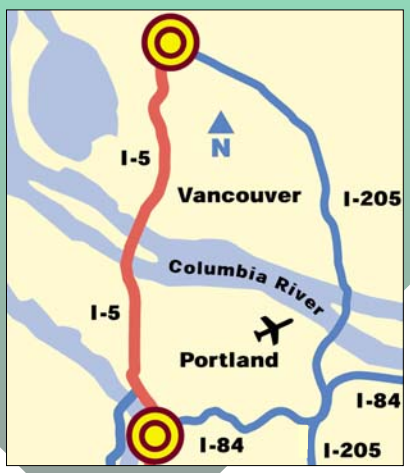
Bridge Influence Area Summary



About this Presentation

- Part I: Background
  - Overview of overall transportation benefits of draft recommendations
- Part II: Bridge Influence Area Analysis
  - Detailed examination of the benefits, impacts and costs of improvements in the bridge influence area (SR 500 in WA to Columbia Blvd. in OR)

Overall, what kind of transportation performance can we expect from the draft recommendations?

Introduction

- The next few charts compare freeway and transit performance today with three future scenarios:
  - No Build (2020)
  - Baseline (2020)
  - LRT/3 Lanes (2020)**
- Descriptions of these three scenarios follow.

***** The LRT/3 Lanes scenario was studied last fall and reflects the draft recommendations of the Task Force for the I-5 Corridor***

No Build (2020)

- **No Build (2020)** - what is expected to happen if we build only the currently funded projects.
- Currently funded projects include:
  - Construction of Interstate MAX light rail from the Rose Garden to the Expo Center in Portland
  - Widening of I-5 to three lanes in each direction between 99th and Main in Vancouver
  - Other transit and highway projects outside the I-5 corridor that have funding for construction over the next 4-6 years.

Baseline (2020)

- Baseline (2020) - what is expected to happen if we construct the funded projects, PLUS the projects in our 20 year plans?
- The Portland/Vancouver Region's 20 year plans include the following projects:
  - Widening of I-5 to 3 lanes in each direction between Delta Park and Lombard in Portland
  - Widening of I-5 to 3 lanes in each direction between 99th and I-205 in Vancouver
  - Increased in basic transit service throughout the Portland/Vancouver region
  - Increased TDM/TSM throughout the Portland/Vancouver region
  - Other transit and highway capital projects outside the I-5 corridor that are planned over the next 20 years.

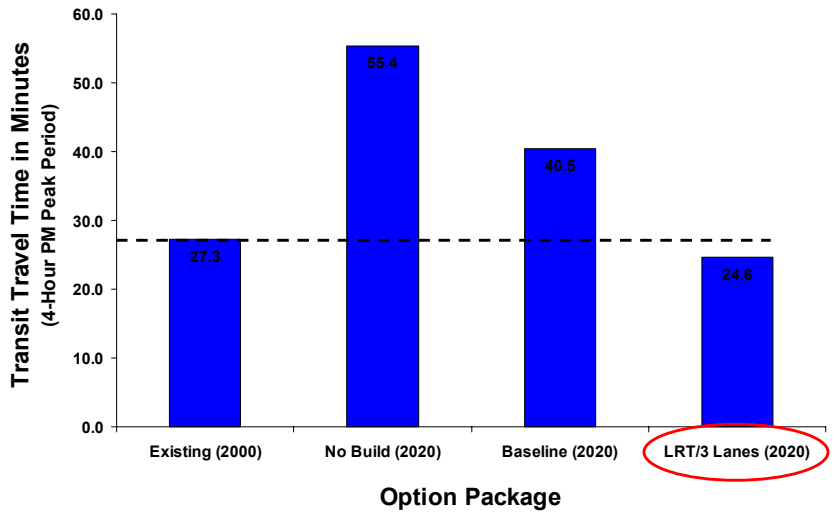
LRT/3 Lanes (2020)

- LRT/3 Lanes (2020)- what is expected to happen if we construct the funded projects, the Baseline 2020 projects, PLUS the add capacity in the Bridge Influence Area?
- The draft recommendations include:
  - Establish a phased light rail loop in Clark County
  - Add two additional lanes in each direction across the Columbia River
  - Make interchange and capacity improvements in the bridge influence area (SR 500 to Columbia Blvd.)
- The LRT/3 Lanes scenario was studied last fall and reflects the draft recommendations of the Task Force for the I-5 Corridor

Overall, what kind of transportation performance can we expect from the draft recommendations?

