful advance planning and appropriate funding levels."

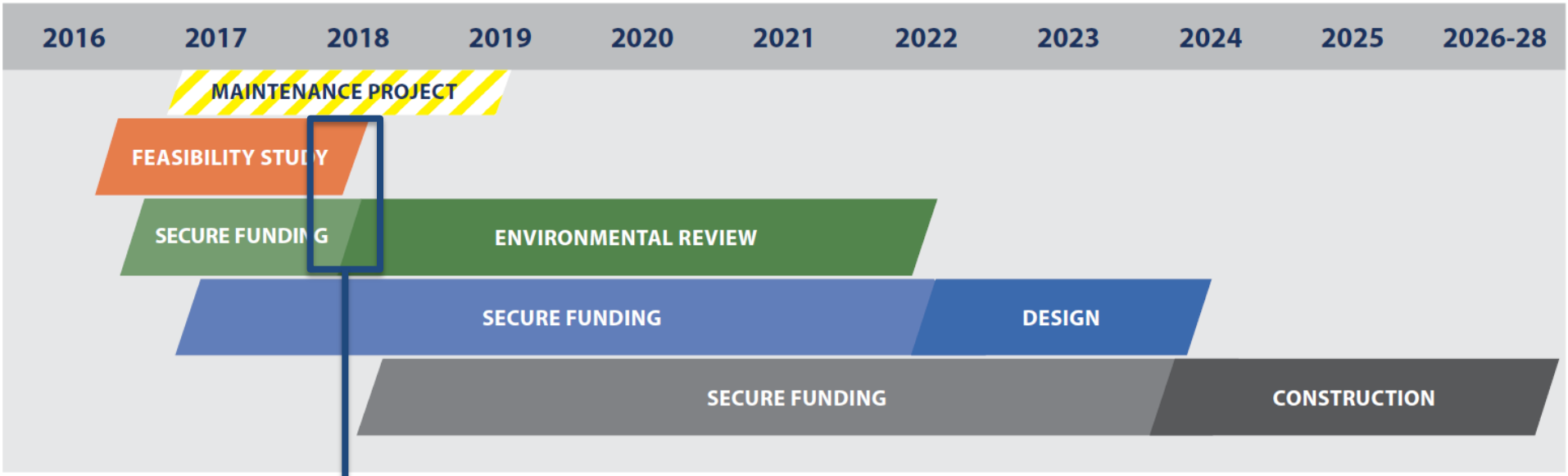
"Build it once, build it right. If we have the technology to construct a seismically stable bridge, build/reconstruct one that will last a century. If that technology is still 30 years out, build/reconstruct a bridge that will last a half-century with plans to fix it better later."

2. Project Milestones

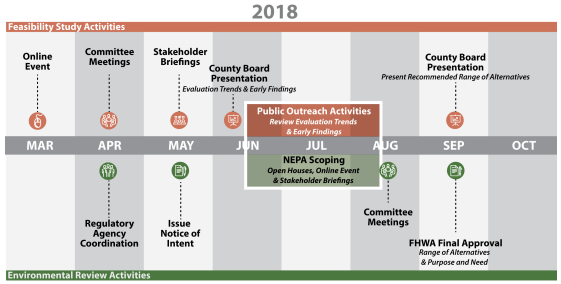
Where we left off



2. Project Milestones

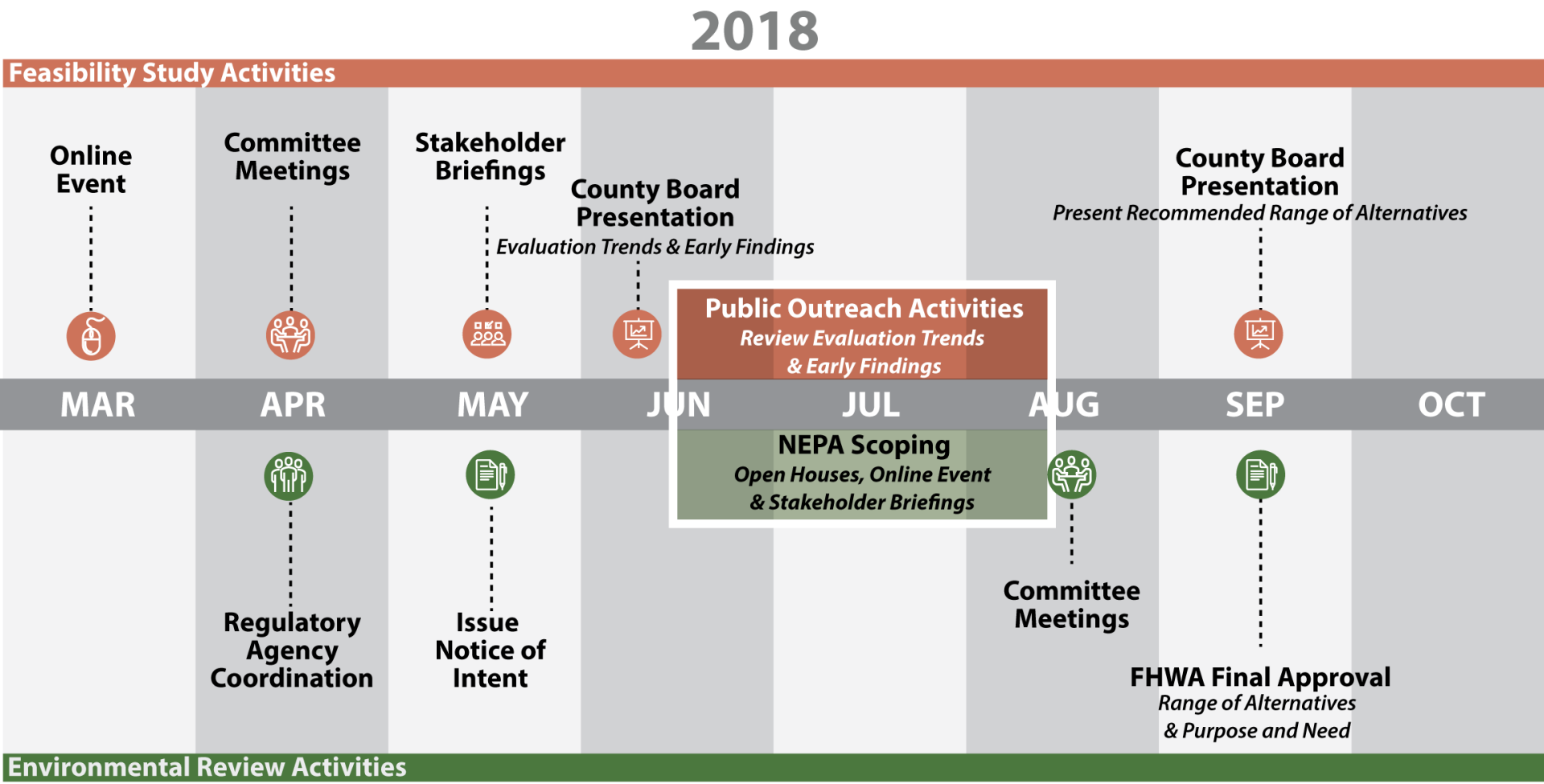


Early Environmental Activities



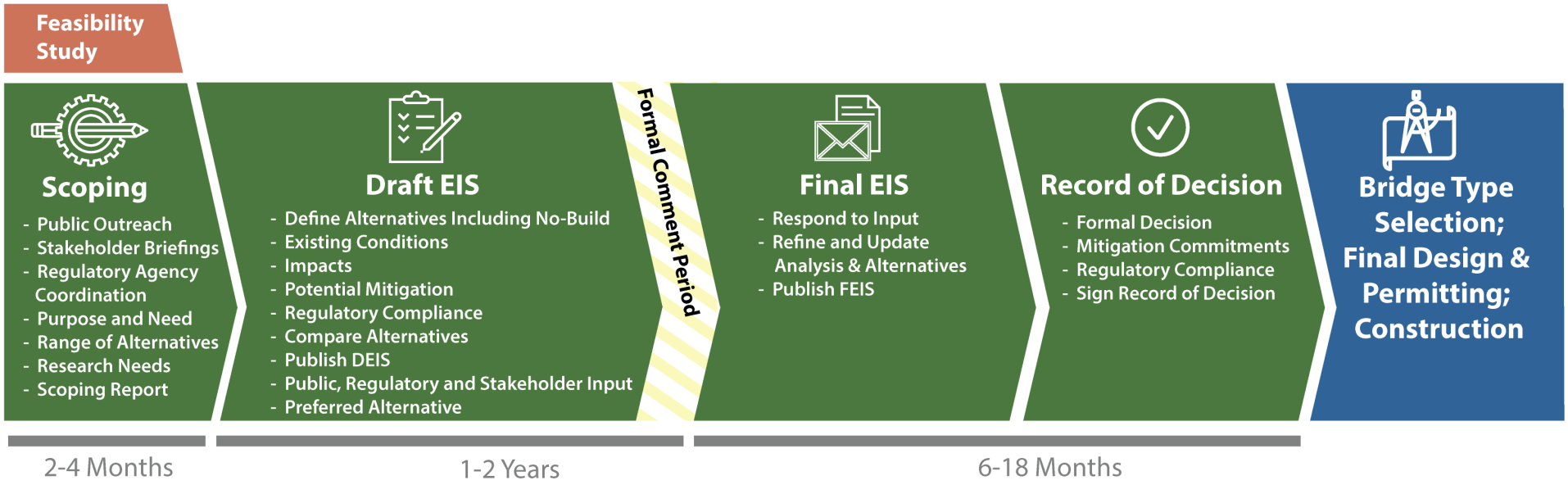
2. Project Milestones

Early Environmental Review Activities



2. Project Milestones

National Environmental Policy Act (NEPA) Process



2. Project Milestones

Purpose and Need

- Plays a critical role in NEPA compliance
- Defines “reasonable” alternatives
- Benchmark for other federal environmental regulations
- Developed from draft Problem Statement

3. Options Evaluation

EARTHQUAKE READY BURNSIDE BRIDGE

SCREENING STEPS

1
Each option was screened against the core requirements of seismic resiliency, emergency response, and compatibility with major infrastructure.

2
Each remaining option was evaluated on how well it functioned immediately after an earthquake in addition to everyday use.

3
Each remaining option is being further evaluated for its performance in six key categories:

We are here.

- **SEISMIC RESILIENCY** — Support reliable and rapid emergency response after an earthquake.
- **NON-MOTORIZED TRANSPORTATION** — Support access and safety for bicyclists, pedestrians and people with disabilities.
- **CONNECTIVITY** — Support street system integration and function for all modes.
- **EQUITY** — Minimize adverse impacts to historically marginalized communities and promote transportation equity.
- **BUILT ENVIRONMENT** — Promote land use compatibility and minimize impacts to parks and historic resources.
- **FINANCIAL STEWARDSHIP** — Ensure public funds are invested wisely.

FINAL REPORT

FALL 2018

The options that pass through these three screening steps will be published in a final report.

REMAINING OPTIONS

A draft of the final report will be available for public comment in Summer 2018.

The Multnomah County Board of Commissioners will make the final decision on which options will advance to environmental review.

OPTION GROUPS

No Build — ✗
Maintain existing bridge as-is.
These options are not seismically resilient or cannot support emergency response.

Seismic Retrofit — ✗
Upgrade the existing bridge.
A full seismic retrofit of the bridge is not feasible due to significant impacts to I-5 during construction.

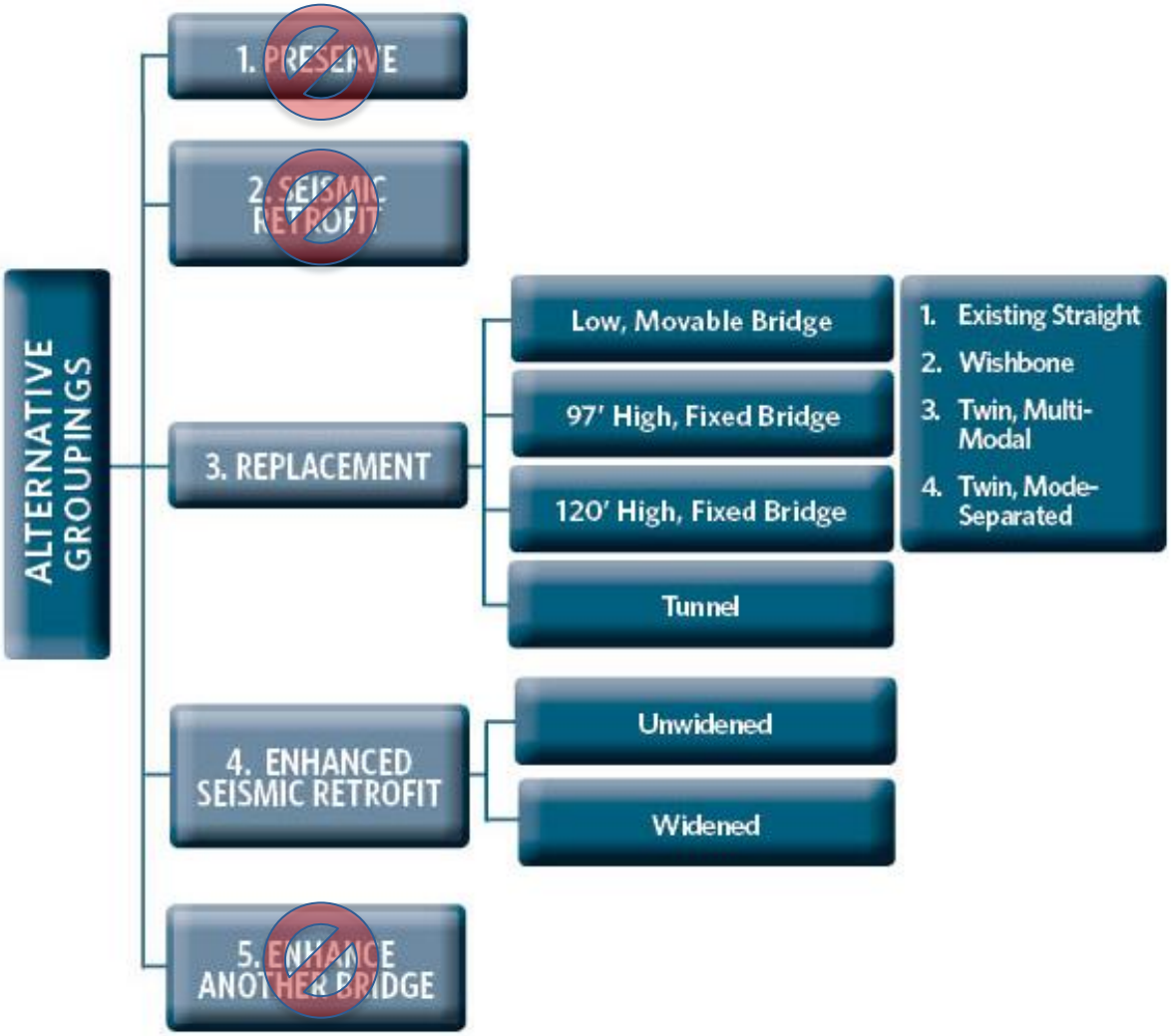
Enhanced Seismic Retrofit — ✓ ✓
Retrofit most of the existing bridge, but replace the spans over I-5 and the railroad.

Replacement — ✓ ✓
Build a new crossing such as a high fixed bridge, low movable bridge, twin bridges or a tunnel.

Enhance Another Bridge — ✓ ✗
Retrofit or replace a different bridge across the Willamette River.
Other bridges do not provide a rapid and reliable connection to the Burnside lifeline route after an earthquake.

