Interstate Bridge Replacement River Crossing Alternatives Analyzed

Oregon Department of Transportation

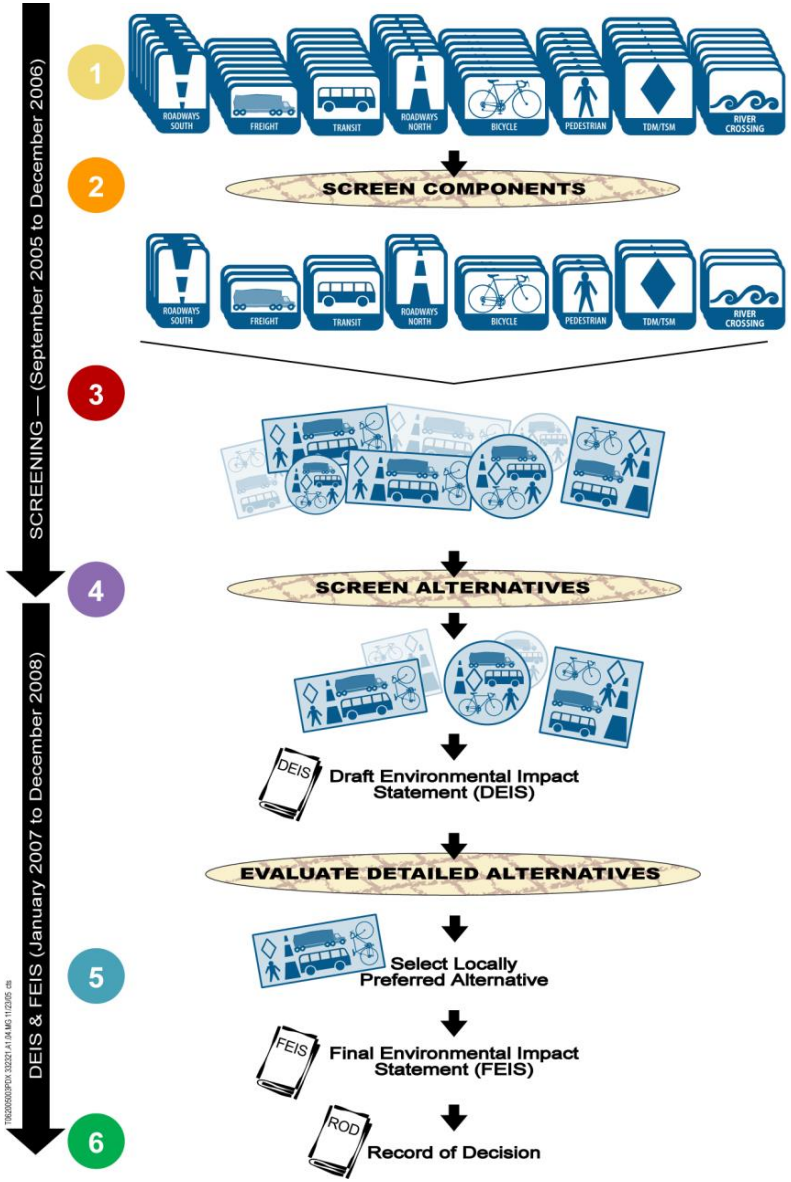
Travis Brouwer
Assistant Director

Washington State Department of Transportation

Carley Francis
Regional Administrator

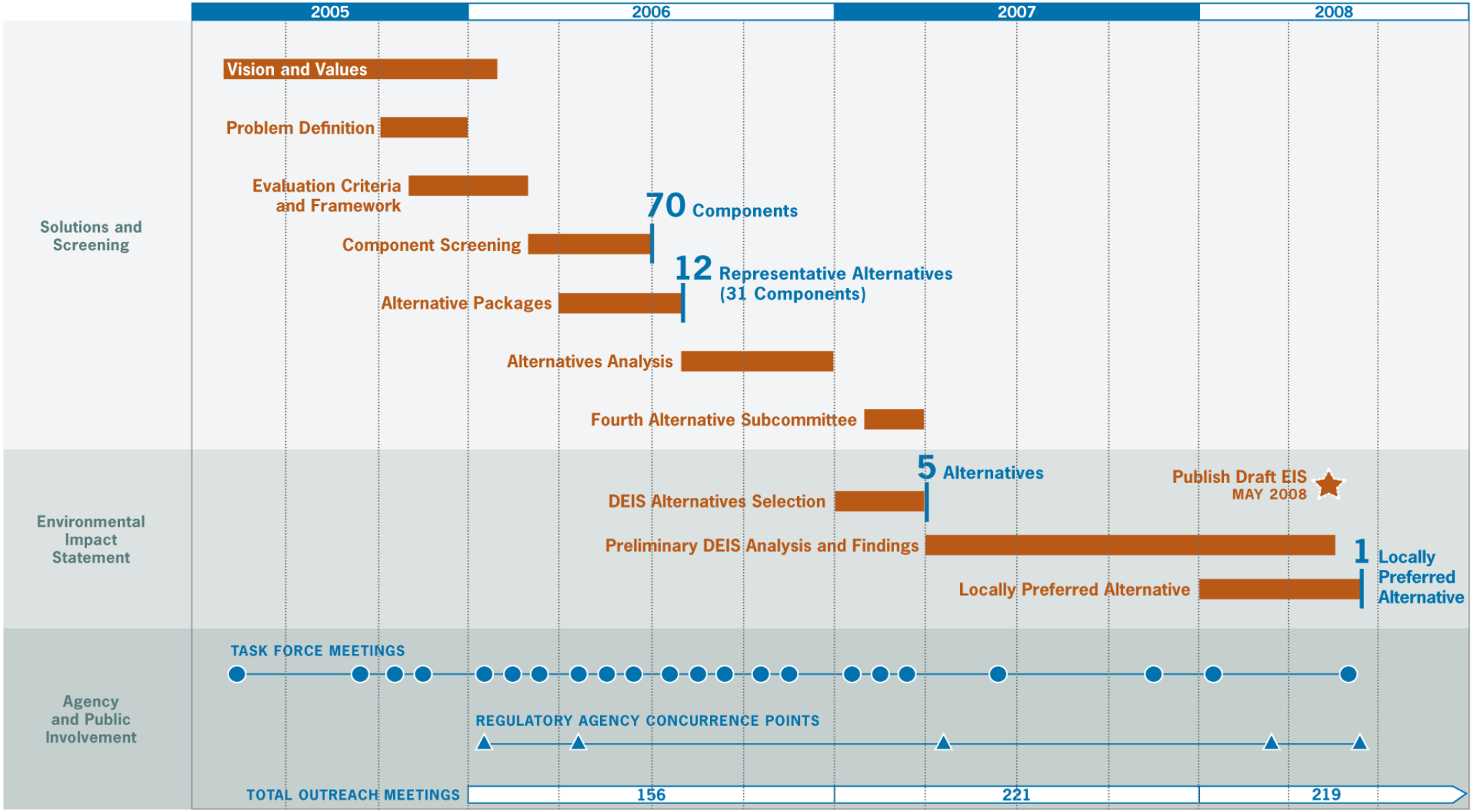
November 13, 2019

Evaluation Framework



1. Collect all ideas
2. Test independently
   - Step A Screening
   - Step B Screening
3. Package and analyze ideas together
4. Identify and analyze DEIS Alternatives
   - Detailed technical analysis of performance measures for each alternative
5. Select a locally preferred alternative (LPA)
   - Analyze LPA in Final EIS
6. Receive a record of decision from FHWA / FTA

Project Development



Component Ideas

Where Did Component Ideas Come From?

- Trade and Transportation Partnership
- South/North Corridor EIS
- Interstate Collaborative Environmental Process (InterCEP)
- Public scoping meetings
- Ideas submitted by public comment from the web, email or mail
  - Some of these ideas include the bi-state industrial corridor, common sense alternative, westside bypass, and eastside new bridge
- Staff

Component Categories

- River Crossing
- Transit
- Bicycle
- Pedestrian
- Roadways north
- Roadways south
- TDM/TSM
- Freight

River Crossing Components

- **Six** Replacement bridge ideas, including moveable
- **Six** Supplemental bridge ideas, including moveable
- **Two** tunnel ideas
  - Supplemental
  - Replacement
- **Three** arterial crossing ideas to supplement I-5:
  - Multi-modal bridge
  - Multi-modal bridge, no on-ramps to Interstate bridge from SR 14 or Hayden Island
  - Multi-modal bridge with I-5 improvements
- **Six** alternate location ideas:
  - Port-to-Port/Bi-state Industrial Corridor (BNSF adjacent)
  - Multi-modal arterial bridge by BNSF bridge, modify BNSF bridge, widen existing Interstate bridges
  - Western Highway/Westside Bypass (I-605)
  - Eastern Crossing (east of I-205)
  - I-205 improvements
  - 33rd Ave Crossing (between I-5 and I-205)

Transit Components

- Express Bus in General Purpose Lanes
- Express Bus in Managed Lanes
- Bus Rapid Transit (BRT) – Lite
- Bus Rapid Transit (BRT) – Full
- Light Rail Transit (LRT)
- Streetcar
- High Speed Rail
- Ferry Service
- Monorail System
- Magnetic Levitation Railway
- Commuter Rail in BNSF Trackage
- Heavy Rail
- Personal Rapid Transit
- People Mover/Automated Guideway Transit (AGT)

Step A Component Screening: Purpose and Need

River Crossing Step A Component Screening

River crossing ideas needed to address the purpose and need.

A component failed if the answer to any of these question was no:

Q1: Increase vehicular capacity or decrease vehicular demand within the project area?

Q2: Improve transit performance within the project area?

Q3: Improve freight mobility within the project area?

Q4: Improve safety and decrease vulnerability to incidents within the project area?

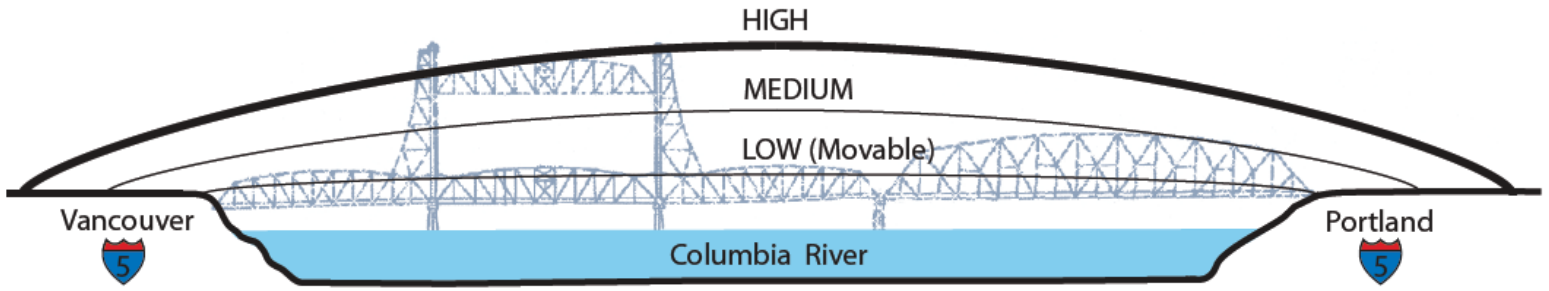
Q5: Improve bicycle and pedestrian mobility within the project area?