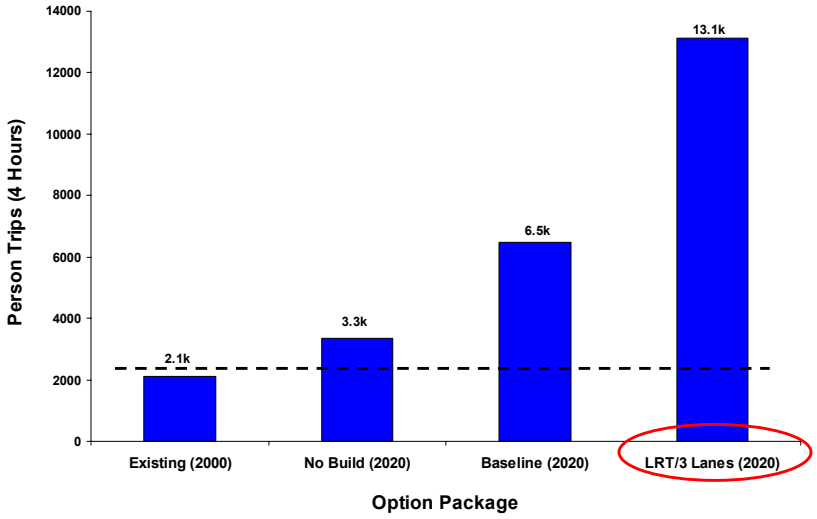
Transit Travel Time

Downtown Portland to Downtown Vancouver (PM Peak)



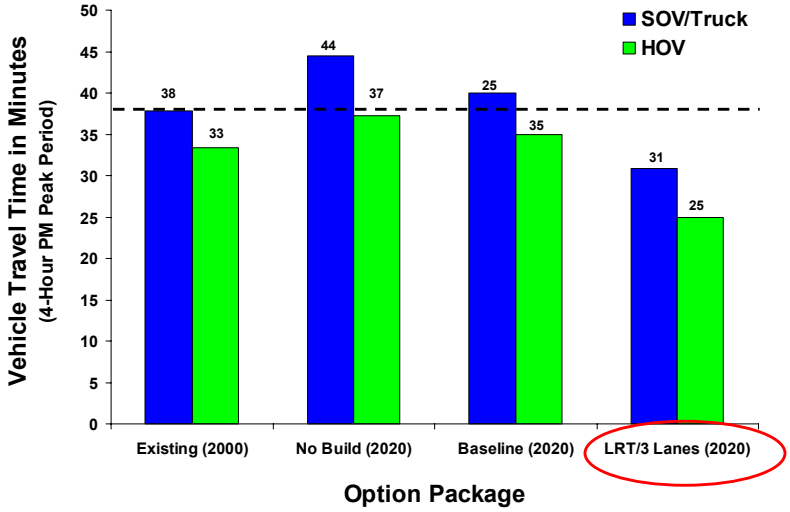
Transit Trips

Across the Columbia River (PM Peak)



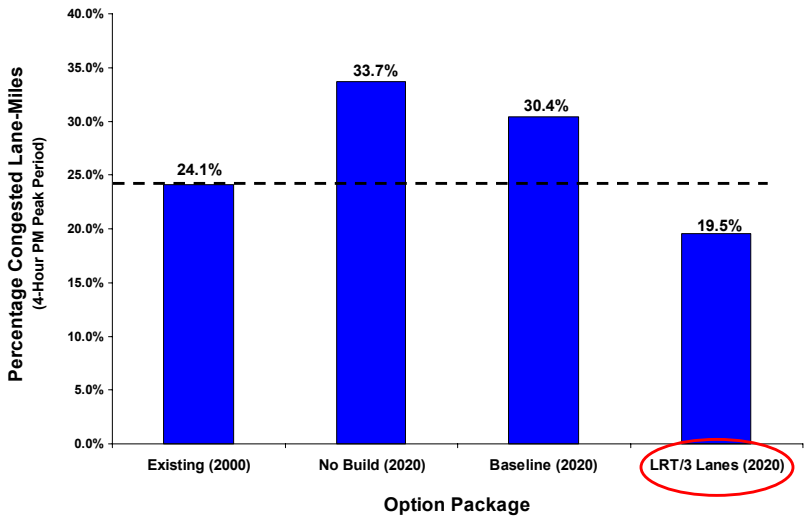
Vehicle Travel Times

Downtown Portland to Salmon Creek (PM Peak)