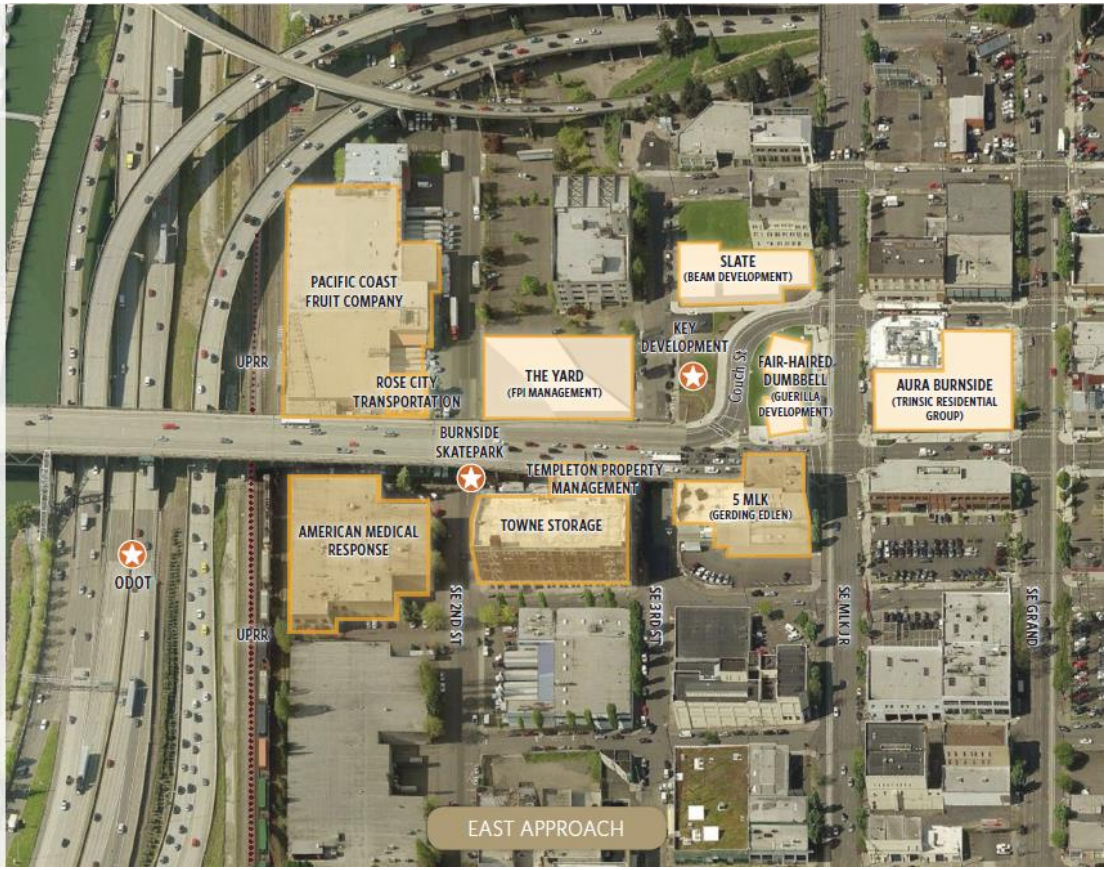
3. Options Evaluation

Remaining Alternatives



3. Options Evaluation

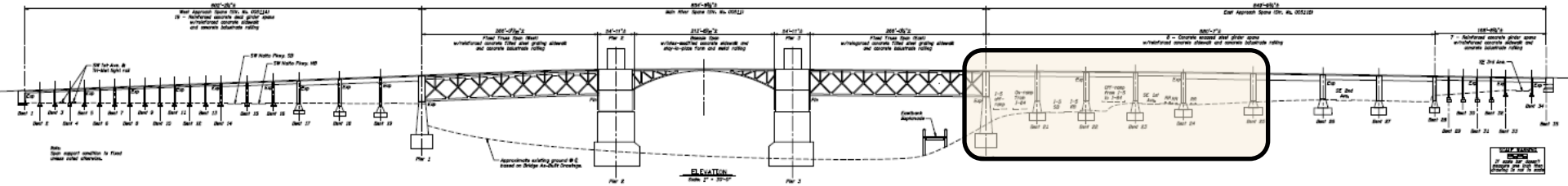
Project Context



3. Options Evaluation

EARTHQUAKE READY BURNSIDE BRIDGE

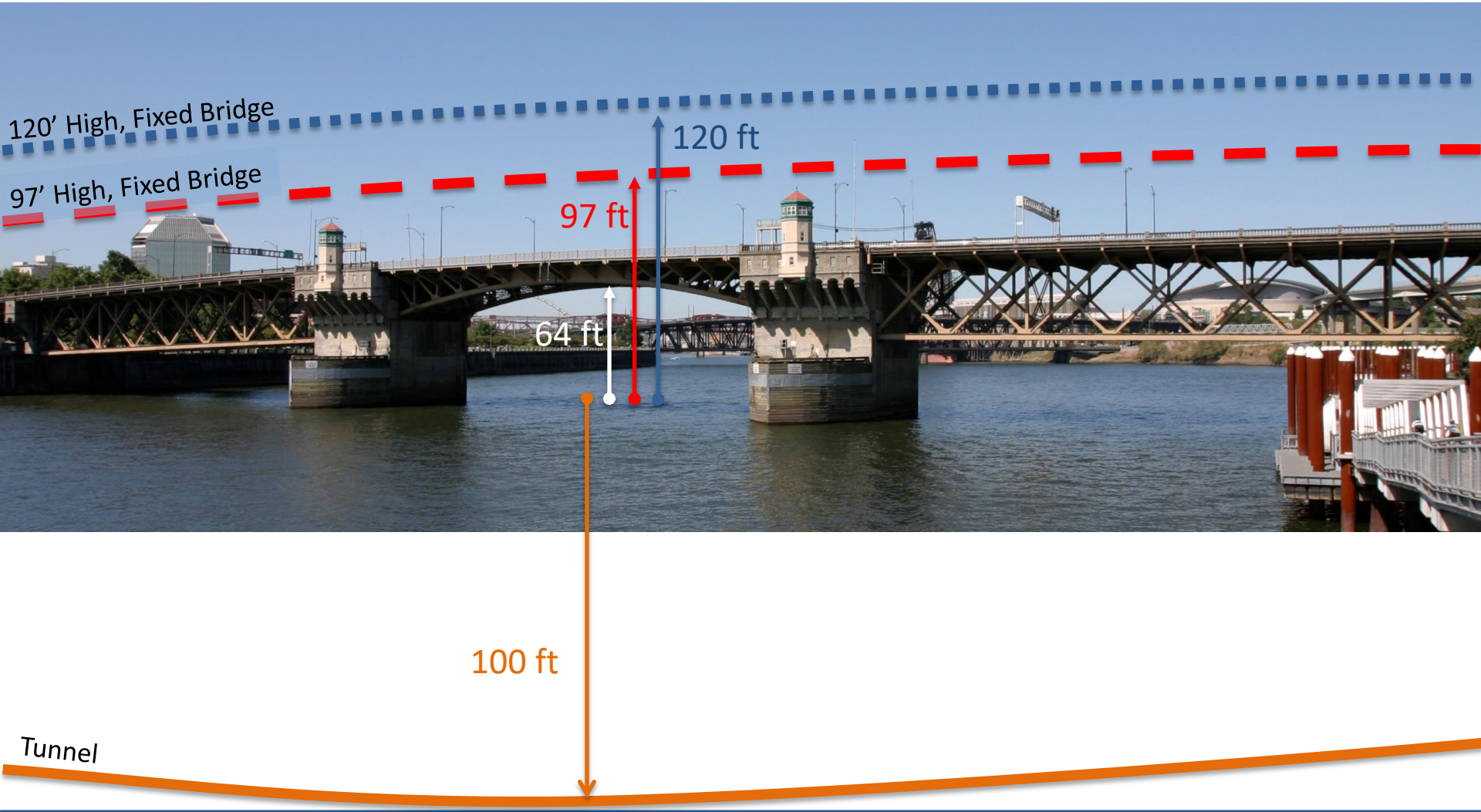
Enhanced Seismic Retrofit Options



Photos of sections of bridge next to I-5

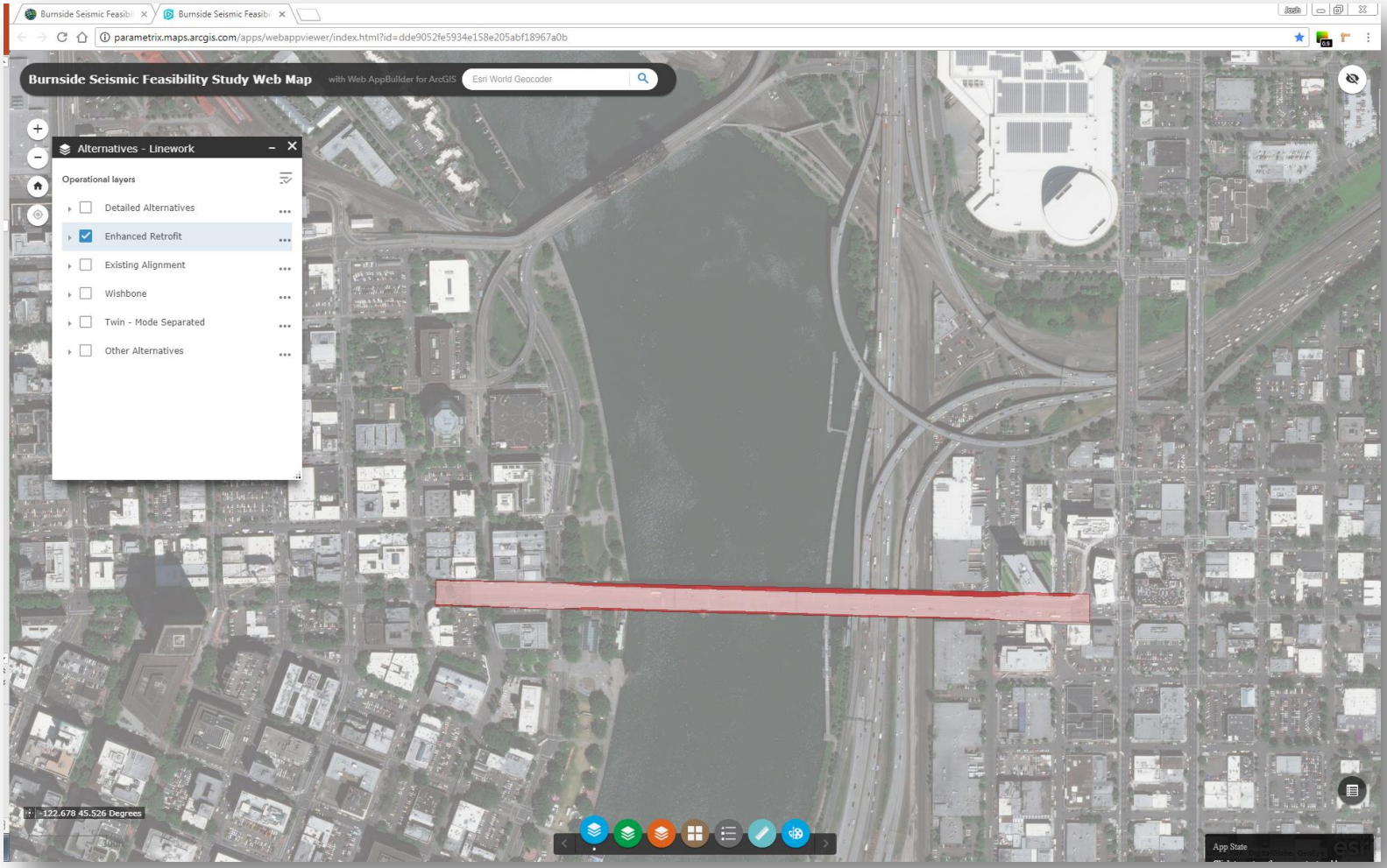
3. Options Evaluation

Elevations



3. Options Evaluation

Replacement Options (see GIS tool)



3. Options Evaluation

Guiding Principles

- Measurable at the level of design and information that will be available in this step
- Help differentiate alternatives
- Reflect input received to date
- Narrow range of crossing options to be carried forward into an environmental impact statement

3. Options Evaluation

Screening Criteria

SEISMIC RESILIENCY
Support reliable and rapid emergency response after an earthquake.

NON-MOTORIZED TRANSPORTATION
Support access and safety for bicyclists, pedestrians and people with disabilities.

CONNECTIVITY
Support street system integration and function for all modes.

EQUITY
Minimize adverse impacts to historically marginalized communities and promote transportation equity.

BUILT ENVIRONMENT
Promote land use compatibility and minimize impacts to parks and historic resources.

FINANCIAL STEWARDSHIP
Ensure public funds are invested wisely.

Scoring

HIGH

MEDIUM

LOW

3. Options Evaluation

EARTHQUAKE READY BURNSIDE BRIDGE

Screening Results – Evaluation Trends and Early Findings

		SEISMIC RESILIENCY		NON-MOTORIZED TRANSPORTATION			CONNECTIVITY			EQUITY		BUILT ENVIRONMENT					FINANCIAL STEWARDSHIP		
		Unreinforced Masonry Risk	Disabled Vehicles Risk	Ease of Ped + Bike Use	Safe Ped + Bike Connections	Personal Security for Ped + Bikes	Street Network Connection	Crossing Safety and Convenience	Moveable Bridge (Periodic Delay)	Social Service Impacts	Low Income Housing Impacts	Visual Impacts to Existing Buildings	Commercial + Industrial Impact	Long Term Housing	Park + Recreation Impact	Historic Structures + District Impacts	Capital Cost	Longterm Maintenance	Score (0-100%)
ENHANCED RETROFIT (ER)	Enhanced Seismic Retrofit, No widening (4b1)	●	●	●	●	●	●	◒	○	●	●	●	●	●	◒	●	●	○	82%
	Enhanced Seismic Retrofit, Widened (4b2)	●	●	●	●	●	●	◒	○	●	●	●	●	●	◒	●	●	○	80%
LOW MOVABLE (LM)	Low Existing Alignment (3a-1d)	●	●	●	●	●	●	◒	○	●	●	●	●	●	●	●	●	◒	85%
	Low Northeast Wishbone (3a-2b)	●	●	●	●	●	●	●	○	●	●	●	○	●	●	●	●	◒	85%
	Low Southeast Wishbone (3a-3b1)	●	●	●	●	●	◒	○	○	●	●	●	●	●	●	●	◒	◒	78%
	Low North Twin (3a-4d1)	○	◒	●	◒	●	◒	○	○	●	●	◒	○	○	●	○	○	○	45%
	Low North Twin - Mode Separated (3a-5d1)	●	◒	●	●	◒	●	◒	○	●	●	●	○	●	○	●	◒	○	66%
	Low South Twin (3a-6d1)	○	◒	●	●	●	○	○	○	◒	◒	◒	○	●	●	○	◒	○	42%
	Low South Twin - Mode Separated (3a-7d1)	●	◒	●	●	◒	◒	●	○	◒	●	●	●	●	○	●	◒	○	65%
	Low Stacked (3a-8d)	●	◒	●	○	○	◒	●	○	◒	●	◒	●	●	●	◒	●	◒	63%
	Low Double Wishbone (3a-9d)	○	◒	●	◒	●	◒	○	○	◒	●	○	○	○	●	○	●	◒	49%
97' FIXED (97F)	97' High Existing Alignment (3b-1b1)	◒	●	○	○	●	◒	●	●	◒	●	◒	●	●	○	○	●	●	67%
	97' High Northeast Wishbone (3b-2b1)	◒	◒	○	○	●	◒	◒	●	◒	●	◒	○	●	●	○	●	●	60%
	97' High Southeast Wishbone (3b-3b1)	◒	◒	○	○	●	○	○	●	◒	●	◒	●	●	●	○	●	●	58%
	97' High North Twin (3b-4d1)	○	◒	○	○	●	○	◒	●	◒	●	○	○	○	●	○	◒	◒	42%
	97' High North Twin - Mode Separated (3b-5d1)	◒	●	○	●	○	◒	◒	●	◒	●	◒	○	●	○	○	◒	◒	55%
	97' High South Twin (3b-6d1)	○	◒	○	○	●	○	○	●	◒	◒	○	○	●	●	○	◒	◒	39%
	97' High South Twin - Mode Separated (3b-7d1)	◒	●	○	●	◒	◒	◒	●	◒	●	◒	●	●	○	○	◒	◒	61%
120' FIXED (120F)	120' High Existing Alignment (3b-1b2)	◒	○	○	○	●	○	●	●	○	○	○	○	◒	○	○	○	◒	29%
	120' High Northeast Wishbone (3b-2b2)	○	○	○	○	●	○	◒	●	○	○	○	○	●	○	○	○	◒	23%
	120' High Southeast Wishbone (3b-3b2)	◒	○	○	○	●	○	○	●	○	○	○	○	●	○	○	○	◒	25%
	120' High North Twin (3b-4d2)	○	○	○	◒	●	○	◒	●	○	○	○	○	○	○	○	○	○	17%
	120' High North Twin - Mode Separated (3b-5d2)	◒	○	◒	●	○	○	◒	●	◒	●	○	○	●	○	○	○	○	39%
	120' High South Twin (3b-6d2)	○	○	○	○	●	○	○	●	○	○	○	○	●	○	○	○	○	14%
	120' High South Twin - Mode Separated (3b-7d2)	◒	○	◒	●	○	○	◒	●	◒	●	○	●	●	○	○	○	○	42%
TUNNEL (T)	Tunnel - Mode Separated (3c-1a)	●	○	◒	●	◒	○	◒	◒	●	○	●	○	○	○	●	○	○	40%