Q6: Reduce seismic risk of the I-5 bridge?

Replacement Bridge - High Up/Downstream
Supplemental Bridge - Mid Upstream, High Up/Downstream

Do not satisfy Question 4:

- Q4 – Would result in unacceptable encroachment into Pearson Field airspace

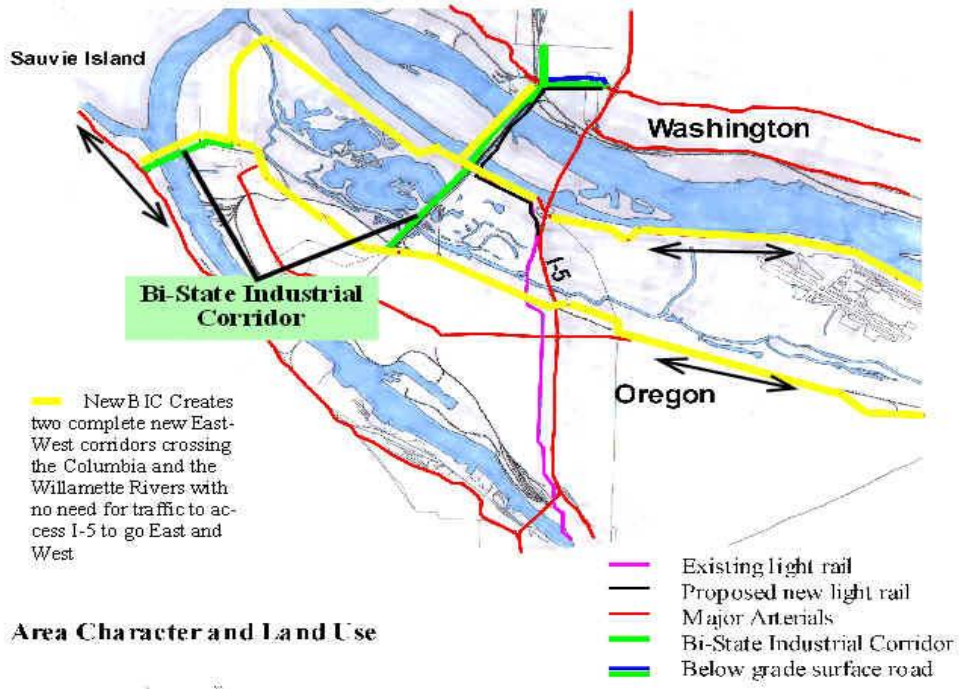


Component Numbers: RC 5, RC 6, RC 10, RC 11, RC 12

New Corridor Crossing Near BNSF Rail Crossing

Does not satisfy Questions 2, 4, 5 and 6

- Q2 – Does not improve transit performance. Does not provide service to population centers on Hayden Island.
- Q4 –Future I-5 safety would be expected to worsen as demand increases as it maintains non-standard design features.
- Q5 – Does not improve multi-use pathway across Columbia river or improve bicycle/pedestrian connections.
- Q6 – Does not reduce the seismic risk of I-5 bridge