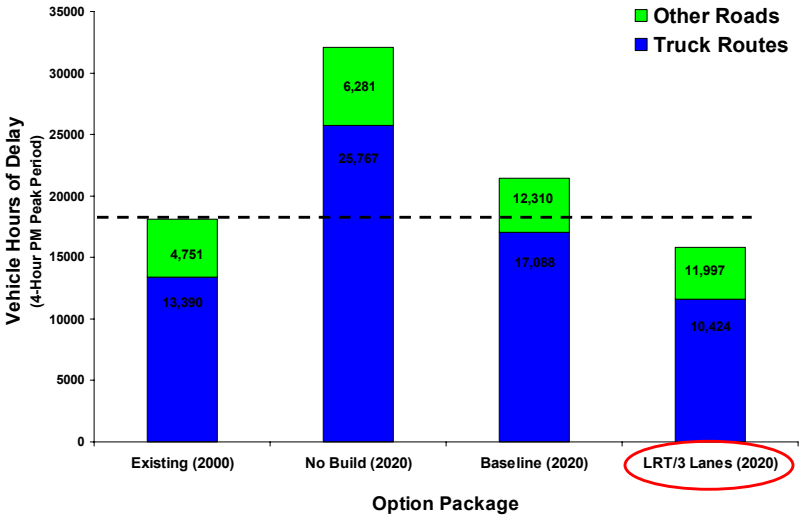
Congestion on I-5 and I-205

Congested Lane-Miles (PM Peak)



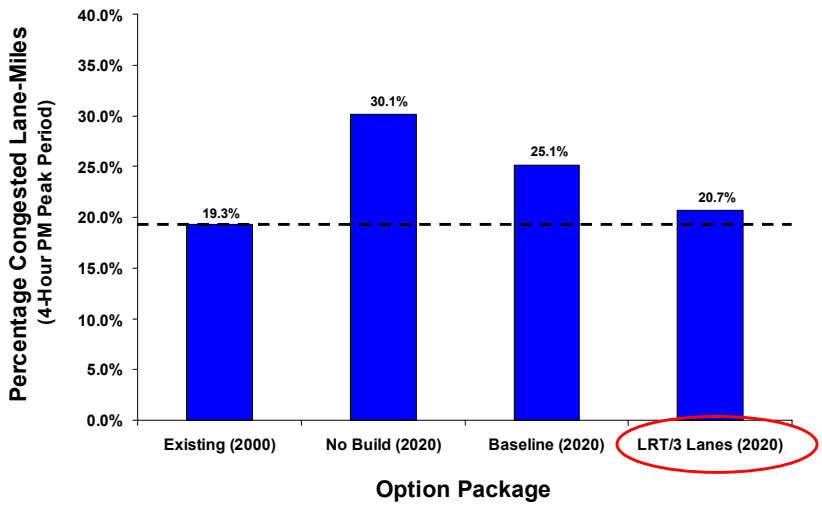
Vehicle Hours of Delay

In the Study Area (PM Peak)



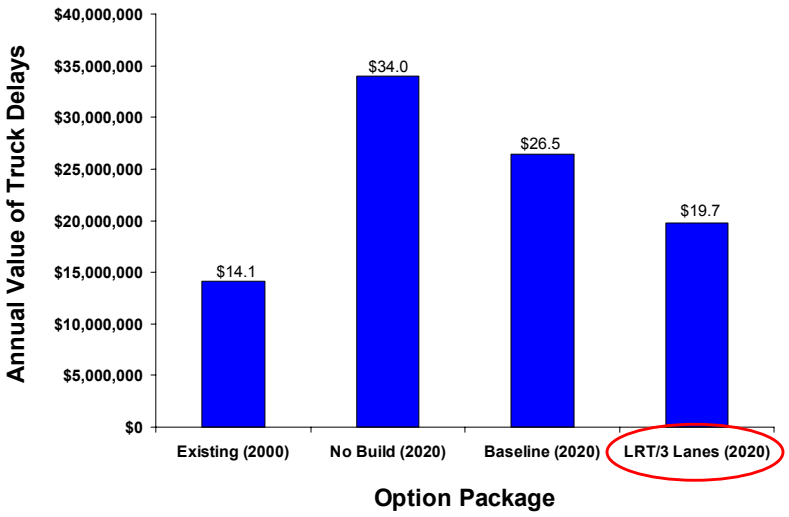
Congestion on Truck Routes

Congested Lane-Miles (PM Peak)



Value of Truck Delay

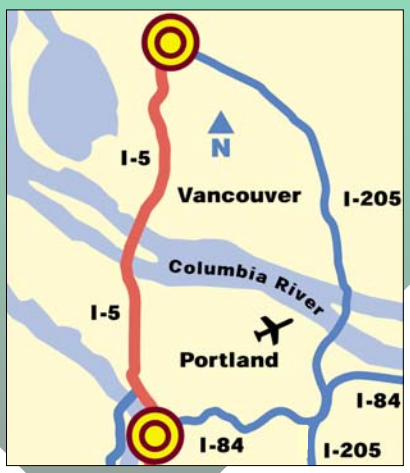
(In the Study Area)



Overall Findings

- By 2020, if we do nothing in the I-5 corridor, users of the freeway system will experience a substantial increase in congestion and delay.
- In the absence of transit and highway investment in the Corridor, congestion and delay will grow steadily resulting in the AM and PM periods of congestion spreading into the early morning, mid-day, and evening hours.
- In order to maintain or improve today's level of performance, up to two additional lanes of freeway capacity in each direction across the Columbia River are needed.