3. Options Evaluation

EARTHQUAKE READY BURNSIDE BRIDGE

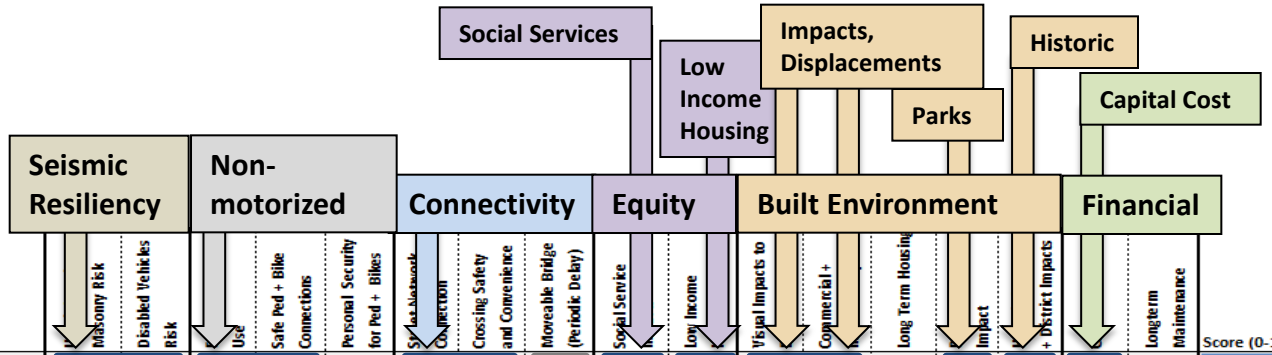
Screening Results – Evaluation Trends and Early Findings

		SEISMIC RESILIENCY		NON-MOTORIZED TRANSPORTATION			CONNECTIVITY			EQUITY		BUILT ENVIRONMENT					FINANCIAL STEWARDSHIP		
		Unreinforced Masonry Risk	Disabled Vehicles Risk	Ease of Ped + Bike Use	Safe Ped + Bike Connections	Personal Security for Ped + Bikes	Street Network Connection	Crossing Safety and Convenience	Moveable Bridge (Periodic Delay)	Social Service Impacts	Low Income Housing Impacts	Visual Impacts to Existing Buildings	Commercial + Industrial Impact	Long Term Housing	Park + Recreation Impact	Historic Structures + District Impacts	Capital Cost	Longterm Maintenance	Score (0-100%)
LM	Low Existing Alignment (3a-1d)	●	●	●	●	●	●	◒	○	●	●	●	●	●	●	●	●	◒	85%
LM	Low Northeast Wishbone (3a-2b)	●	●	●	●	●	●	●	○	●	●	●	○	●	●	●	●	◒	85%
ER	Enhanced Seismic Retrofit, No widening (4b1)	●	●	●	●	●	●	◒	○	●	●	●	●	●	◒	●	●	○	82%
ER	Enhanced Seismic Retrofit, Widened (4b2)	●	●	●	●	●	●	◒	○	●	●	●	●	●	◒	●	●	○	80%
LM	Low Southeast Wishbone (3a-3b1)	●	●	●	●	●	◒	○	○	●	●	●	●	●	●	●	◒	◒	78%
97F	97' High Existing Alignment (3b-1b1)	◒	●	○	○	●	◒	●	●	◒	●	◒	●	●	○	○	●	●	67%
LM	Low North Twin - Mode Separated (3a-5d1)	●	◒	●	●	◒	●	◒	○	●	●	●	○	●	○	●	◒	○	66%
LM	Low South Twin - Mode Separated (3a-7d1)	●	◒	●	●	◒	◒	●	○	◒	●	●	●	●	○	●	◒	○	65%
LM	Low Stacked (3a-8d)	●	◒	●	○	○	◒	●	○	◒	●	◒	●	●	●	◒	●	◒	63%
97F	97' High South Twin - Mode Separated (3b-7d1)	◒	●	○	●	◒	◒	◒	●	◒	●	◒	●	●	○	○	◒	◒	61%
97F	97' High Northeast Wishbone (3b-2b1)	◒	◒	○	○	●	◒	◒	●	◒	●	◒	○	●	●	○	●	●	60%
97F	97' High Southeast Wishbone (3b-3b1)	◒	◒	○	○	●	○	○	●	◒	●	◒	●	●	●	○	●	●	58%
97F	97' High North Twin - Mode Separated (3b-5d1)	◒	●	○	●	○	◒	◒	●	◒	●	◒	○	●	○	○	◒	◒	55%
LM	Low Double Wishbone (3a-9d)	○	◒	●	◒	●	◒	○	○	◒	●	○	○	○	●	○	●	◒	49%
LM	Low North Twin (3a-4d1)	○	◒	●	◒	●	◒	○	○	●	●	◒	○	○	●	○	○	○	45%
97F	97' High North Twin (3b-4d1)	○	◒	○	○	●	○	◒	●	◒	●	○	○	○	●	○	◒	◒	42%
120F	120' High South Twin - Mode Separated (3b-7d2)	◒	○	◒	●	○	○	◒	●	◒	●	○	●	●	○	○	○	○	42%
LM	Low South Twin (3a-6d1)	○	◒	●	●	●	○	○	○	◒	◒	◒	○	●	●	○	◒	○	42%
T	Tunnel - Mode Separated (3c-1a)	●	○	◒	●	◒	○	◒	◒	●	○	●	○	○	○	●	○	○	40%
120F	120' High North Twin - Mode Separated (3b-5d2)	◒	○	◒	●	○	○	◒	●	◒	●	○	○	●	○	○	○	○	39%
97F	97' High South Twin (3b-6d1)	○	◒	○	○	●	○	○	●	◒	◒	○	○	●	●	○	◒	◒	39%
120F	120' High Existing Alignment (3b-1b2)	◒	○	○	○	●	○	●	●	○	○	○	○	◒	○	○	○	◒	29%
120F	120' High Southeast Wishbone (3b-3b2)	◒	○	○	○	●	○	○	●	○	○	○	○	●	○	○	○	◒	25%
120F	120' High Northeast Wishbone (3b-2b2)	○	○	○	○	●	○	◒	●	○	○	○	○	●	○	○	○	◒	23%
120F	120' High North Twin (3b-4d2)	○	○	○	◒	●	○	◒	●	○	○	○	○	○	○	○	○	○	17%
120F	120' High South Twin (3b-6d2)	○	○	○	○	●	○	○	●	○	○	○	○	●	○	○	○	○	14%

3. Options Evaluation

EARTHQUAKE READY BURNSIDE BRIDGE

Screening Results – Evaluation Trends and Early Findings



LM	Low Existing Alignment (3a-1d)	85%
LM	Low Northeast Wishbone (3a-2b)	85%
ER	Enhanced Seismic Retrofit, No widening (4b1)	82%
ER	Enhanced Seismic Retrofit, Widened (4b2)	80%
LM	Low Southeast Wishbone (3a-3b1)	78%
97F	97' High Existing Alignment (3b-1b1)	67%
LM	Low North Twin - Mode Separated (3a-5d1)	66%
LM	Low South Twin - Mode Separated (3a-7d1)	65%
LM	Low Stacked (3a-8d)	63%
97F	97' High South Twin - Mode Separated (3b-7d1)	61%
97F	97' High Northeast Wishbone (3b-2b1)	60%
97F	97' High Southeast Wishbone (3b-3b1)	58%
97F	97' High North Twin - Mode Separated (3b-5d1)	55%
LM	Low Double Wishbone (3a-9d)	49%
LM	Low North Twin (3a-4d1)	45%
97F	97' High North Twin (3b-4d1)	42%
120F	120' High South Twin - Mode Separated (3b-7d2)	42%
LM	Low South Twin (3a-6d1)	42%
T	Tunnel - Mode Separated (3c-1a)	40%
120F	120' High North Twin - Mode Separated (3b-5d2)	39%
97F	97' High South Twin (3b-6d1)	39%
120F	120' High Existing Alignment (3b-1b2)	29%
120F	120' High Southeast Wishbone (3b-3b2)	25%
120F	120' High Northeast Wishbone (3b-2b2)	23%
120F	120' High North Twin (3b-4d2)	17%
120F	120' High South Twin (3b-6d2)	14%

3. Options Evaluation

Seismic Resiliency

High: lows, enhanced retrofits

Low: 120s, twins, 97s, tunnel

Measures:

- Risk that evacuation and emergency response will be blocked by:
  - URM collapse
  - Vehicle crashes

		SEISMIC RESILIENCY	
		Unreinforced Masonry Risk	Disabled Vehicles Risk
LM	Low Existing Alignment (3a-1d)	●	●
LM	Low Northeast Wishbone (3a-2b)	●	●
ER	Enhanced Seismic Retrofit, No widening (4b1)	●	●
ER	Enhanced Seismic Retrofit, Widened (4b2)	●	●
LM	Low Southeast Wishbone (3a-3b1)	●	●
97F	97' High Existing Alignment (3b-1b1)	◒	●
LM	Low North Twin - Mode Separated (3a-5d1)	●	◒
LM	Low South Twin - Mode Separated (3a-7d1)	●	◒
LM	Low Stacked (3a-8d)	●	◒
97F	97' High South Twin - Mode Separated (3b-7d1)	◒	●
97F	97' High Northeast Wishbone (3b-2b1)	◒	◒
97F	97' High Southeast Wishbone (3b-3b1)	◒	◒
97F	97' High North Twin - Mode Separated (3b-5d1)	◒	●
LM	Low Double Wishbone (3a-9d)	○	◒
LM	Low North Twin (3a-4d1)	○	◒
97F	97' High North Twin (3b-4d1)	○	◒
120F	120' High South Twin - Mode Separated (3b-7d2)	◒	○
LM	Low South Twin (3a-6d1)	○	◒
T	Tunnel - Mode Separated (3c-1a)	●	○
120F	120' High North Twin - Mode Separated (3b-5d2)	◒	○
97F	97' High South Twin (3b-6d1)	○	◒
120F	120' High Existing Alignment (3b-1b2)	◒	○
120F	120' High Southeast Wishbone (3b-3b2)	◒	○
120F	120' High Northeast Wishbone (3b-2b2)	○	○
120F	120' High North Twin (3b-4d2)	○	○
120F	120' High South Twin (3b-6d2)	○	○

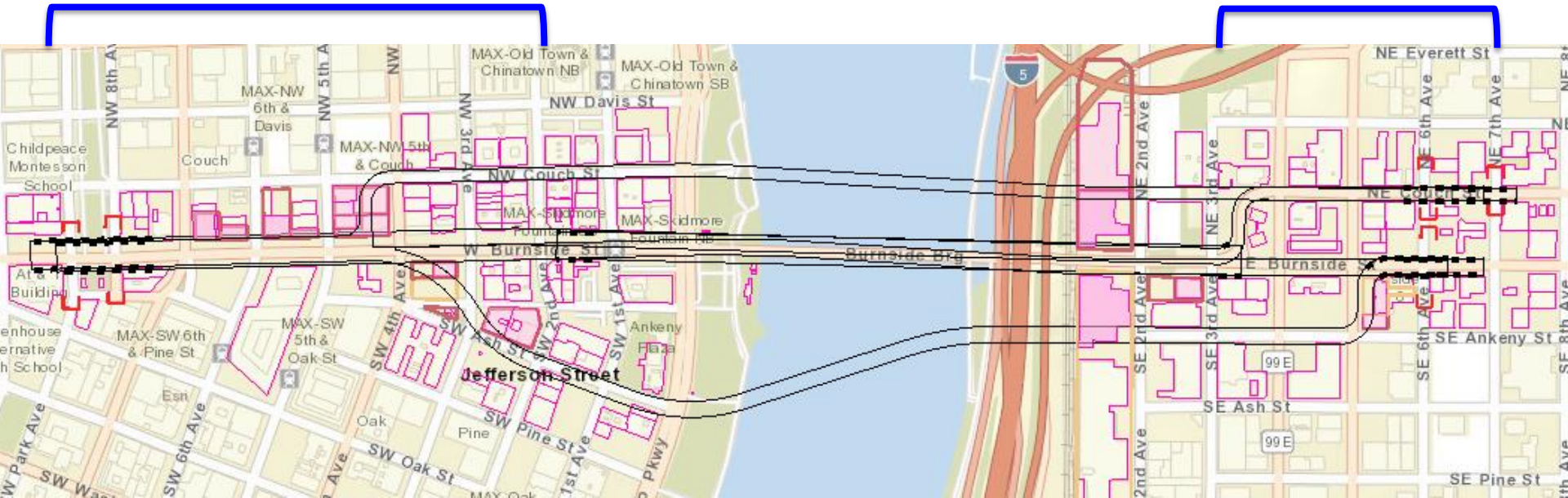
3. Options Evaluation

Seismic Resiliency

120s, twins, 97s

Differentiators:

- Longest bridges and twin bridges exposed to the most URMs



3. Options Evaluation

Seismic Resiliency

- tunnel

Differentiator:

- Crashes more difficult to clear from tunnel

3. Options Evaluation

Non-Motorized Transportation

- lows, enhanced retrofits, mode separated
- 120s, 97s

Measures:

- Length and height of grade
- Connectivity to bike network:
  - Existing designations
  - Planned designations
- Personal Security