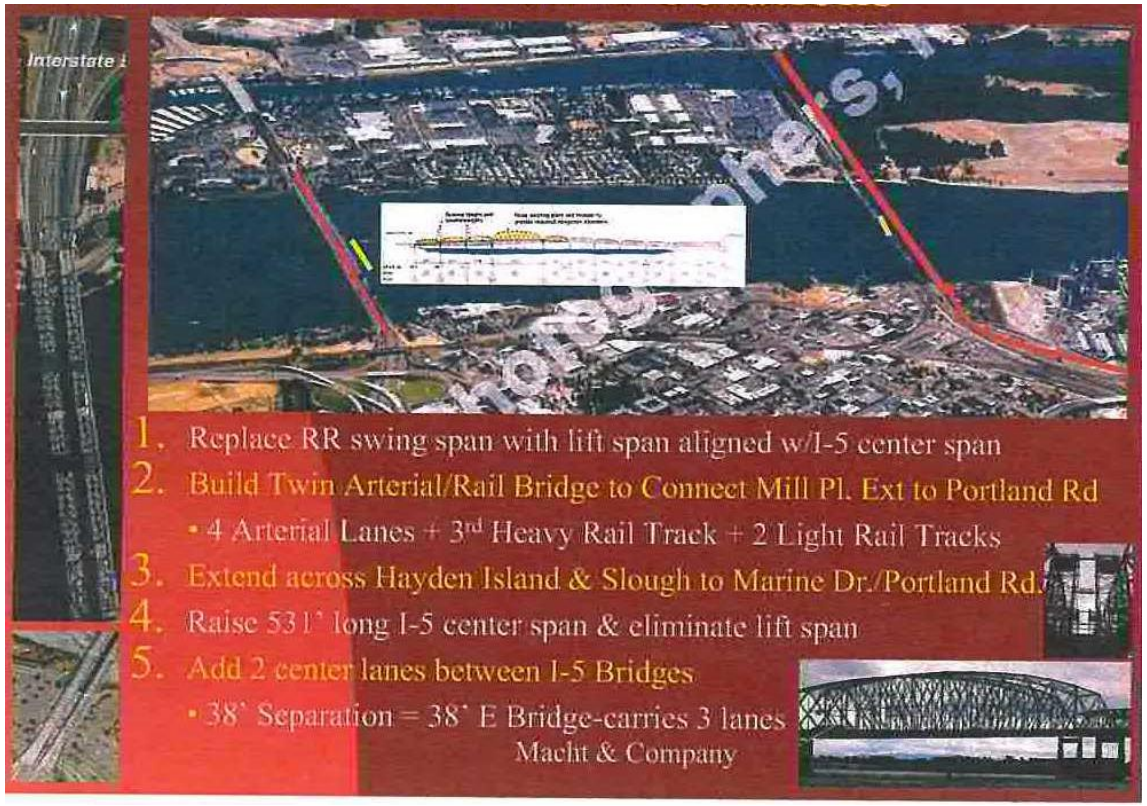


Component Number: RC 14

New Corridor Crossing and Widen Existing I-5 Bridges

Does not satisfy Questions 2, 4, 5 and 6

- Note: Not feasible to add new travel lanes between existing I-5 bridges. This alternative performs similar to RC-14.
- Q2 – Does not improve transit performance within the Bridge Influence Area.
- Q4 – Future I-5 safety would be expected to worsen as demand increases as it maintains, and may worsen, non-standard design features.
- Q5 – Does not improve multi-use pathway across Columbia river or improve bicycle/pedestrian connections.
- Q6 – Does not reduce the seismic risk of I-5 bridge

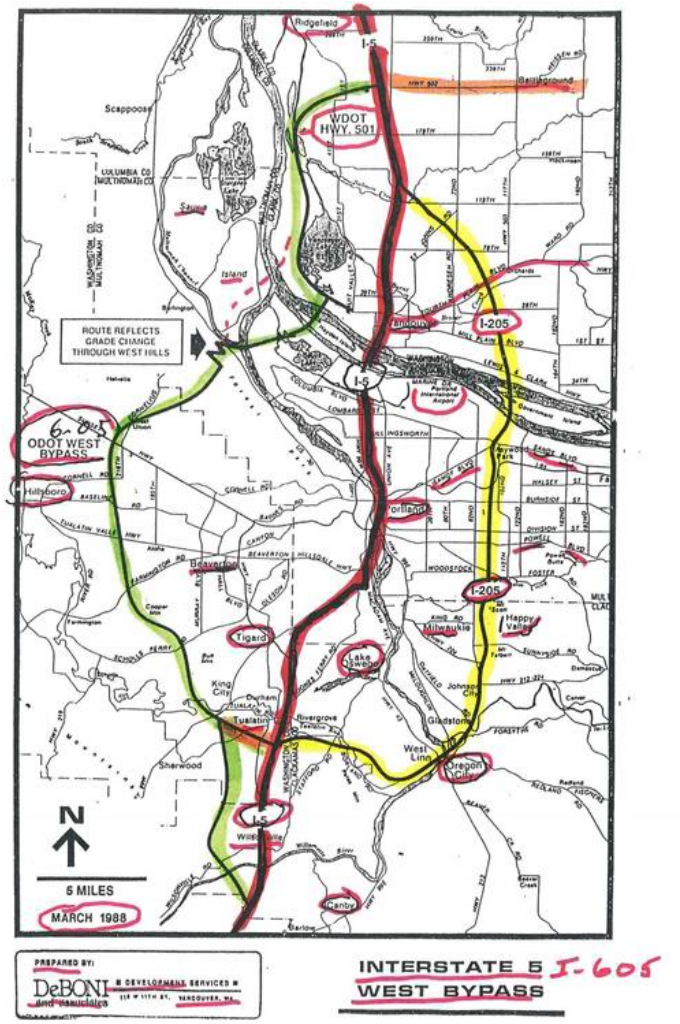


Component Number: RC 15

New Western Highway (I-605)

Does not satisfy Questions 1 through 6

- Q1 and 3 – Does not significantly increase capacity or reduce demand for travel along I-5.
- Q2 – Does not improve transit performance
- Q4 – Maintains known I-5 design features that contribute to crashes. Future I-5 safety would be expected to worsen as demand increases.
- Q5 – Does not improve multi-use pathway across Columbia river or improve bicycle/pedestrian connections.
- Q6 – Does not reduce the seismic risk of I-5 bridge



Component Number: RC 16

New Eastern Columbia River Crossing

Does not satisfy Questions 1 through 6

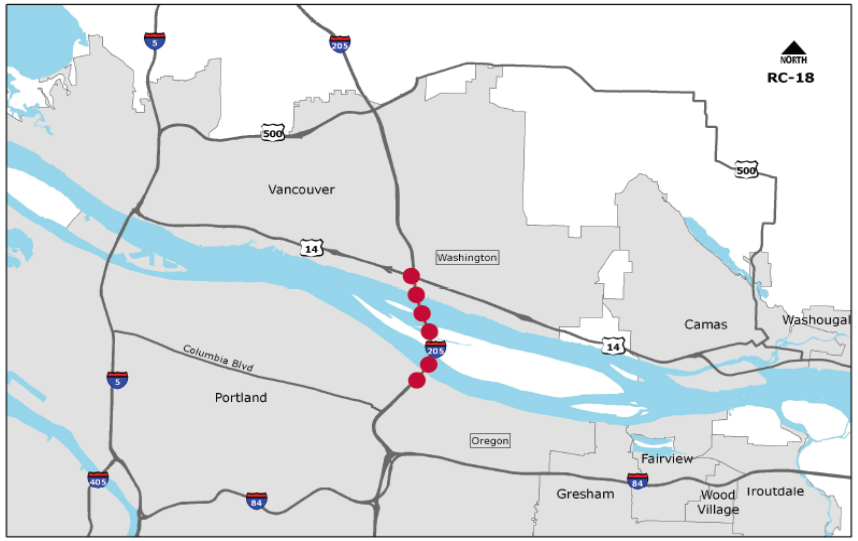
- Q1 and 3 – Does not significantly increase capacity or reduce demand for travel along I-5.
- Q2 – Does not improve transit service to identified I-5 transit markets.
- Q4 – Maintains known I-5 design features that contribute to crashes. Future I-5 safety would be expected to worsen as demand increases.
- Q5 – Does not improve multi-use pathway across Columbia river or improve bicycle/pedestrian connections.
- Q6 – Does not reduce the seismic risk of I-5 bridge