Part II: Bridge Influence Area - Summary of Findings



Task Force Draft Recommendations for the I-5 River Crossing

- **River Crossing Capacity:**
  - New transit and vehicle capacity should be constructed across the Columbia River in the I-5 Corridor.
  - **For vehicles**, there should be no more than 3 through lanes in each direction and up to two supplemental lanes (auxiliary or local access) in each direction across the Columbia River (total 5 lanes in each direction). **For transit**, there should be two light rail tracks across the Columbia River in the I-5 Corridor.
  - In adding river-crossing capacity, every effort should be made to avoid displacements and encroachments.
  - The proposed design should include safety considerations.

Task Force Draft Recommendations for the I-5 Bridge Influence Area

- **Bridge Influence Area:**
  - Between the SR 500 and Columbia Blvd. interchanges, the freeway needs to be designed to balance all of the on and off traffic, consistent with 3 through lane Corridor capacity and 5 lanes of bridge capacity, in each direction.

Additional Work in the Bridge Influence Area

- Specifically, the Task Force requested the Project Team to:
  - Present a solution or solutions that balance the following: minimize the disruption to neighborhoods and the environment while matching bridge and freeway lane configurations; address merging and weaving problems; and safely and efficiently move traffic on and off the freeway.
  - Work collaboratively with the community to identify and develop new conceptual designs for the interchanges.

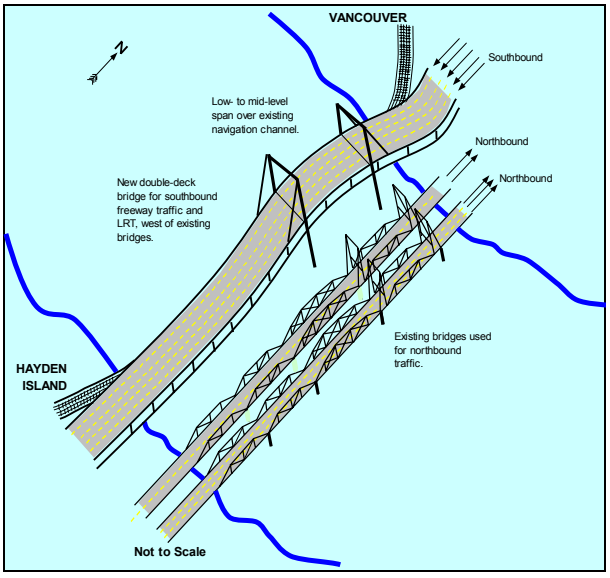
Looking specifically at the Bridge Influence Area, what are the benefits, cost and impacts of improvements?

A Range of River Crossing Concepts Developed to Evaluate:

- Supplemental vs. replacement bridge concepts
- Joint use (LRT-highway) vs. separate bridges
- Alignments east and west of existing bridges
- Freeway lanes and arterial lanes

The Range of River Crossing Concepts Fall Into Three Categories:

- Category 1 – River crossings that provide five freeway lanes in each direction (Concepts 1,2,3,4)
- Category 2 – A freeway and river crossing system that provides three mainline freeway lanes in plus four lane collector-distributor (Concepts 5,6)
- Category 3 – River crossings that have four freeway lanes in each direction plus a two lane arterial (Concepts 7,8)