		NON-MOTORIZED TRANSPORTATION		
		Ease of Ped + Bike Use	Safe Ped + Bike Connections	Personal Security for Ped + Bikes
LM	Low Existing Alignment (3a-1d)	●	●	●
LM	Low Northeast Wishbone (3a-2b)	●	●	●
ER	Enhanced Seismic Retrofit, No widening (4b1)	●	●	●
ER	Enhanced Seismic Retrofit, Widened (4b2)	●	●	●
LM	Low Southeast Wishbone (3a-3b1)	●	●	●
97F	97' High Existing Alignment (3b-1b1)	○	○	●
LM	Low North Twin - Mode Separated (3a-5d1)	●	●	◒
LM	Low South Twin - Mode Separated (3a-7d1)	●	●	◒
LM	Low Stacked (3a-8d)	●	○	○
97F	97' High South Twin - Mode Separated (3b-7d1)	○	●	◒
97F	97' High Northeast Wishbone (3b-2b1)	○	○	●
97F	97' High Southeast Wishbone (3b-3b1)	○	○	●
97F	97' High North Twin - Mode Separated (3b-5d1)	○	●	○
LM	Low Double Wishbone (3a-9d)	●	◒	●
LM	Low North Twin (3a-4d1)	●	◒	●
97F	97' High North Twin (3b-4d1)	○	○	●
120F	120' High South Twin - Mode Separated (3b-7d2)	◒	●	○
LM	Low South Twin (3a-6d1)	●	●	●
T	Tunnel - Mode Separated (3c-1a)	◒	●	◒
120F	120' High North Twin - Mode Separated (3b-5d2)	◒	●	○
97F	97' High South Twin (3b-6d1)	○	○	●
120F	120' High Existing Alignment (3b-1b2)	○	○	●
120F	120' High Southeast Wishbone (3b-3b2)	○	○	●
120F	120' High Northeast Wishbone (3b-2b2)	○	○	●
120F	120' High North Twin (3b-4d2)	○	◒	●
120F	120' High South Twin (3b-6d2)	○	○	●

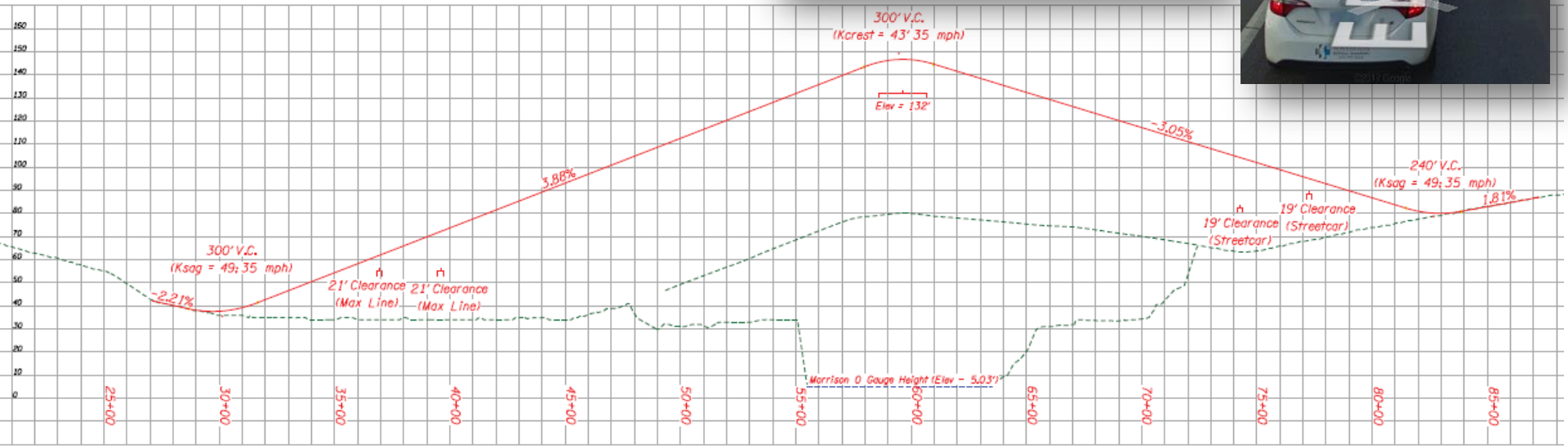
3. Options Evaluation

Non-Motorized Transportation: Bike/Ped Grade & Connections

120s, 97s

Differentiators:

- Taller bridges have longer grades and bypass more bike connections



3. Options Evaluation

Connectivity

low existing

120s, 97s, tunnel, twins, southeast wishbone

Measures:

- Number of streets closed and bypassed
- Grade length and height
- Non-traditional intersections and curves

		CONNECTIVITY		
		Street Network Connection	Crossing Safety and Convenience	Moveable Bridge (Periodic Delay)
LM	Low Existing Alignment (3a-1d)	●	◒	○
LM	Low Northeast Wishbone (3a-2b)	●	●	○
ER	Enhanced Seismic Retrofit, No widening (4b1)	●	◒	○
ER	Enhanced Seismic Retrofit, Widened (4b2)	●	◒	○
LM	Low Southeast Wishbone (3a-3b1)	◒	○	○
97F	97' High Existing Alignment (3b-1b1)	◒	●	●
LM	Low North Twin - Mode Separated (3a-5d1)	●	◒	○
LM	Low South Twin - Mode Separated (3a-7d1)	◒	●	○
LM	Low Stacked (3a-8d)	◒	●	○
97F	97' High South Twin - Mode Separated (3b-7d1)	◒	◒	●
97F	97' High Northeast Wishbone (3b-2b1)	◒	◒	●
97F	97' High Southeast Wishbone (3b-3b1)	○	○	●
97F	97' High North Twin - Mode Separated (3b-5d1)	◒	◒	●
LM	Low Double Wishbone (3a-9d)	◒	○	○
LM	Low North Twin (3a-4d1)	◒	○	○
97F	97' High North Twin (3b-4d1)	○	◒	●
120F	120' High South Twin - Mode Separated (3b-7d2)	○	◒	●
LM	Low South Twin (3a-6d1)	○	○	○
T	Tunnel - Mode Separated (3c-1a)	○	◒	◒
120F	120' High North Twin - Mode Separated (3b-5d2)	○	◒	●
97F	97' High South Twin (3b-6d1)	○	○	●
120F	120' High Existing Alignment (3b-1b2)	○	●	●
120F	120' High Southeast Wishbone (3b-3b2)	○	○	●
120F	120' High Northeast Wishbone (3b-2b2)	○	◒	●
120F	120' High North Twin (3b-4d2)	○	◒	●
120F	120' High South Twin (3b-6d2)	○	○	●

3. Options Evaluation

EARTHQUAKE READY BURNSIDE BRIDGE

Connectivity: Street Connectivity, Crossing Safety & Convenience

120s, 97s

Differentiators:

- Bypass/close streets
- Longer grades affect vehicle safety

3. Options Evaluation

EARTHQUAKE READY BURNSIDE BRIDGE

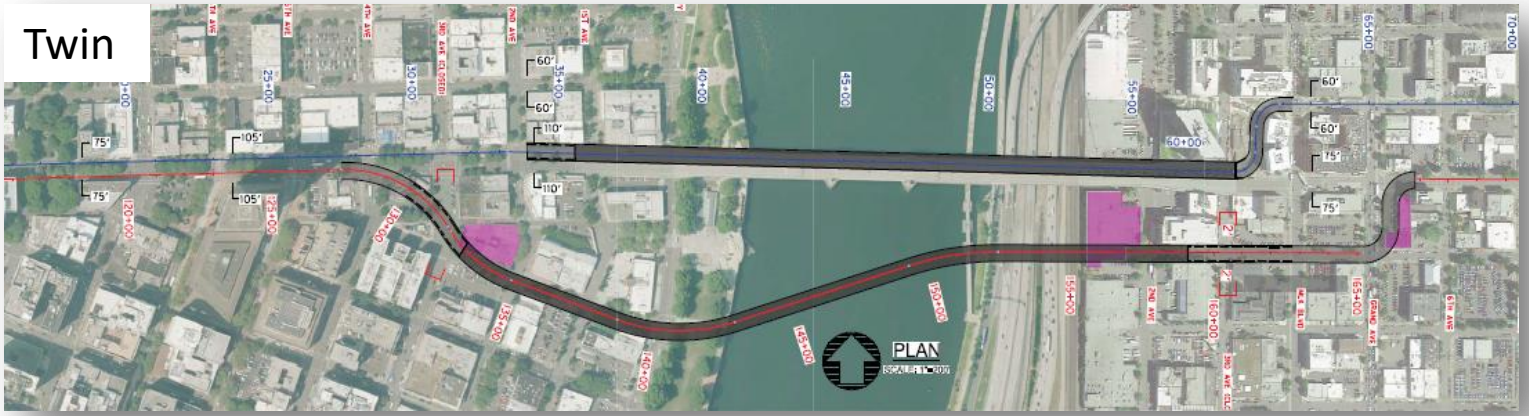
Connectivity: Street Connectivity, Crossing Safety & Convenience

twins, wishbones

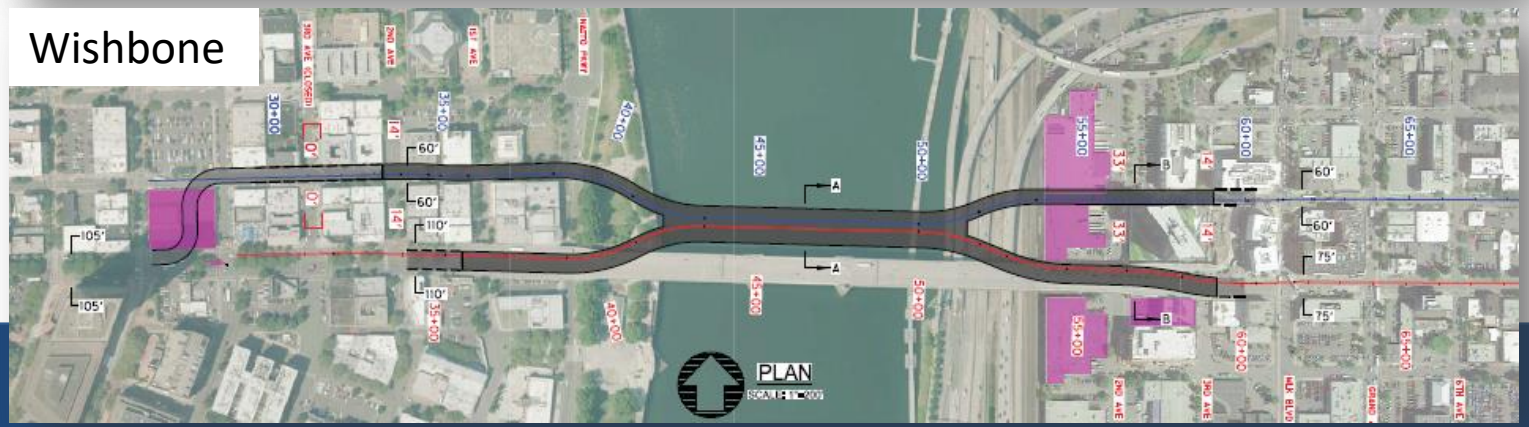
Differentiators:

- Bypass/close streets
- Curves/intersections

Twin



Wishbone



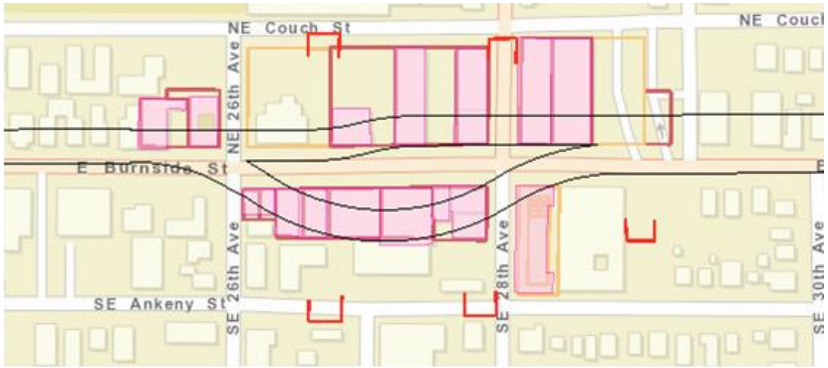
3. Options Evaluation

Connectivity: Street Connectivity, Crossing Safety & Convenience

tunnel

Differentiators:

- Bypasses most streets
- Most street closure
- Longer grades: vehicle safety



3. Options Evaluation

Equity

lows, enhanced retrofits

120s, tunnel

Measures:

- Existing low income housing displacements
- Loss of potential future low income housing

		EQUITY	
		Social Service Impacts	Low Income Housing Impacts
LM	Low Existing Alignment (3a-1d)	●	●
LM	Low Northeast Wishbone (3a-2b)	●	●
ER	Enhanced Seismic Retrofit, No widening (4b1)	●	●
ER	Enhanced Seismic Retrofit, Widened (4b2)	●	●
LM	Low Southeast Wishbone (3a-3b1)	●	●
97F	97' High Existing Alignment (3b-1b1)	◒	●
LM	Low North Twin - Mode Separated (3a-5d1)	●	●
LM	Low South Twin - Mode Separated (3a-7d1)	◒	●
LM	Low Stacked (3a-8d)	◒	●
97F	97' High South Twin - Mode Separated (3b-7d1)	◒	●
97F	97' High Northeast Wishbone (3b-2b1)	◒	●
97F	97' High Southeast Wishbone (3b-3b1)	◒	●
97F	97' High North Twin - Mode Separated (3b-5d1)	◒	●
LM	Low Double Wishbone (3a-9d)	◒	●
LM	Low North Twin (3a-4d1)	●	●
97F	97' High North Twin (3b-4d1)	◒	●
120F	120' High South Twin - Mode Separated (3b-7d2)	◒	●
LM	Low South Twin (3a-6d1)	◒	◒
T	Tunnel - Mode Separated (3c-1a)	●	○
120F	120' High North Twin - Mode Separated (3b-5d2)	◒	●
97F	97' High South Twin (3b-6d1)	◒	◒
120F	120' High Existing Alignment (3b-1b2)	○	○
120F	120' High Southeast Wishbone (3b-3b2)	○	○
120F	120' High Northeast Wishbone (3b-2b2)	○	○
120F	120' High North Twin (3b-4d2)	○	○
120F	120' High South Twin (3b-6d2)	○	○

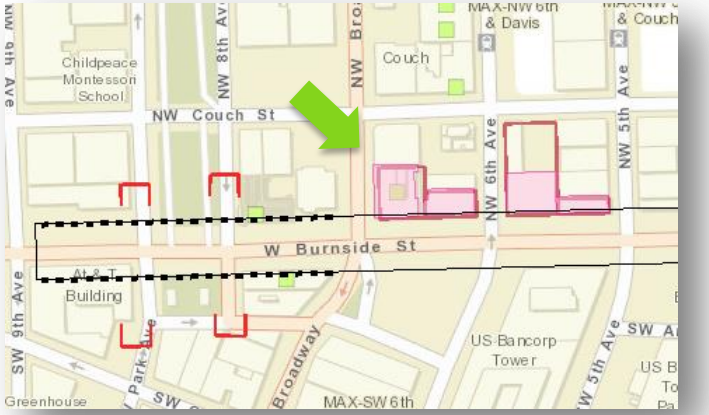
3. Options Evaluation

Equity: Low Income Housing

- lows, enhanced retrofits
- 120s, tunnel

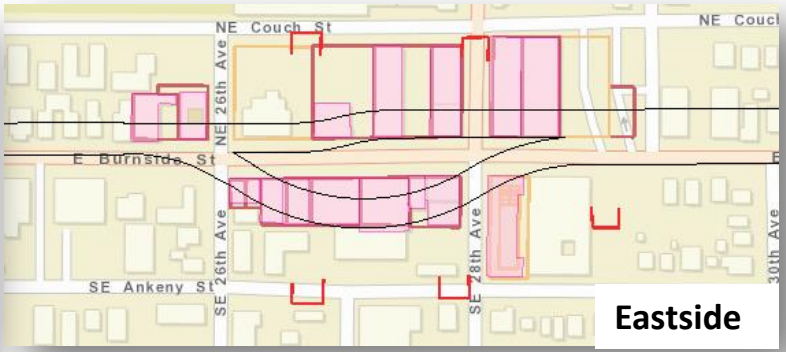
Differentiators:

- Most 120s displace Broadway Hotel with 105 low income units



- Tunnel portals have highest displacements (future housing loss)

Westside



Eastside

3. Options Evaluation

Equity: Social Services

- lows, enhanced retrofits, tunnel
- 120s

Measures:

- Displacement of and access impacts to Social Service providers

		EQUITY	
		Social Service Impacts	Low Income Housing Impacts
LM	Low Existing Alignment (3a-1d)	●	●
LM	Low Northeast Wishbone (3a-2b)	●	●
ER	Enhanced Seismic Retrofit, No widening (4b1)	●	●
ER	Enhanced Seismic Retrofit, Widened (4b2)	●	●
LM	Low Southeast Wishbone (3a-3b1)	●	●
97F	97' High Existing Alignment (3b-1b1)	◒	●
LM	Low North Twin - Mode Separated (3a-5d1)	●	●
LM	Low South Twin - Mode Separated (3a-7d1)	◒	●
LM	Low Stacked (3a-8d)	◒	●
97F	97' High South Twin - Mode Separated (3b-7d1)	◒	●
97F	97' High Northeast Wishbone (3b-2b1)	◒	●
97F	97' High Southeast Wishbone (3b-3b1)	◒	●
97F	97' High North Twin - Mode Separated (3b-5d1)	◒	●
LM	Low Double Wishbone (3a-9d)	◒	●
LM	Low North Twin (3a-4d1)	●	●
97F	97' High North Twin (3b-4d1)	◒	●
120F	120' High South Twin - Mode Separated (3b-7d2)	◒	●
LM	Low South Twin (3a-6d1)	◒	◒
T	Tunnel - Mode Separated (3c-1a)	●	○
120F	120' High North Twin - Mode Separated (3b-5d2)	◒	●
97F	97' High South Twin (3b-6d1)	◒	◒
120F	120' High Existing Alignment (3b-1b2)	○	○
120F	120' High Southeast Wishbone (3b-3b2)	○	○
120F	120' High Northeast Wishbone (3b-2b2)	○	○
120F	120' High North Twin (3b-4d2)	○	○
120F	120' High South Twin (3b-6d2)	○	○

3. Options Evaluation

Equity: Social Services

120s

Differentiators:

- Longer bridge extension displaces overnight shelter and diminishes access

3. Options Evaluation

Built Environment

lows, enhanced retrofits

120s, 97s, twins, tunnel (commercial)

Measures:

- Visual and access impacts from new bridges/walls
- Commercial/industrial displacements (# of businesses, employees)
- Historic resource and district impacts

		BUILT ENVIRONMENT				
		Visual Impacts to Existing Buildings	Commercial + Industrial Impact	Long Term Housing	Park + Recreation Impact	Historic Structures + District Impacts
LM	Low Existing Alignment (3a-1d)	●	●	●	●	●
LM	Low Northeast Wishbone (3a-2b)	●	○	●	●	●
ER	Enhanced Seismic Retrofit, No widening (4b1)	●	●	●	◒	●
ER	Enhanced Seismic Retrofit, Widened (4b2)	●	●	●	◒	●
LM	Low Southeast Wishbone (3a-3b1)	●	●	●	●	●
97F	97' High Existing Alignment (3b-1b1)	◒	●	●	○	○
LM	Low North Twin - Mode Separated (3a-5d1)	●	○	●	○	●
LM	Low South Twin - Mode Separated (3a-7d1)	●	●	●	○	●
LM	Low Stacked (3a-8d)	◒	●	●	●	◒
97F	97' High South Twin - Mode Separated (3b-7d1)	◒	●	●	○	○
97F	97' High Northeast Wishbone (3b-2b1)	◒	○	●	●	○
97F	97' High Southeast Wishbone (3b-3b1)	◒	●	●	●	○
97F	97' High North Twin - Mode Separated (3b-5d1)	◒	○	●	○	○
LM	Low Double Wishbone (3a-9d)	○	○	○	●	○
LM	Low North Twin (3a-4d1)	◒	○	○	●	○
97F	97' High North Twin (3b-4d1)	○	○	○	●	○
120F	120' High South Twin - Mode Separated (3b-7d2)	○	●	●	○	○
LM	Low South Twin (3a-6d1)	◒	○	●	●	○
T	Tunnel - Mode Separated (3c-1a)	●	○	○	○	●
120F	120' High North Twin - Mode Separated (3b-5d2)	○	○	●	○	○
97F	97' High South Twin (3b-6d1)	○	○	●	●	○
120F	120' High Existing Alignment (3b-1b2)	○	○	◒	○	○
120F	120' High Southeast Wishbone (3b-3b2)	○	○	●	○	○
120F	120' High Northeast Wishbone (3b-2b2)	○	○	●	○	○
120F	120' High North Twin (3b-4d2)	○	○	○	○	○
120F	120' High South Twin (3b-6d2)	○	○	●	○	○

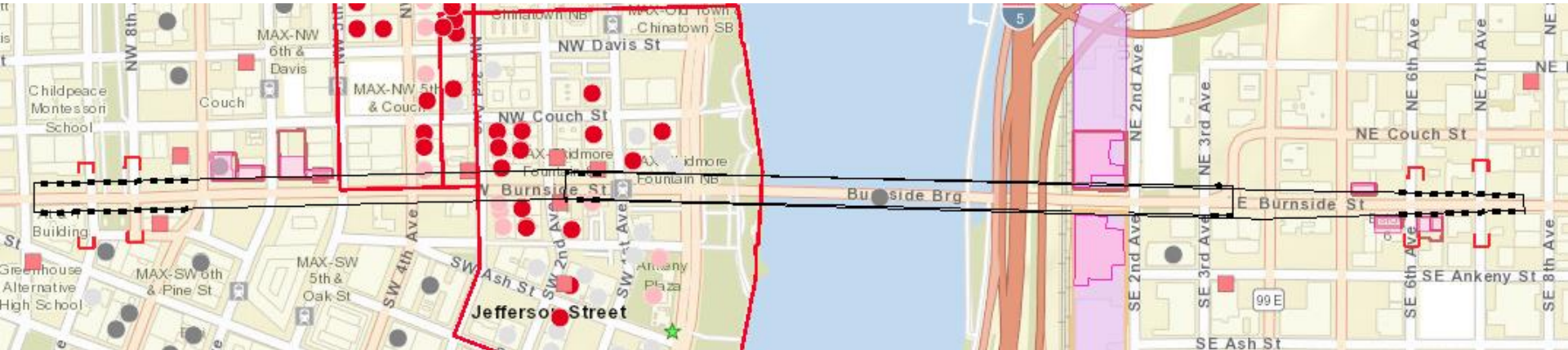
3. Options Evaluation

Built Environment: Visual, Commercial & Historic

120s, 97s

Differentiators:

- 120s extend bridge length west and east
- 97s extend west



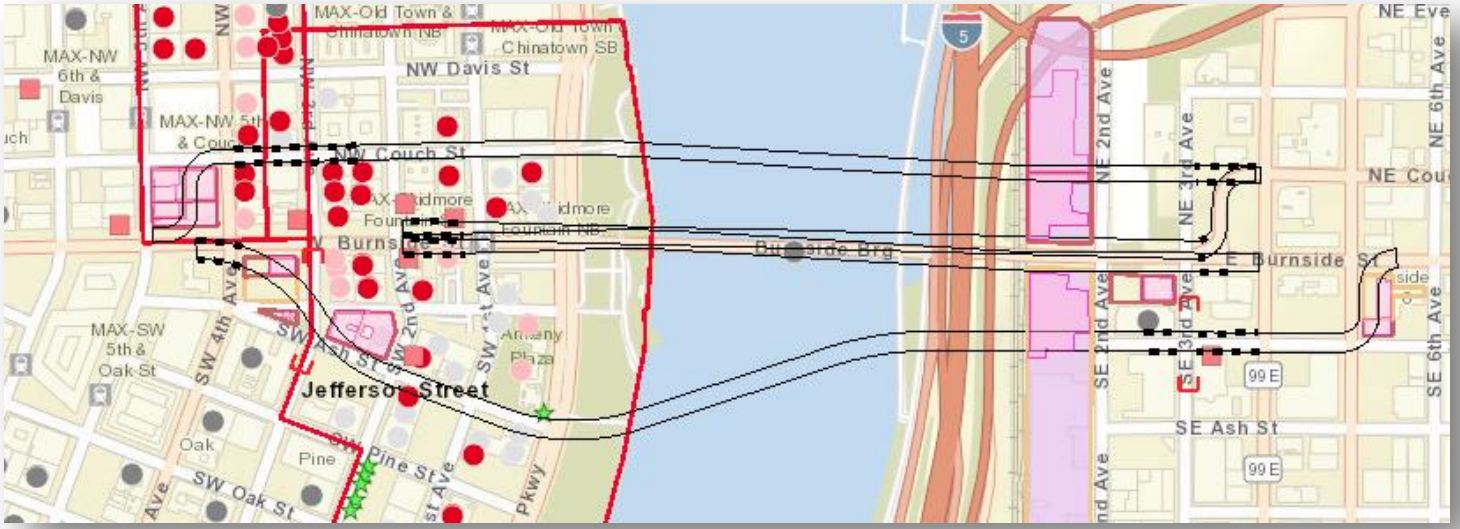
3. Options Evaluation

Built Environment: Visual, Commercial & Historic

twins

Differentiator:

- Add new bridges on historic district streets and on east side



3. Options Evaluation

Built Environment: Visual, Commercial & Historic

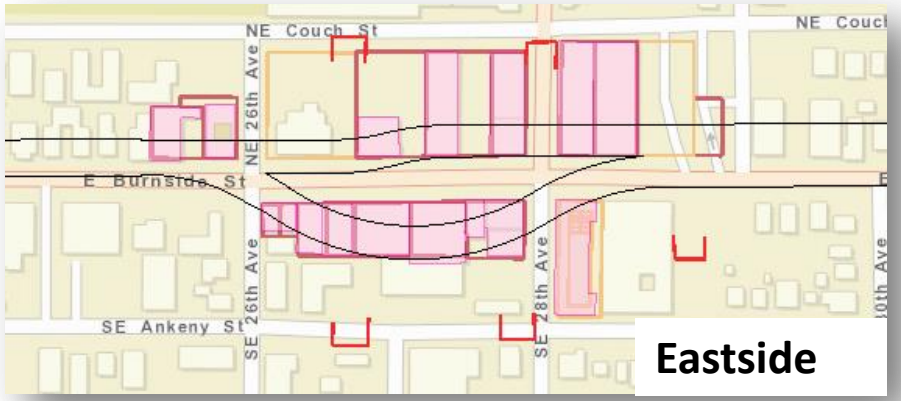
3. Options Evaluation

Built Environment: Visual, Commercial & Historic

tunnel

Differentiator:

- Portals cause highest commercial displacements



3. Options Evaluation

Built Environment: Parks

lows, enhanced retrofits

120s, high mode separated

Measures:

- Total area of impact
- Circulation/access impact

Differentiators:

- 120s impact Park Blocks
- High mode separated foot-print in Waterfront Park

3. Options Evaluation

Financial Stewardship

lows, enhanced retrofit, 97 existing and wishbone alignments

tunnel, 120s, twins

Measures:

- Estimated capital cost
- Estimated maintenance costs

		FINANCIAL STEWARDSHIP	
		Capital Cost	Long term Maintenance
LM	Low Existing Alignment (3a-1d)	●	◒
LM	Low Northeast Wishbone (3a-2b)	●	◒
ER	Enhanced Seismic Retrofit, No widening (4b1)	●	○
ER	Enhanced Seismic Retrofit, Widened (4b2)	●	○
LM	Low Southeast Wishbone (3a-3b1)	◒	◒
97F	97' High Existing Alignment (3b-1b1)	●	●
LM	Low North Twin - Mode Separated (3a-5d1)	◒	○
LM	Low South Twin - Mode Separated (3a-7d1)	◒	○
LM	Low Stacked (3a-8d)	●	◒
97F	97' High South Twin - Mode Separated (3b-7d1)	◒	◒
97F	97' High Northeast Wishbone (3b-2b1)	●	●
97F	97' High Southeast Wishbone (3b-3b1)	●	●
97F	97' High North Twin - Mode Separated (3b-5d1)	◒	◒
LM	Low Double Wishbone (3a-9d)	●	◒
LM	Low North Twin (3a-4d1)	○	○
97F	97' High North Twin (3b-4d1)	◒	◒
120F	120' High South Twin - Mode Separated (3b-7d2)	○	○
LM	Low South Twin (3a-6d1)	◒	○
T	Tunnel - Mode Separated (3c-1a)	○	○
120F	120' High North Twin - Mode Separated (3b-5d2)	○	○
97F	97' High South Twin (3b-6d1)	◒	◒
120F	120' High Existing Alignment (3b-1b2)	○	◒
120F	120' High Southeast Wishbone (3b-3b2)	○	◒
120F	120' High Northeast Wishbone (3b-2b2)	○	◒
120F	120' High North Twin (3b-4d2)	○	○
120F	120' High South Twin (3b-6d2)	○	○

3. Options Evaluation

Financial Stewardship: Cost

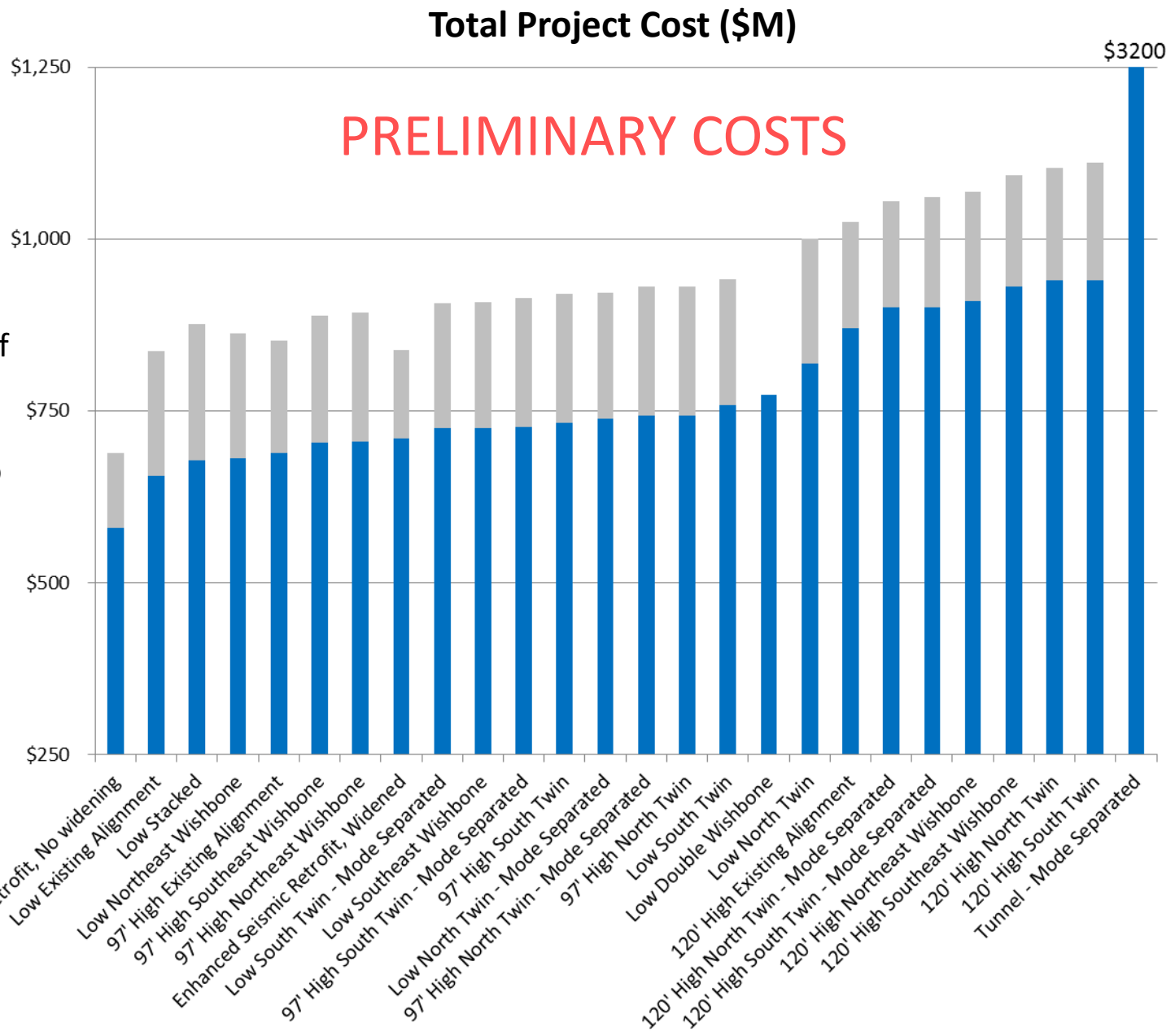
tunnel, 120, twin

Differentiators:

- Tunnel long and costly to build
- Longest bridges and multiple bridges increase cost
- ROW costs higher with tunnel and longer bridges

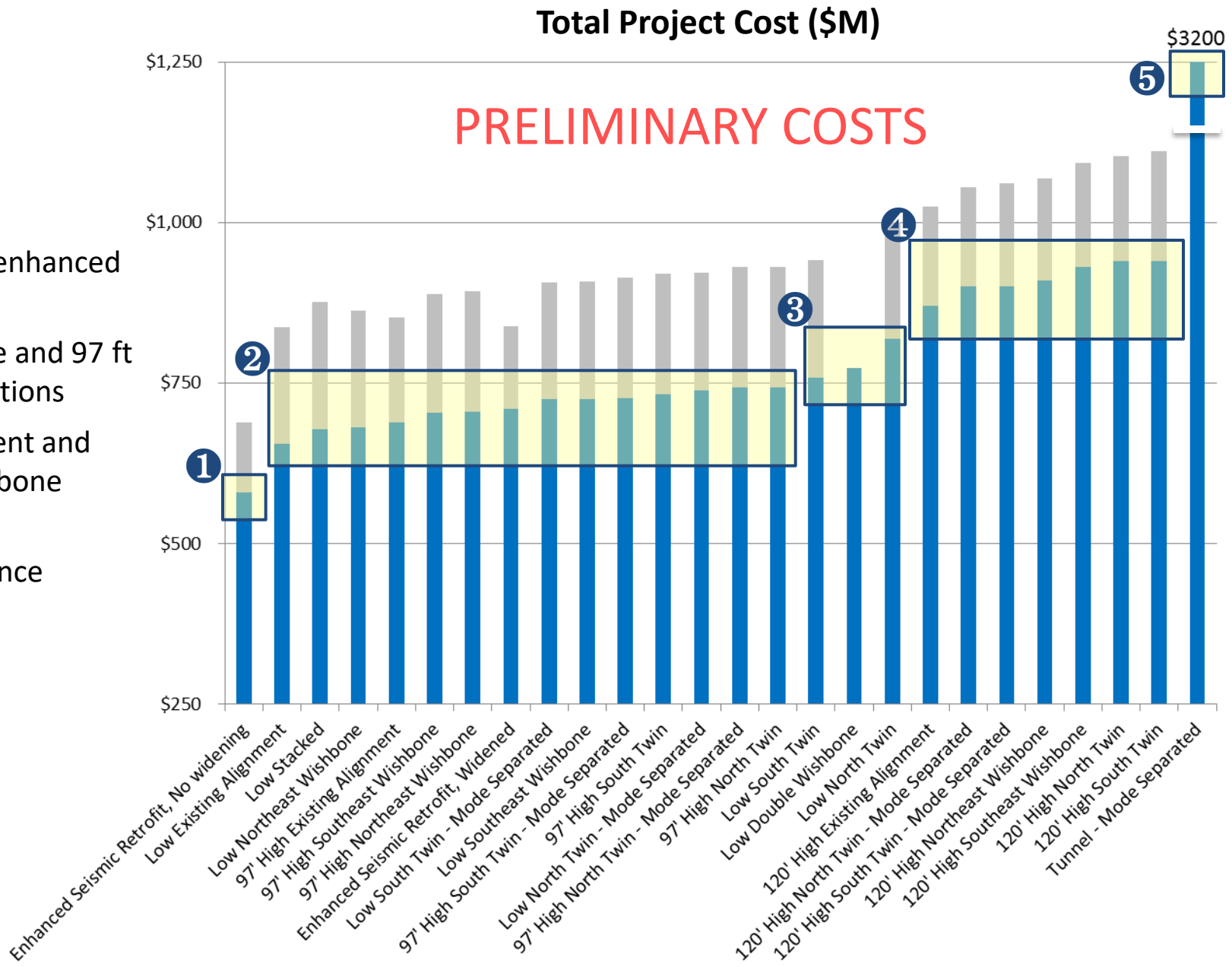
Notes:

1. Project costs includes NEPA, Design, ROW Acquisition, and Construction phases
2. Project costs are escalated to the year of construction
3. Blue bar: cost if Burnside St is closed to traffic during construction
4. Grey bar: cost if Burnside St is open to traffic during bridge construction



Notes:

1. Unwidened enhanced retrofit
2. Low movable and 97 ft clearance options
3. Twin alignment and Double wishbone options
4. 120 ft clearance options
5. Tunnel



3. Options Evaluation

EARTHQUAKE READY BURNSIDE BRIDGE

Feasibility Study Objective: Define the Range of Alternatives for NEPA

What is a “reasonable range” for an environmental study?

- 25 is too many for detailed NEPA analysis
- Eliminate those that perform poorly
- For sub-groups of similar alternatives, advance the better performing (as representative)
- Include a range of types, features and functionality

3. Options Evaluation

EARTHQUAKE READY BURNSIDE BRIDGE

Trends Discussion

		SEISMIC RESILIENCY		NON-MOTORIZED TRANSPORTATION			CONNECTIVITY			EQUITY		BUILT ENVIRONMENT					FINANCIAL STEWARDSHIP		
		Unreinforced Masonry Risk	Disabled Vehicles Risk	Ease of Ped + Bike Use	Safe Ped + Bike Connections	Personal Security for Ped + Bikes	Street Network Connection	Crossing Safety and Convenience	Moveable Bridge (Periodic Delay)	Social Service Impacts	Low Income Housing Impacts	Visual Impacts to Existing Buildings	Commercial + Industrial Impact	Long Term Housing	Park + Recreation Impact	Historic Structures + District Impacts	Capital Cost	Longterm Maintenance	Score (0-100%)
LM	Low Existing Alignment (3a-1d)	●	●	●	●	●	●	◒	○	●	●	●	●	●	●	●	●	◒	85%
LM	Low Northeast Wishbone (3a-2b)	●	●	●	●	●	●	●	○	●	●	●	○	●	●	●	●	◒	85%
ER	Enhanced Seismic Retrofit, No widening (4b1)	●	●	●	●	●	●	◒	○	●	●	●	●	●	◒	●	●	○	82%
ER	Enhanced Seismic Retrofit, Widened (4b2)	●	●	●	●	●	●	◒	○	●	●	●	●	●	◒	●	●	○	80%
LM	Low Southeast Wishbone (3a-3b1)	●	●	●	●	●	◒	○	○	●	●	●	●	●	●	●	◒	◒	78%
97F	97' High Existing Alignment (3b-1b1)	◒	●	○	○	●	◒	●	●	◒	●	◒	●	●	○	○	●	●	67%
LM	Low North Twin - Mode Separated (3a-5d1)	●	◒	●	●	◒	●	◒	○	●	●	●	○	●	○	●	◒	○	66%
LM	Low South Twin - Mode Separated (3a-7d1)	●	◒	●	●	◒	◒	●	○	◒	●	●	●	●	○	●	◒	○	65%
LM	Low Stacked (3a-8d)	●	◒	●	○	○	◒	●	○	◒	●	◒	●	●	●	◒	●	◒	63%
97F	97' High South Twin - Mode Separated (3b-7d1)	◒	●	○	●	◒	◒	◒	●	◒	●	◒	●	●	○	○	◒	◒	61%
97F	97' High Northeast Wishbone (3b-2b1)	◒	◒	○	○	●	◒	◒	●	◒	●	◒	○	●	●	○	●	●	60%
97F	97' High Southeast Wishbone (3b-3b1)	◒	◒	○	○	●	○	○	●	◒	●	◒	●	●	●	○	●	●	58%
97F	97' High North Twin - Mode Separated (3b-5d1)	◒	●	○	●	○	◒	◒	●	◒	●	◒	○	●	○	○	◒	◒	55%
LM	Low Double Wishbone (3a-9d)	○	◒	●	◒	●	◒	○	○	◒	●	○	○	○	●	○	●	◒	49%
LM	Low North Twin (3a-4d1)	○	◒	●	◒	●	◒	○	○	●	●	◒	○	○	●	○	○	○	45%
97F	97' High North Twin (3b-4d1)	○	◒	○	○	●	○	◒	●	◒	●	○	○	○	●	○	◒	◒	42%
120F	120' High South Twin - Mode Separated (3b-7d2)	◒	○	◒	●	○	○	◒	●	◒	●	○	●	●	○	○	○	○	42%
LM	Low South Twin (3a-6d1)	○	◒	●	●	●	○	○	○	◒	◒	◒	○	●	●	○	◒	○	42%
T	Tunnel - Mode Separated (3c-1a)	●	○	◒	●	◒	○	◒	◒	●	○	●	○	○	○	●	○	○	40%
120F	120' High North Twin - Mode Separated (3b-5d2)	◒	○	◒	●	○	○	◒	●	◒	●	○	○	●	○	○	○	○	39%
97F	97' High South Twin (3b-6d1)	○	◒	○	○	●	○	○	●	◒	◒	○	○	●	●	○	◒	◒	39%
120F	120' High Existing Alignment (3b-1b2)	◒	○	○	○	●	○	●	●	○	○	○	○	◒	○	○	○	◒	29%
120F	120' High Southeast Wishbone (3b-3b2)	◒	○	○	○	●	○	○	●	○	○	○	○	●	○	○	○	◒	25%
120F	120' High Northeast Wishbone (3b-2b2)	○	○	○	○	●	○	◒	●	○	○	○	○	●	○	○	○	◒	23%
120F	120' High North Twin (3b-4d2)	○	○	○	◒	●	○	◒	●	○	○	○	○	○	○	○	○	○	17%
120F	120' High South Twin (3b-6d2)	○	○	○	○	●	○	○	●	○	○	○	○	●	○	○	○	○	14%

3. Options Evaluation

EARTHQUAKE READY BURNSIDE BRIDGE

Trends Discussion – Tunnel and 120s

		SEISMIC RESILIENCY		NON-MOTORIZED TRANSPORTATION			CONNECTIVITY			EQUITY		BUILT ENVIRONMENT					FINANCIAL STEWARDSHIP		
		Unreinforced Masonry Risk	Disabled Vehicles Risk	Ease of Ped + Bike Use	Safe Ped + Bike Connections	Personal Security for Ped + Bikes	Street Network Connection	Crossing Safety and Convenience	Moveable Bridge (Periodic Delay)	Social Service Impacts	Low Income Housing Impacts	Visual Impacts to Existing Buildings	Commercial + Industrial Impact	Long Term Housing	Park + Recreation Impact	Historic Structures + District Impacts	Capital Cost	Longterm Maintenance	Score (0-100%)
LM	Low Existing Alignment (3a-1d)	●	●	●	●	●	●	◒	○	●	●	●	●	●	●	●	●	◒	85%
LM	Low Northeast Wishbone (3a-2b)	●	●	●	●	●	●	●	○	●	●	●	○	●	●	●	●	◒	85%
ER	Enhanced Seismic Retrofit, No widening (4b1)	●	●	●	●	●	●	◒	○	●	●	●	●	●	◒	●	●	○	82%
ER	Enhanced Seismic Retrofit, Widened (4b2)	●	●	●	●	●	●	◒	○	●	●	●	●	●	◒	●	●	○	80%
LM	Low Southeast Wishbone (3a-3b1)	●	●	●	●	●	◒	○	○	●	●	●	●	●	●	●	◒	◒	78%
97F	97' High Existing Alignment (3b-1b1)	◒	●	○	○	●	◒	●	●	◒	●	◒	●	●	○	○	●	●	67%
LM	Low North Twin - Mode Separated (3a-5d1)	●	◒	●	●	◒	●	◒	○	●	●	●	○	●	○	●	◒	○	66%
LM	Low South Twin - Mode Separated (3a-7d1)	●	◒	●	●	◒	◒	●	○	◒	●	●	●	●	○	●	◒	○	65%
LM	Low Stacked (3a-8d)	●	◒	●	○	○	◒	●	○	◒	●	◒	●	●	●	◒	●	◒	63%
97F	97' High South Twin - Mode Separated (3b-7d1)	◒	●	○	●	◒	◒	◒	●	◒	●	◒	●	●	○	○	◒	◒	61%
97F	97' High Northeast Wishbone (3b-2b1)	◒	◒	○	○	●	◒	◒	●	◒	●	◒	○	●	●	○	●	●	60%
97F	97' High Southeast Wishbone (3b-3b1)	◒	◒	○	○	●	○	○	●	◒	●	◒	●	●	●	○	●	●	58%
97F	97' High North Twin - Mode Separated (3b-5d1)	◒	●	○	●	○	◒	◒	●	◒	●	◒	○	●	○	○	◒	◒	55%
LM	Low Double Wishbone (3a-9d)	○	◒	●	◒	●	◒	○	○	◒	●	○	○	○	●	○	●	◒	49%
LM	Low North Twin (3a-4d1)	○	◒	●	◒	●	◒	○	○	●	●	◒	○	○	●	○	○	○	45%
97F	97' High North Twin (3b-4d1)	○	◒	○	○	●	○	◒	●	◒	●	○	○	○	●	○	◒	◒	42%
120F	120' High South Twin - Mode Separated (3b-7d2)	◒	○	◒	●	○	○	◒	●	◒	●	○	●	●	○	○	○	○	42%
LM	Low South Twin (3a-6d1)	○	◒	●	●	●	○	○	○	◒	◒	◒	○	●	●	○	◒	○	42%
T	Tunnel - Mode Separated (3c-1a)	●	○	◒	●	◒	○	◒	◒	●	○	●	○	○	○	●	○	○	40%
120F	120' High North Twin - Mode Separated (3b-5d2)	◒	○	◒	●	○	○	◒	●	◒	●	○	○	●	○	○	○	○	39%
97F	97' High South Twin (3b-6d1)	○	◒	○	○	●	○	○	●	◒	◒	○	○	●	●	○	◒	◒	39%
120F	120' High Existing Alignment (3b-1b2)	◒	○	○	○	●	○	●	●	○	○	○	○	◒	○	○	○	◒	29%
120F	120' High Southeast Wishbone (3b-3b2)	◒	○	○	○	●	○	○	●	○	○	○	○	●	○	○	○	◒	25%
120F	120' High Northeast Wishbone (3b-2b2)	○	○	○	○	●	○	◒	●	○	○	○	○	●	○	○	○	◒	23%
120F	120' High North Twin (3b-4d2)	○	○	○	◒	●	○	◒	●	○	○	○	○	○	○	○	○	○	17%
120F	120' High South Twin (3b-6d2)	○	○	○	○	●	○	○	●	○	○	○	○	●	○	○	○	○	14%