Component Number: RC 17

I-205 Improvements

Does not satisfy Questions 1 through 6

- Q1 and 3 – Does not significantly increase capacity or reduce demand for travel along I-5.
- Q2 – Does not improve transit service to identified I-5 transit markets.
- Q4 – Maintains known I-5 design features that contribute to crashes. Future I-5 safety would be expected to worsen as demand increases.
- Q5 – Does not improve multi-use pathway across Columbia river or improve bicycle/pedestrian connections.
- Q6 – Does not reduce the seismic risk of I-5 bridge

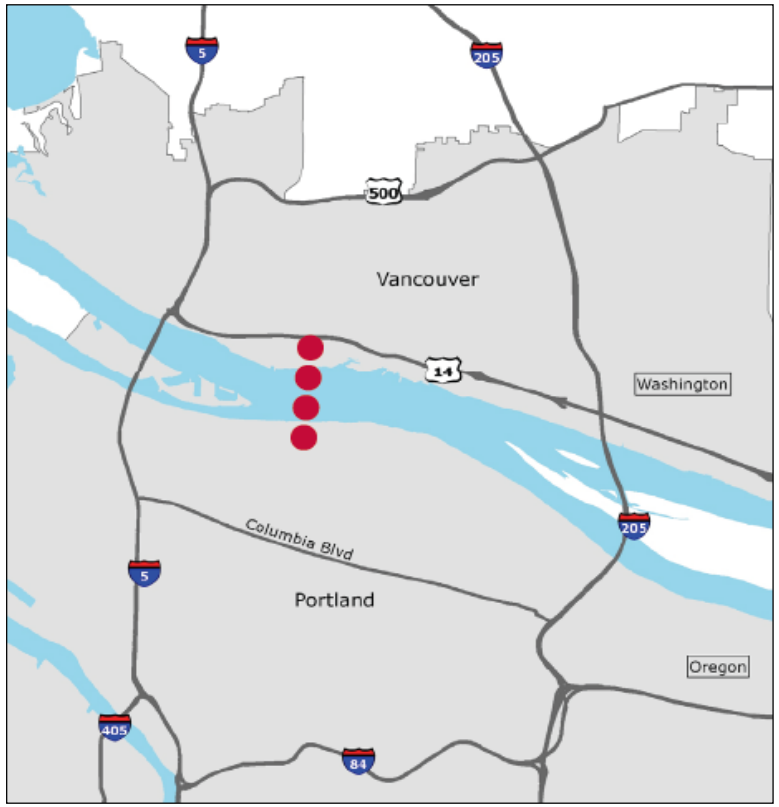


Component Number: RC 18

33rd Avenue Crossing

Does not satisfy Questions 1-6

- Q1 & 3 – Does not significantly increase capacity or reduce demand for travel along I-5.
- Q2 –Does not improve transit performance within the Bridge Influence Area.
- Q4 – Maintains known I-5 design features that contribute to crashes. Future I-5 safety would be expected to worsen as demand increases.
- Q5 – Does not improve multi-use pathway across Columbia river or improve bicycle/pedestrian connections.
- Q6 – Does not reduce the seismic risk of I-5 bridge