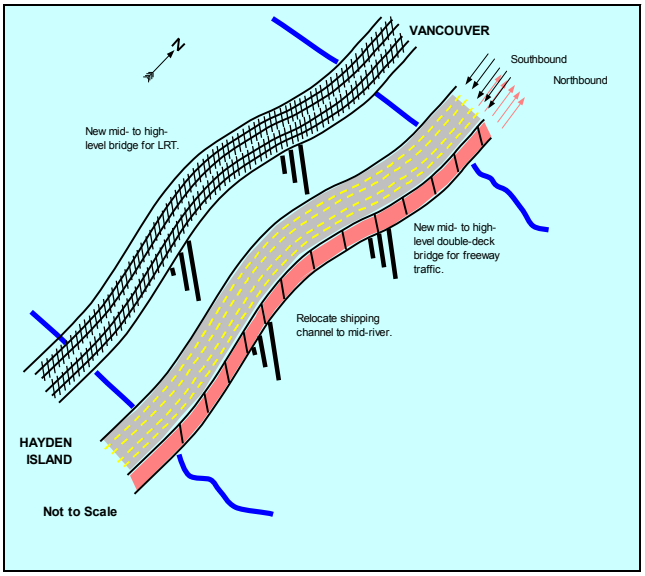


Concept 1:
5-lane southbound supplemental bridge for freeway traffic w/LRT

1. Southbound traffic on new five-lane bridge, LRT on lower deck -- west of existing bridges

2. Low- to mid-level bridge, with lift span over existing navigation channel

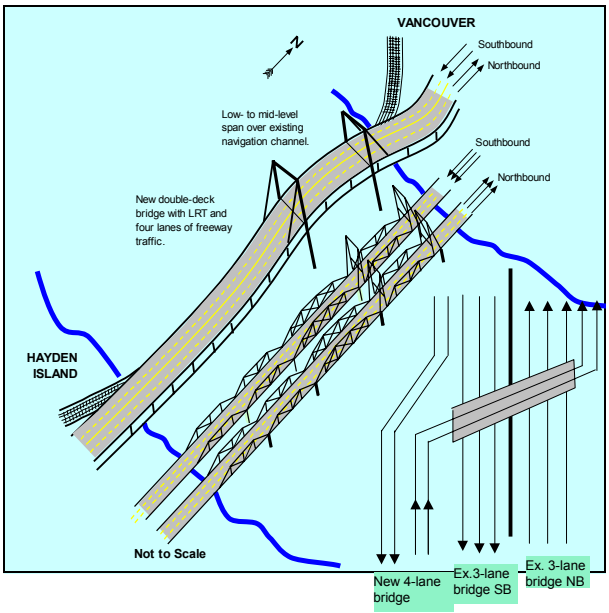
3. Northbound traffic would be split between the two existing bridges



Concept 4:
10-lane double deck, replacement bridge, plus LRT on separate new bridge

1. Mid- to high-level bridges. Navigation channel relocated to center of river

2. Potential fixed spans for highway and LRT (with Coast Guard reduction of existing lift requirements), or lift spans

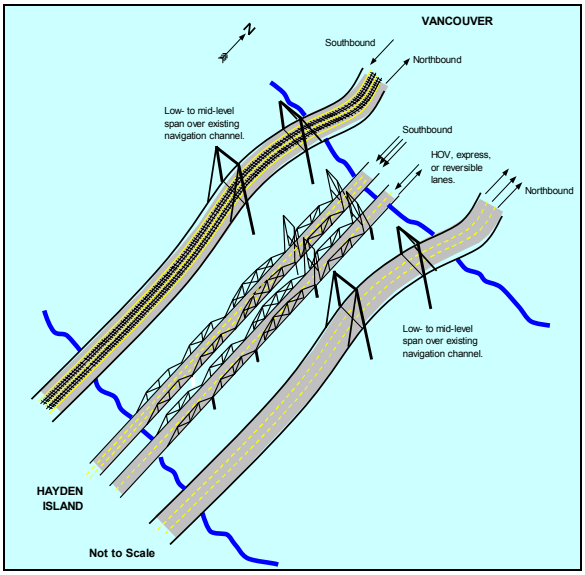


Concept 6:
4-lane supplemental collector-distributor bridge w/LRT, plus 6 lane freeway

1. Provides for new four-lane bridge with LRT west of the existing bridges

2. Low- to mid-level bridge with lift span over current navigation channel

3. Use four-lane bridge as collector-distributor (i.e., ramp access for Hayden Island, etc.). Requires fly-over ramps north and south, as shown in the schematic on the left



Concept 7:
8-lane freeway concept plus new LRT bridge with two-lane arterial

1. Provides for new four-lane bridge with LRT

2. Low- to mid-level bridges with lift spans over current navigation channel

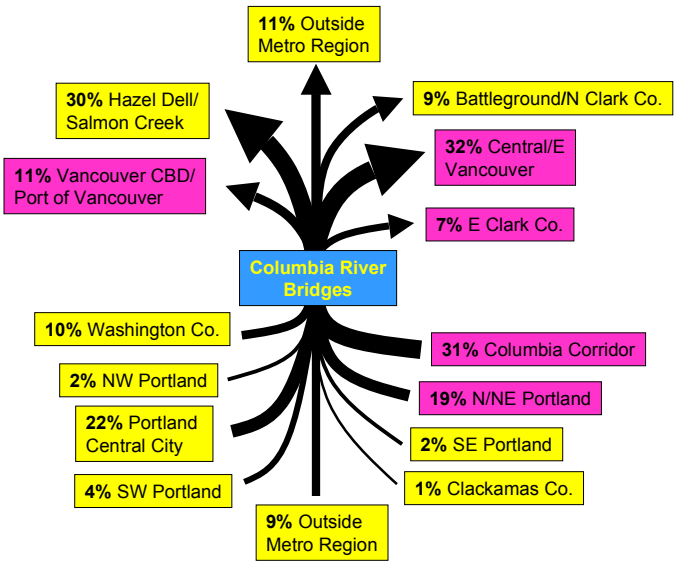
3. Two lanes on existing northbound bridge could be used for HOV, express lanes, or (potentially) reversible lanes

BIA Performance

Is Freeway Effectiveness Increased with Additional Capacity in the BIA?