3. Options Evaluation

EARTHQUAKE READY BURNSIDE BRIDGE

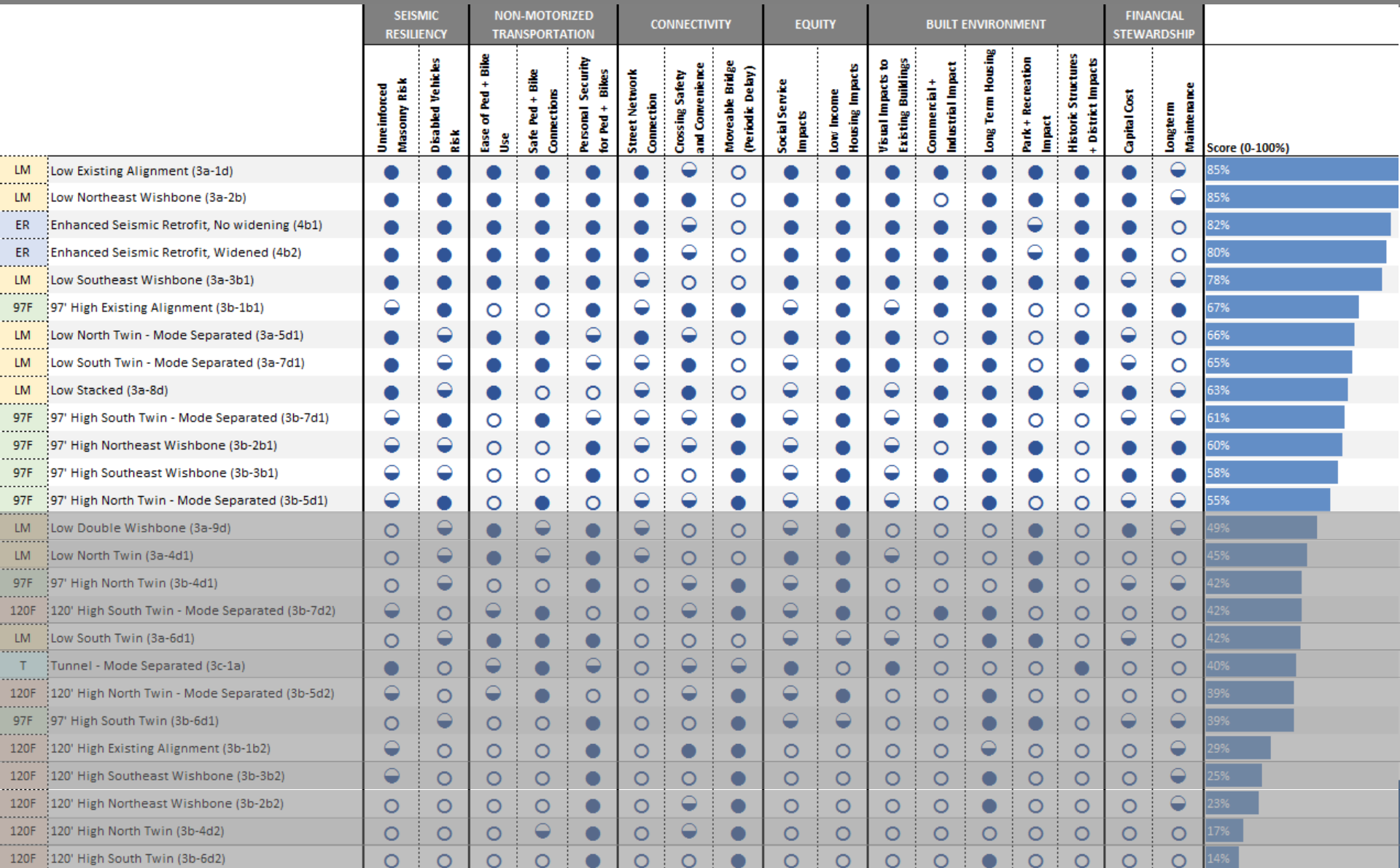
Trends Discussion – Twin Multi-Modals

		SEISMIC RESILIENCY		NON-MOTORIZED TRANSPORTATION			CONNECTIVITY			EQUITY		BUILT ENVIRONMENT					FINANCIAL STEWARDSHIP		
		Unreinforced Masonry Risk	Disabled Vehicles Risk	Ease of Ped + Bike Use	Safe Ped + Bike Connections	Personal Security for Ped + Bikes	Street Network Connection	Crossing Safety and Convenience	Moveable Bridge (Periodic Delay)	Social Service Impacts	Low Income Housing Impacts	Visual Impacts to Existing Buildings	Commercial + Industrial Impact	Long Term Housing	Park + Recreation Impact	Historic Structures + District Impacts	Capital Cost	Longterm Maintenance	Score (0-100%)
LM	Low Existing Alignment (3a-1d)	●	●	●	●	●	●	◒	○	●	●	●	●	●	●	●	●	◒	85%
LM	Low Northeast Wishbone (3a-2b)	●	●	●	●	●	●	●	○	●	●	●	○	●	●	●	●	◒	85%
ER	Enhanced Seismic Retrofit, No widening (4b1)	●	●	●	●	●	●	◒	○	●	●	●	●	●	◒	●	●	○	82%
ER	Enhanced Seismic Retrofit, Widened (4b2)	●	●	●	●	●	●	◒	○	●	●	●	●	●	◒	●	●	○	80%
LM	Low Southeast Wishbone (3a-3b1)	●	●	●	●	●	◒	○	○	●	●	●	●	●	●	●	◒	◒	78%
97F	97' High Existing Alignment (3b-1b1)	◒	●	○	○	●	◒	●	●	◒	●	◒	●	●	○	○	●	●	67%
LM	Low North Twin - Mode Separated (3a-5d1)	●	◒	●	●	◒	●	◒	○	●	●	●	○	●	○	●	◒	○	66%
LM	Low South Twin - Mode Separated (3a-7d1)	●	◒	●	●	◒	◒	●	○	◒	●	●	●	●	○	●	◒	○	65%
LM	Low Stacked (3a-8d)	●	◒	●	○	○	◒	●	○	◒	●	◒	●	●	●	◒	●	◒	63%
97F	97' High South Twin - Mode Separated (3b-7d1)	◒	●	○	●	◒	◒	◒	●	◒	●	◒	●	●	○	○	◒	◒	61%
97F	97' High Northeast Wishbone (3b-2b1)	◒	◒	○	○	●	◒	◒	●	◒	●	◒	○	●	●	○	●	●	60%
97F	97' High Southeast Wishbone (3b-3b1)	◒	◒	○	○	●	○	○	●	◒	●	◒	●	●	●	○	●	●	58%
97F	97' High North Twin - Mode Separated (3b-5d1)	◒	●	○	●	○	◒	◒	●	◒	●	◒	○	●	○	○	◒	◒	55%
LM	Low Double Wishbone (3a-9d)	○	◒	●	◒	●	◒	○	○	◒	●	○	○	○	●	○	●	◒	49%
LM	Low North Twin (3a-4d1)	○	◒	●	◒	●	◒	○	○	●	●	◒	○	○	●	○	○	○	45%
97F	97' High North Twin (3b-4d1)	○	◒	○	○	●	○	◒	●	◒	●	○	○	○	●	○	◒	◒	42%
120F	120' High South Twin - Mode Separated (3b-7d2)	◒	○	◒	●	○	○	◒	●	◒	●	○	●	●	○	○	○	○	42%
LM	Low South Twin (3a-6d1)	○	◒	●	●	●	○	○	○	◒	◒	◒	○	●	●	○	◒	○	42%
T	Tunnel - Mode Separated (3c-1a)	●	○	◒	●	◒	○	◒	◒	●	○	●	○	○	○	●	○	○	40%
120F	120' High North Twin - Mode Separated (3b-5d2)	◒	○	◒	●	○	○	◒	●	◒	●	○	○	●	○	○	○	○	39%
97F	97' High South Twin (3b-6d1)	○	◒	○	○	●	○	○	●	◒	◒	○	○	●	●	○	◒	◒	39%
120F	120' High Existing Alignment (3b-1b2)	◒	○	○	○	●	○	●	●	○	○	○	○	◒	○	○	○	◒	29%
120F	120' High Southeast Wishbone (3b-3b2)	◒	○	○	○	●	○	○	●	○	○	○	○	●	○	○	○	◒	25%
120F	120' High Northeast Wishbone (3b-2b2)	○	○	○	○	●	○	◒	●	○	○	○	○	●	○	○	○	◒	23%
120F	120' High North Twin (3b-4d2)	○	○	○	◒	●	○	◒	●	○	○	○	○	○	○	○	○	○	17%
120F	120' High South Twin (3b-6d2)	○	○	○	○	●	○	○	●	○	○	○	○	●	○	○	○	○	14%

3. Options Evaluation

EARTHQUAKE READY BURNSIDE BRIDGE

Trends Discussion – Double Wishbone



3. Options Evaluation

EARTHQUAKE READY BURNSIDE BRIDGE

Trends Discussion – 97 Wishbone

		SEISMIC RESILIENCY		NON-MOTORIZED TRANSPORTATION			CONNECTIVITY			EQUITY		BUILT ENVIRONMENT					FINANCIAL STEWARDSHIP		
		Unreinforced Masonry Risk	Disabled Vehicles Risk	Ease of Ped + Bike Use	Safe Ped + Bike Connections	Personal Security for Ped + Bikes	Street Network Connection	Crossing Safety and Convenience	Moveable Bridge (Periodic Delay)	Social Service Impacts	Low Income Housing Impacts	Visual Impacts to Existing Buildings	Commercial + Industrial Impact	Long Term Housing	Park + Recreation Impact	Historic Structures + District Impacts	Capital Cost	Longterm Maintenance	Score (0-100%)
LM	Low Existing Alignment (3a-1d)	●	●	●	●	●	●	◒	○	●	●	●	●	●	●	●	●	◒	85%
LM	Low Northeast Wishbone (3a-2b)	●	●	●	●	●	●	●	○	●	●	●	○	●	●	●	●	◒	85%
ER	Enhanced Seismic Retrofit, No widening (4b1)	●	●	●	●	●	●	◒	○	●	●	●	●	●	◒	●	●	○	82%
ER	Enhanced Seismic Retrofit, Widened (4b2)	●	●	●	●	●	●	◒	○	●	●	●	●	●	◒	●	●	○	80%
LM	Low Southeast Wishbone (3a-3b1)	●	●	●	●	●	◒	○	○	●	●	●	●	●	●	●	◒	◒	78%
97F	97' High Existing Alignment (3b-1b1)	◒	●	○	○	●	◒	●	●	◒	●	◒	●	●	○	○	●	●	67%
LM	Low North Twin - Mode Separated (3a-5d1)	●	◒	●	●	◒	●	◒	○	●	●	●	○	●	○	●	◒	○	66%
LM	Low South Twin - Mode Separated (3a-7d1)	●	◒	●	●	◒	◒	●	○	◒	●	●	●	●	○	●	◒	○	65%
LM	Low Stacked (3a-8d)	●	◒	●	○	○	◒	●	○	◒	●	◒	●	●	●	◒	●	◒	63%
97F	97' High South Twin - Mode Separated (3b-7d1)	◒	●	○	●	◒	◒	◒	●	◒	●	◒	●	●	○	○	◒	◒	61%
97F	97' High Northeast Wishbone (3b-2b1)	◒	◒	○	○	●	◒	◒	●	◒	●	◒	○	●	●	○	●	●	60%
97F	97' High Southeast Wishbone (3b-3b1)	◒	◒	○	○	●	○	○	●	◒	●	◒	●	●	●	○	●	●	58%
97F	97' High North Twin - Mode Separated (3b-5d1)	◒	●	○	●	○	◒	◒	●	◒	●	◒	○	●	○	○	◒	◒	55%
LM	Low Double Wishbone (3a-9d)	○	◒	●	◒	●	◒	○	○	◒	●	○	○	○	●	○	●	◒	49%
LM	Low North Twin (3a-4d1)	○	◒	●	◒	●	◒	○	○	●	●	◒	○	○	●	○	○	○	45%
97F	97' High North Twin (3b-4d1)	○	◒	○	○	●	○	◒	●	◒	●	○	○	○	●	○	◒	◒	42%
120F	120' High South Twin - Mode Separated (3b-7d2)	◒	○	◒	●	○	○	◒	●	◒	●	○	●	●	○	○	○	○	42%
LM	Low South Twin (3a-6d1)	○	◒	●	●	●	○	○	○	◒	◒	◒	○	●	●	○	◒	○	42%
T	Tunnel - Mode Separated (3c-1a)	●	○	◒	●	◒	○	◒	◒	●	○	●	○	○	○	●	○	○	40%
120F	120' High North Twin - Mode Separated (3b-5d2)	◒	○	◒	●	○	○	◒	●	◒	●	○	○	●	○	○	○	○	39%
97F	97' High South Twin (3b-6d1)	○	◒	○	○	●	○	○	●	◒	◒	○	○	●	●	○	◒	◒	39%
120F	120' High Existing Alignment (3b-1b2)	◒	○	○	○	●	○	●	●	○	○	○	○	◒	○	○	○	◒	29%
120F	120' High Southeast Wishbone (3b-3b2)	◒	○	○	○	●	○	○	●	○	○	○	○	●	○	○	○	◒	25%
120F	120' High Northeast Wishbone (3b-2b2)	○	○	○	○	●	○	◒	●	○	○	○	○	●	○	○	○	◒	23%
120F	120' High North Twin (3b-4d2)	○	○	○	◒	●	○	◒	●	○	○	○	○	○	○	○	○	○	17%
120F	120' High South Twin (3b-6d2)	○	○	○	○	●	○	○	●	○	○	○	○	●	○	○	○	○	14%