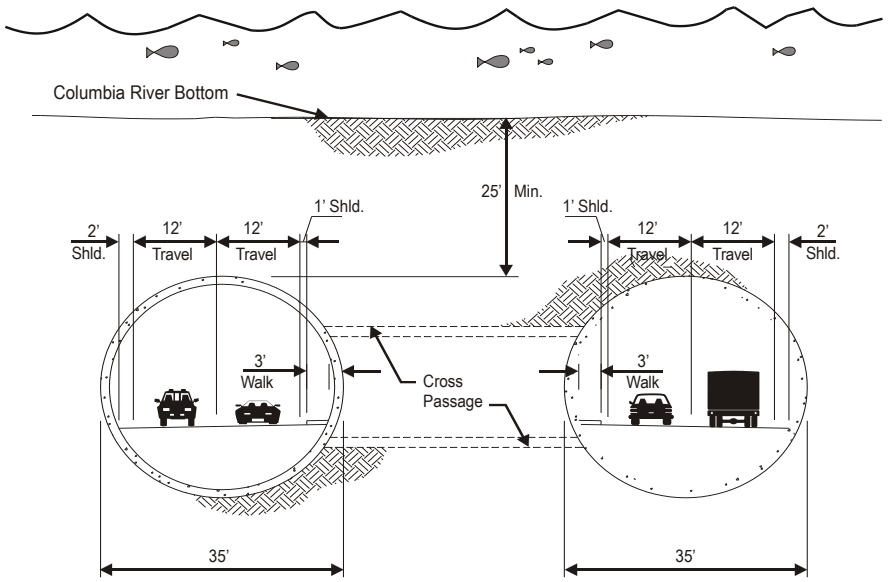


Component Number: RC 21

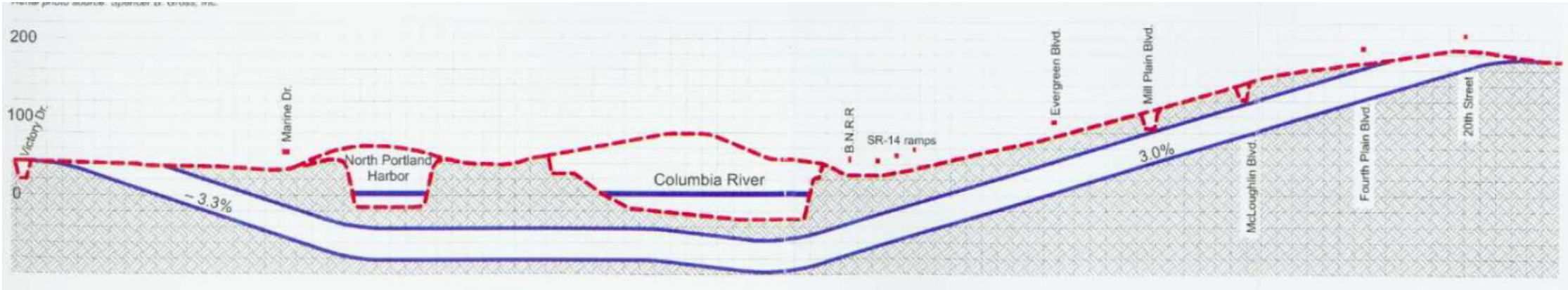
Replacement Tunnel

Does not satisfy Questions 1, 2, 3, and 5

- Q1 & 3 – Does not serve I-5 commuter and truck freight trips within the project area
- Q2 – Does not provide service to key transit markets in downtown Vancouver, Hayden Island, and North Portland
- Q5 – Does not improve bicycle/pedestrian facilities



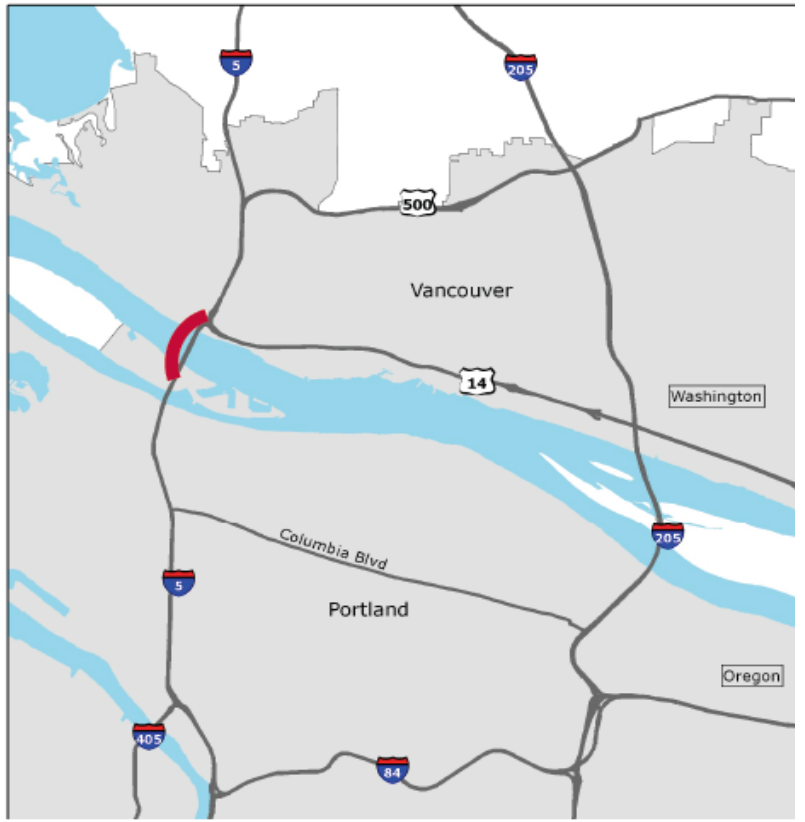
Component Number: RC 20



Arterial Crossing Without I-5 Improvements

Does not satisfy Questions 1, 3, 4, and 6

- Q1 & 3 – Does not significantly increase capacity or reduce demand for travel along I-5.
- Q4 – Maintains known I-5 design features that contribute to crashes. Future I-5 safety would be expected to worsen as demand increases.
- Q6 – Does not reduce the seismic risk of I-5 bridge



Component Number: RC 19

Non-Freeway Multimodal Crossing

Does not satisfy Questions 1, 3, 4, and 6

- Q1 and 3 – Not feasible to elevate existing I-5 structures to eliminate bridge lifts. Does not significantly increase vehicular capacity or reduce travel demand along I-5. Results in out-of-direction travel for commuters within the project area.
- Q4 – Maintains known I-5 design features that contribute to crashes. Future I-5 safety would be expected to worsen as demand increases.
- Q6 – Does not reduce the seismic risk of I-5 bridge

Component Number: RC 22

Ideas that Passed Step A Screening

- **Replacement bridge:**
  - Downstream, low level, movable (RC 1)
  - Upstream, low level, movable (RC 2)
  - Downstream, mid level, fixed (RC 3)
  - Upstream, mid level, fixed (RC 4)
- **Supplemental bridge:**
  - Downstream, low level, movable (RC 7)
  - Upstream, low level, movable (RC 8)
  - Downstream, mid level, fixed (RC 9)
- **Supplemental tunnel** (RC 13)
- **Arterial crossing with I-5 improvements** (RC 23)