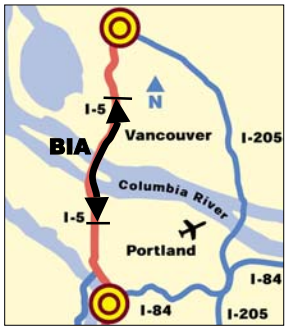
Origins and Destinations of Trips Crossing the Bridge

NB PM Peak (2020)

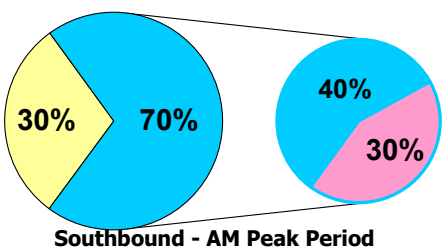


I-5 Columbia River Bridge Traffic

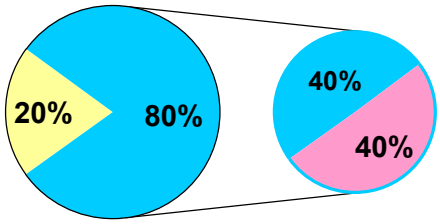
2020 Through Trips vs. Bridge Influence Area Trips



- Through Trips
- Enters or Exits I-5 Within the BIA
- Enters and Exits I-5 Within the BIA



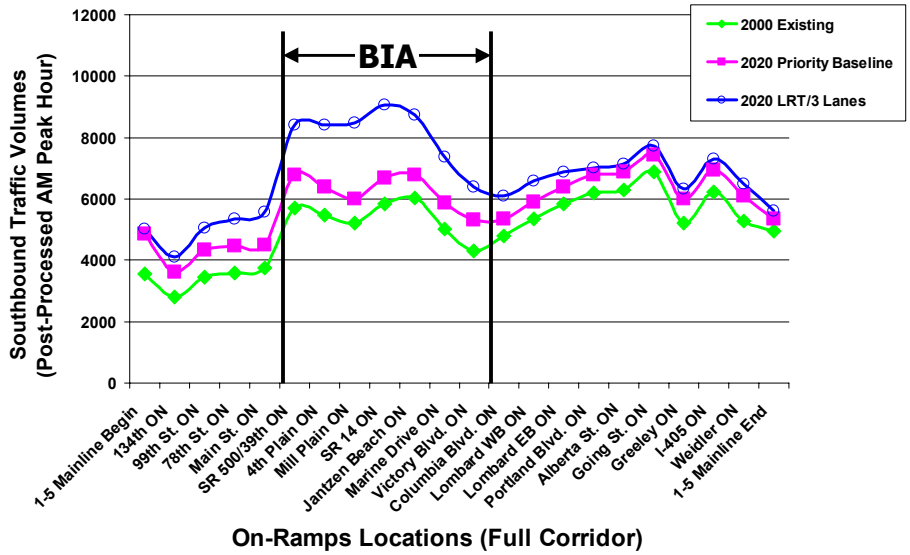
Southbound - AM Peak Period



Northbound - PM Peak Period

Southbound Travel Volumes

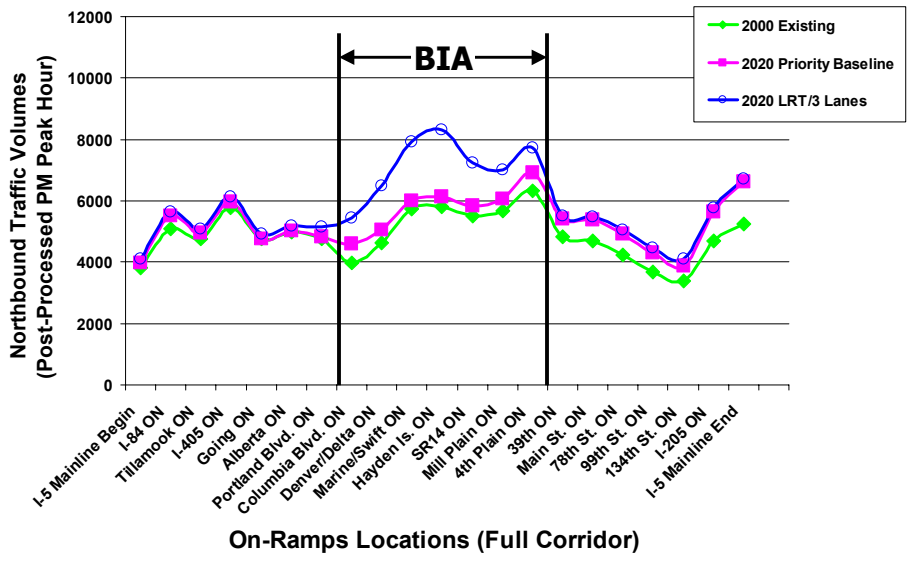
Along I-5 (AM Peak Hour)