3. Options Evaluation

EARTHQUAKE READY BURNSIDE BRIDGE

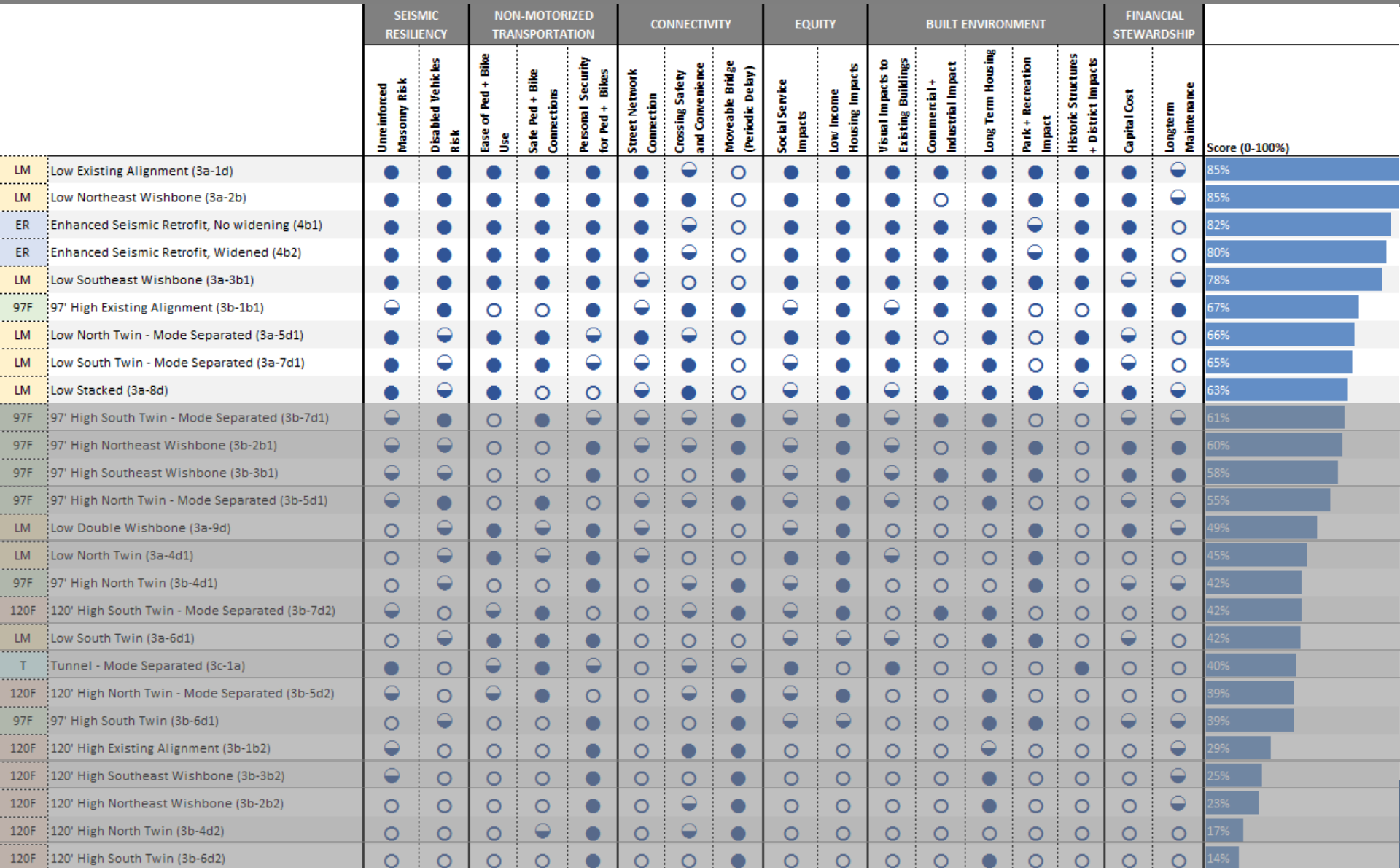
Trends Discussion – 97 Mode-Separated

		SEISMIC RESILIENCY		NON-MOTORIZED TRANSPORTATION			CONNECTIVITY			EQUITY		BUILT ENVIRONMENT					FINANCIAL STEWARDSHIP		
		Unreinforced Masonry Risk	Disabled Vehicles Risk	Ease of Ped + Bike Use	Safe Ped + Bike Connections	Personal Security for Ped + Bikes	Street Network Connection	Crossing Safety and Convenience	Moveable Bridge (Periodic Delay)	Social Service Impacts	Low Income Housing Impacts	Visual Impacts to Existing Buildings	Commercial + Industrial Impact	Long Term Housing	Park + Recreation Impact	Historic Structures + District Impacts	Capital Cost	Longterm Maintenance	Score (0-100%)
LM	Low Existing Alignment (3a-1d)	●	●	●	●	●	●	◒	○	●	●	●	●	●	●	●	●	◒	85%
LM	Low Northeast Wishbone (3a-2b)	●	●	●	●	●	●	●	○	●	●	●	○	●	●	●	●	◒	85%
ER	Enhanced Seismic Retrofit, No widening (4b1)	●	●	●	●	●	●	◒	○	●	●	●	●	●	◒	●	●	○	82%
ER	Enhanced Seismic Retrofit, Widened (4b2)	●	●	●	●	●	●	◒	○	●	●	●	●	●	◒	●	●	○	80%
LM	Low Southeast Wishbone (3a-3b1)	●	●	●	●	●	◒	○	○	●	●	●	●	●	●	●	◒	◒	78%
97F	97' High Existing Alignment (3b-1b1)	◒	●	○	○	●	◒	●	●	◒	●	◒	●	●	○	○	●	●	67%
LM	Low North Twin - Mode Separated (3a-5d1)	●	◒	●	●	◒	●	◒	○	●	●	●	○	●	○	●	◒	○	66%
LM	Low South Twin - Mode Separated (3a-7d1)	●	◒	●	●	◒	◒	●	○	◒	●	●	●	●	○	●	◒	○	65%
LM	Low Stacked (3a-8d)	●	◒	●	○	○	◒	●	○	◒	●	◒	●	●	●	◒	●	◒	63%
97F	97' High South Twin - Mode Separated (3b-7d1)	◒	●	○	●	◒	◒	◒	●	◒	●	◒	●	●	○	○	◒	◒	61%
97F	97' High Northeast Wishbone (3b-2b1)	◒	◒	○	○	●	◒	◒	●	◒	●	◒	○	●	●	○	●	●	60%
97F	97' High Southeast Wishbone (3b-3b1)	◒	◒	○	○	●	○	○	●	◒	●	◒	●	●	●	○	●	●	58%
97F	97' High North Twin - Mode Separated (3b-5d1)	◒	●	○	●	○	◒	◒	●	◒	●	◒	○	●	○	○	◒	◒	55%
LM	Low Double Wishbone (3a-9d)	○	◒	●	◒	●	◒	○	○	◒	●	○	○	○	●	○	●	◒	49%
LM	Low North Twin (3a-4d1)	○	◒	●	◒	●	◒	○	○	●	●	◒	○	○	●	○	○	○	45%
97F	97' High North Twin (3b-4d1)	○	◒	○	○	●	○	◒	●	◒	●	○	○	○	●	○	◒	◒	42%
120F	120' High South Twin - Mode Separated (3b-7d2)	◒	○	◒	●	○	○	◒	●	◒	●	○	●	●	○	○	○	○	42%
LM	Low South Twin (3a-6d1)	○	◒	●	●	●	○	○	○	◒	◒	◒	○	●	●	○	◒	○	42%
T	Tunnel - Mode Separated (3c-1a)	●	○	◒	●	◒	○	◒	◒	●	○	●	○	○	○	●	○	○	40%
120F	120' High North Twin - Mode Separated (3b-5d2)	◒	○	◒	●	○	○	◒	●	◒	●	○	○	●	○	○	○	○	39%
97F	97' High South Twin (3b-6d1)	○	◒	○	○	●	○	○	●	◒	◒	○	○	●	●	○	◒	◒	39%
120F	120' High Existing Alignment (3b-1b2)	◒	○	○	○	●	○	●	●	○	○	○	○	◒	○	○	○	◒	29%
120F	120' High Southeast Wishbone (3b-3b2)	◒	○	○	○	●	○	○	●	○	○	○	○	●	○	○	○	◒	25%
120F	120' High Northeast Wishbone (3b-2b2)	○	○	○	○	●	○	◒	●	○	○	○	○	●	○	○	○	◒	23%
120F	120' High North Twin (3b-4d2)	○	○	○	◒	●	○	◒	●	○	○	○	○	○	○	○	○	○	17%
120F	120' High South Twin (3b-6d2)	○	○	○	○	●	○	○	●	○	○	○	○	●	○	○	○	○	14%

3. Options Evaluation

EARTHQUAKE READY BURNSIDE BRIDGE

Trends Discussion – What is rising to the top…

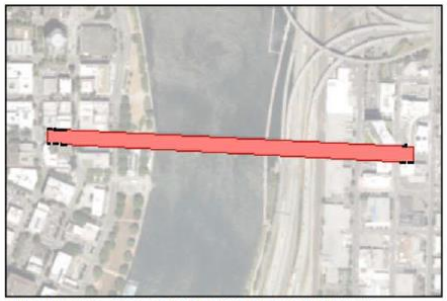


3. Options Evaluation

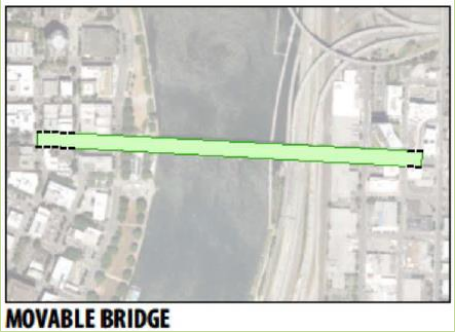
What is rising to the top…

HIGH FIXED

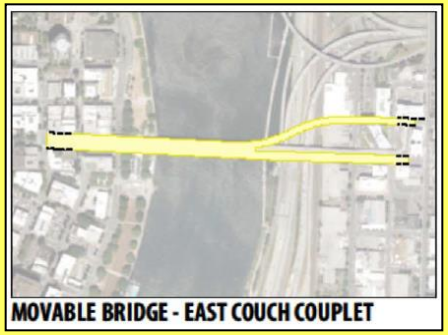
Enhanced Seismic Retrofit

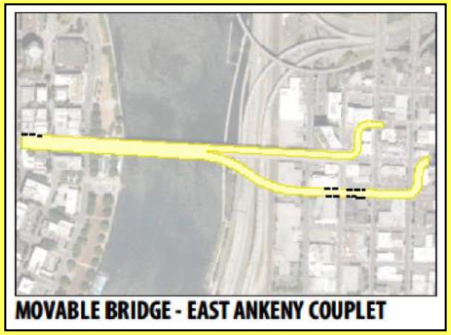


Replacement: Existing Alignment

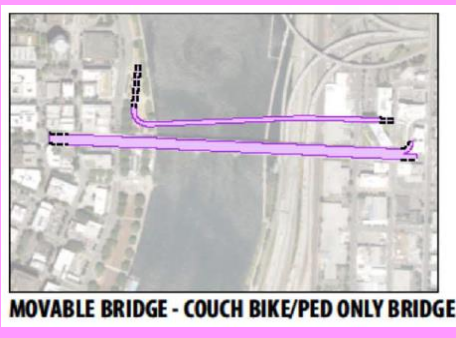


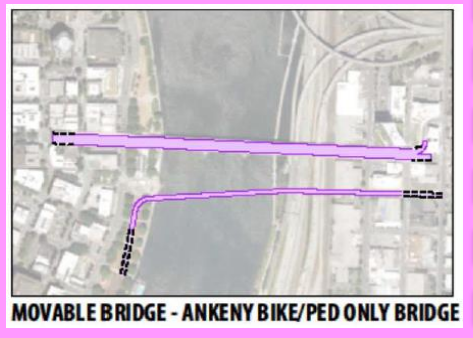
Replacement: Wishbones





Replacement: Mode-Separated





LOW MOVEABLES

3. Options Evaluation

What is rising to the top…

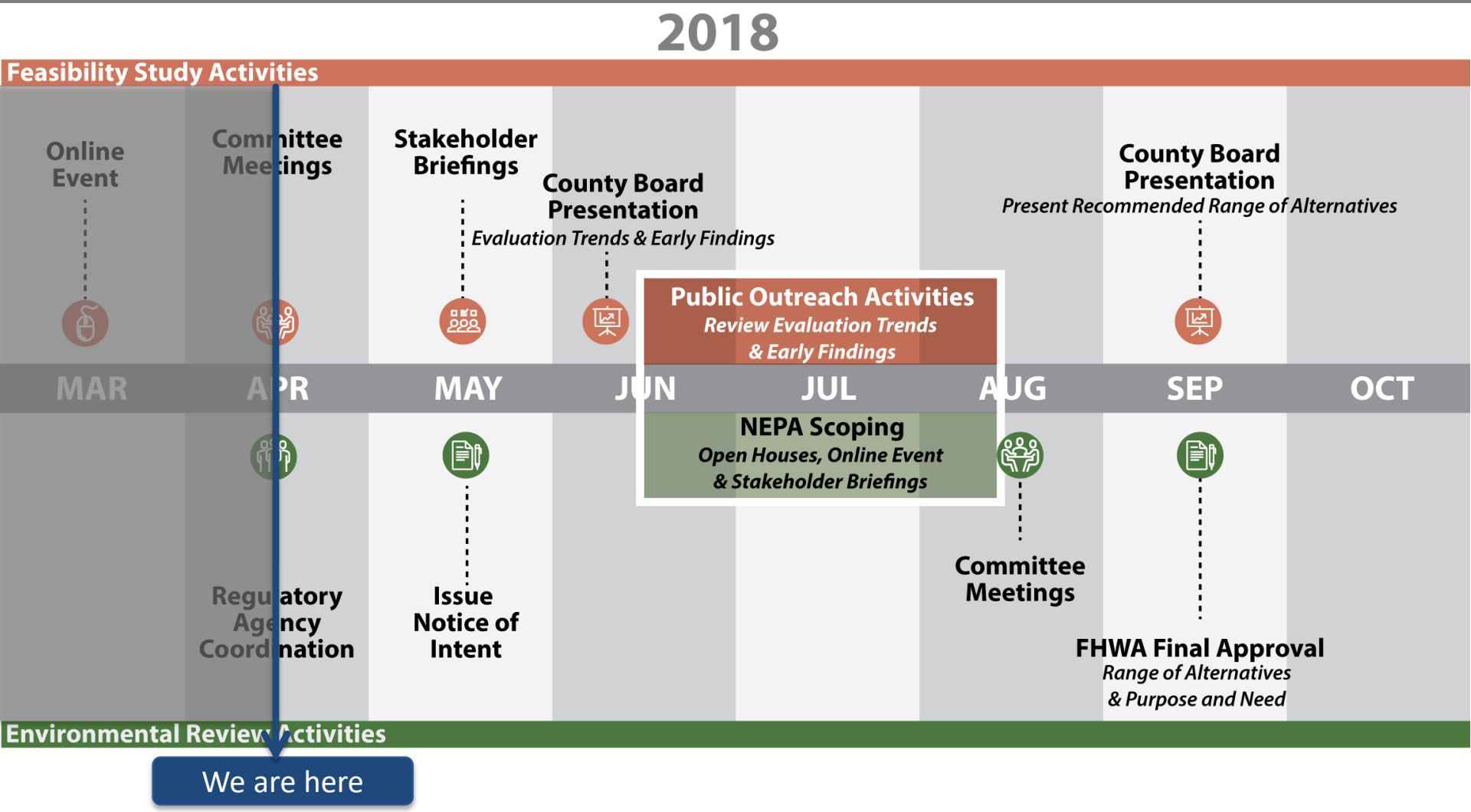
What do they have in common?

- All use existing westside horizontal alignment
- Lowest capital cost
- Shortest bridges in total length
- Fewest streets blocked or bypassed
- All are moveable except for one 97 foot fixed bridge

4. Public Comment

Do you have anything you would like to share?

5. Next Steps


2018
Feasibility Study Activities
Online Event
Committee Meetings
Stakeholder Briefings
County Board Presentation
Evaluation Trends & Early Findings
Public Outreach Activities
Review Evaluation Trends & Early Findings
County Board Presentation
Present Recommended Range of Alternatives
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NEPA Scoping
Open Houses, Online Event & Stakeholder Briefings
Regulatory Agency Coordination
Issue Notice of Intent
Committee Meetings
FHWA Final Approval
Range of Alternatives & Purpose and Need
Environmental Review Activities
We are here

6. Closing Remarks

EARTHQUAKE READY BURNSIDE BRIDGE

Thank You