Step B Component Screening: Community Needs and Values

River Crossing Components Step B Screening

Screening based on community needs and values:

1. Community Livability and Human Resources
2. Mobility, Reliability, Accessibility, Congestion Reduction, and Efficiency
3. Modal Choice
4. Safety
5. Regional Economy/Freight Mobility
6. Stewardship of Natural Resources
7. Distribution of Benefits and Impacts
8. Cost Effectiveness and Financial Resources
9. Growth Management and Land Use
10. Constructability

No ideas that passed Step A were removed due to Step B screening

Further Narrowing of Components

- Recommendation by staff and Task based on additional evaluation to eliminate:
  - **Low-Level Bridge** (requires moveable span)
    - Safety – higher accident rates during bridge openings
    - Continued traffic and transit reliability disruptions during bridge openings
    - Continued restrictions on river traffic when bridge must remain closed
  - **Supplemental Tunnel**
    - Safety – current roadway deficiencies would remain on existing bridges
    - Marginal transportation benefits
    - High community impacts

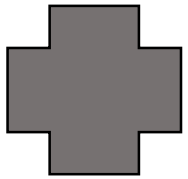
Alternative Packages to DEIS Alternatives

Packaging Most Promising Components into Alternatives

12 packages combined river crossings and transit modes into representative alternatives

RIVER CROSSING:

- **Existing bridge**
- **Supplemental bridge**
- **Replacement bridge**
- **Arterial bridge with I-5 improvements**

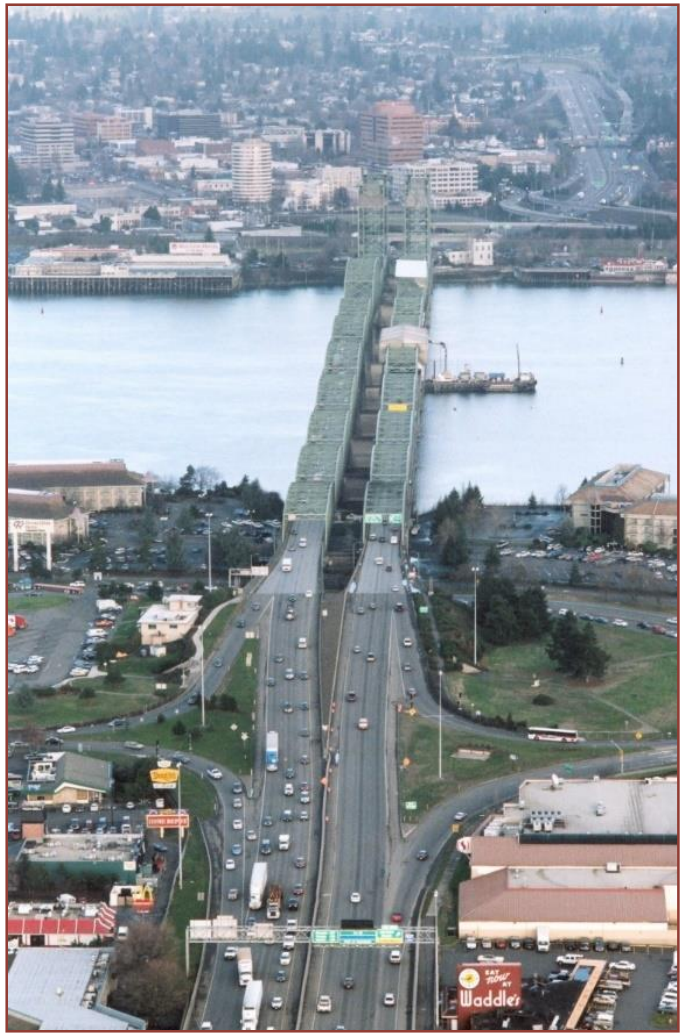


TRANSIT MODE:

- Light rail
- Bus rapid transit
- Bus rapid transit lite
- Express bus
- TDM/TSM emphasis

Packaging Goals

- Identify promising combinations of highway and transit improvements
- Narrow the range of alternatives to be evaluated
- Shape the alternatives to be considered in the DEIS



Evaluating Alternative Packages

The following analysis was done for alternative packages:

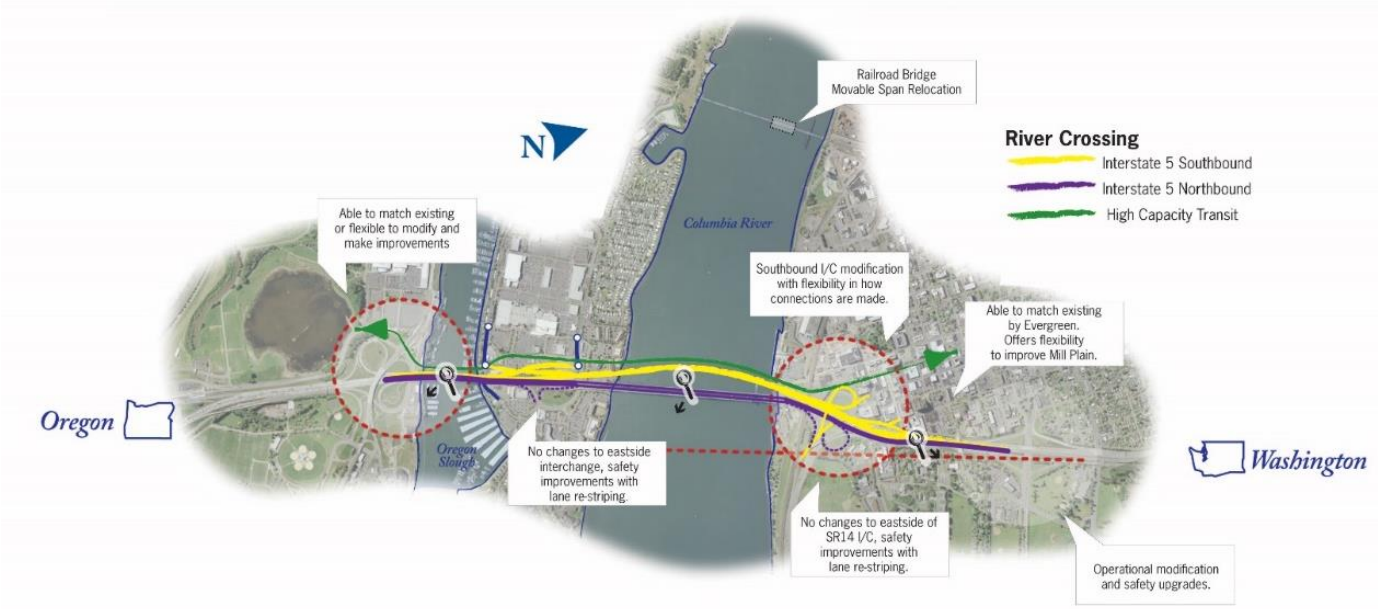
- Travel demand forecast modeling
- Conceptual design refinement
- Staff evaluation among design, traffic, transit, and environmental teams using adopted screening criteria
- Performance measures as quantitative as possible

Summary of Alternative Package Analysis

- Replacement bridge options performed better than supplemental or arterial options
- Supplemental bridge options would impact river navigation due to pier placement
- Supplemental bridge options would have greater impact on Hayden Island and the Vancouver National Historic Reserve
- Supplemental bridge options would retain the existing encroachment into Pearson Field airspace (from lift spans)
- Arterial options would have all of the drawbacks of supplemental options and would also increase congestion in downtown Vancouver, on Hayden Island and in the vicinity of Marine Drive

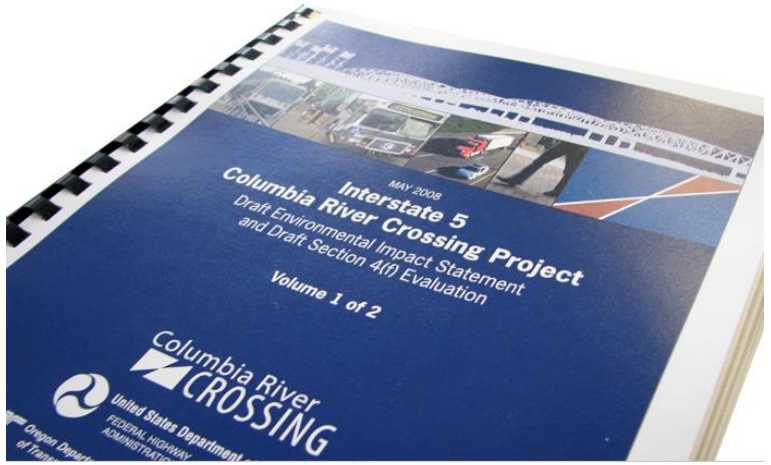
Identifying Draft EIS Alternatives

- Staff recommended to the Task Force that only the replacement bridge options should be evaluated in the DEIS
- Task Force recommended that a supplemental alternative that could meet the P&N be developed
  - A subcommittee was established and assisted by technical staff
  - A revised supplemental bridge alternative was developed to include in the DEIS



DEIS Alternatives

1. No Build
2. Replacement bridge with bus rapid transit
3. Replacement bridge with light rail transit
4. Supplemental bridge with bus rapid transit
5. Supplemental bridge with light rail transit



All "build" alternatives included interchange, freight and pedestrian/bicycle improvements between SR 500 and Delta Park

Selecting a Locally Preferred Alternative

DEIS River Crossing Findings

Technical analysis found that a replacement crossing outperformed a supplemental crossing:

- Less future congestion predicted (5 hours vs. 11 hours)
- Less cut-through traffic on local streets
- Greater improvement to traffic safety
- Improved marine mobility and safety due to elimination of “S-curve” and height restrictions
- Better bicycle and pedestrian connections on Hayden Island and over North Portland Harbor
- Greater improvement to water quality
- Less expensive to operate and maintain over the long run

Alternatives Development – Locally Preferred Alternative

- Replacement I-5 bridge
  - 3 through lanes
  - Up to 3 auxiliary lanes
- Light rail transit to Clark College
- Highway and pedestrian/bicycle improvements

- *Adopted by the CRC Task Force by a 37-2 vote on June 24, 2008*
- *Endorsed by project stakeholders (WSDOT, ODOT, RTC, Metro, C-Tran, TriMet)*

From LPA to Federal Approval

- Worked to address 129 partner agency conditions on Locally Preferred Alternative
    - Number of lanes—through and auxiliary
    - Cost-efficient bridge design
    - Create plan for sustainability during design and construction
    - Develop program to encourage more efficient use of roadway

- Bridge review panel
- Governors selected bridge type
- Received Biological Opinion from NOAA
- Published Final EIS

- Received Federal Approval (Record of Decision)
- Received authorization for tolling in both states
    - WA in 2012, OR in 2013
- Received US Coast Guard General Bridge Permit

Questions?

www.wsdot.wa.gov/projects/i5/interstate-bridge/home