On-Ramps Locations (Full Corridor)

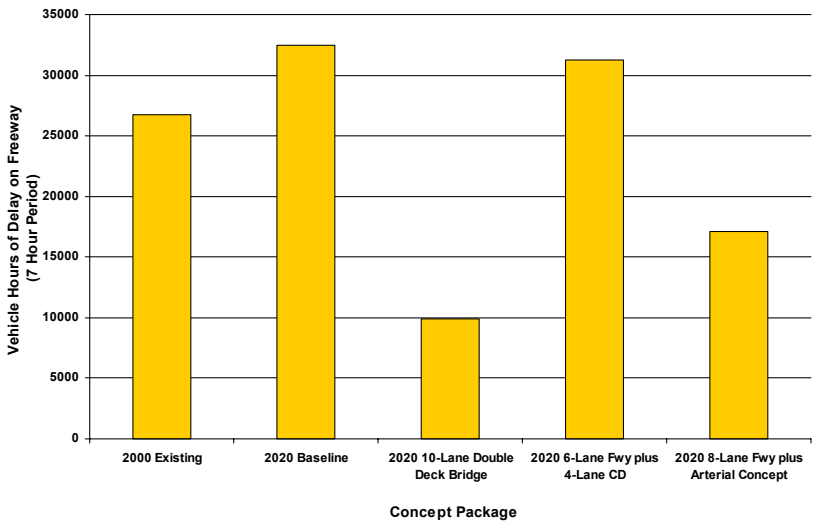
Northbound Travel Volumes

Along I-5 (PM Peak Hour)



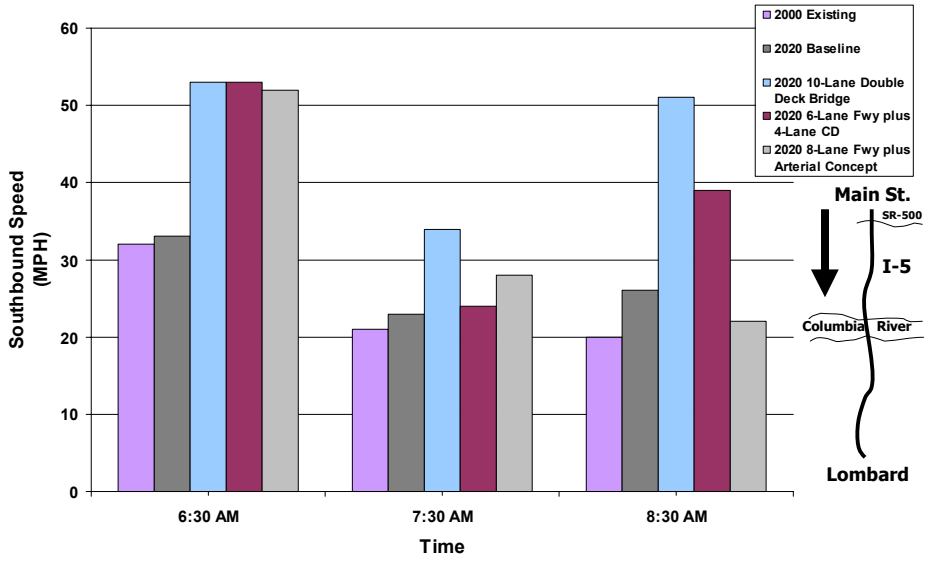
Vehicle Hours of Delay on I-5

(AM and PM Peak Periods)



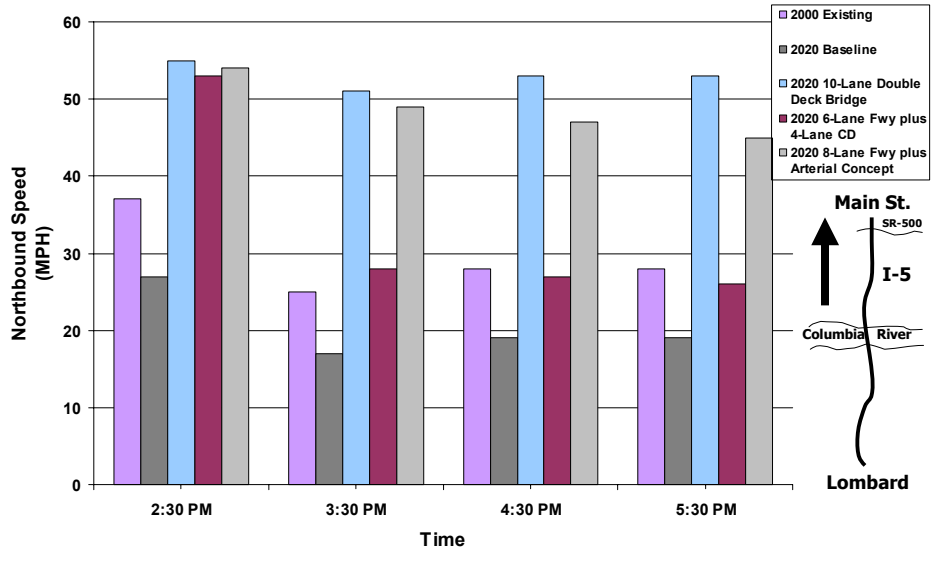
Average Speed

I-5 Southbound - Main St. to Lombard (All Traffic)



Average Speed

I-5 Northbound - Main St. to Lombard (All Traffic)



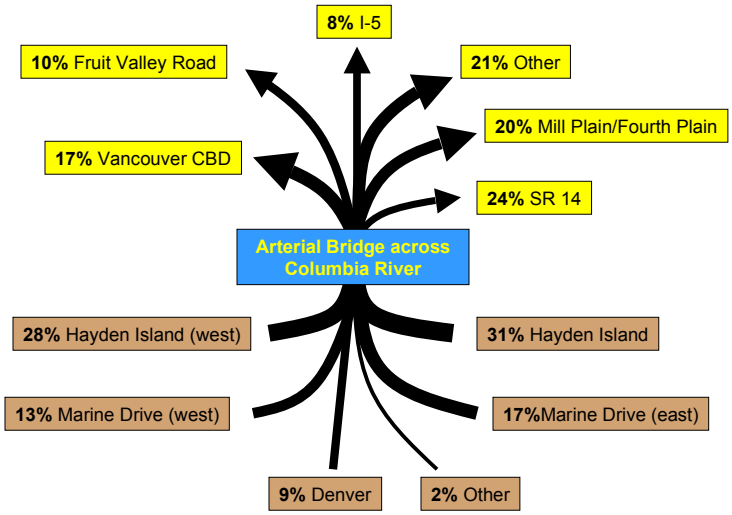
Performance of Concepts

- Overall, the concepts show a reduction in delay and an improvement in speeds compared Existing Conditions and Baseline 2020.
- Some important differences:
  - 10-lane replacement bridge performs the best
  - 8-lane plus arterial system also provides improvements, but has less flexibility for managing ramp and arterial traffic
  - The collector-distributor system performs worst -- design problems will be very difficult to overcome

How Will an Arterial Bridge Function, When Considered With Improved Freeway Capacity?

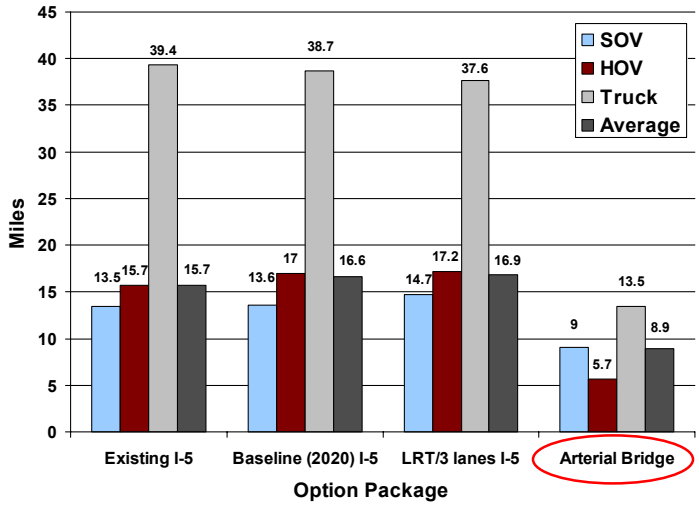
An Arterial Bridge Can Provide Transportation Benefits

Trip Patterns, NB Across Columbia River (PM Peak Period)



Most Trips Are Regional -- Not Local

Average Trip Length
Northbound Across Columbia River (PM Peak Hour)



Arterial Bridge Travel Demands

- Arterial bridge reduces peak direction volumes on I-5 bridge by 1,100 - 1,500 during peak hour
- The arterial bridge does not appear to act as a "bypass" to the I-5 bridge:
  - 10% of PM Arterial traffic from/to I-5
  - 24% of AM Arterial traffic from/to I-5

Arterial Bridge With Additional Freeway Capacity:

- Adding one additional freeway lane and one arterial lane in each direction appears to offer substantial transportation performance benefits
- The arterial connection, in conjunction with an additional freeway lane, can provide important transportation benefits -- it does remove local trips from the freeway, thus reducing the need for freeway level improvements
- Further study is needed of this option -- there may be trade-offs appears in more delay at interchange ramps and along arterials approaching I-5 with the freeway/arterial lane combination

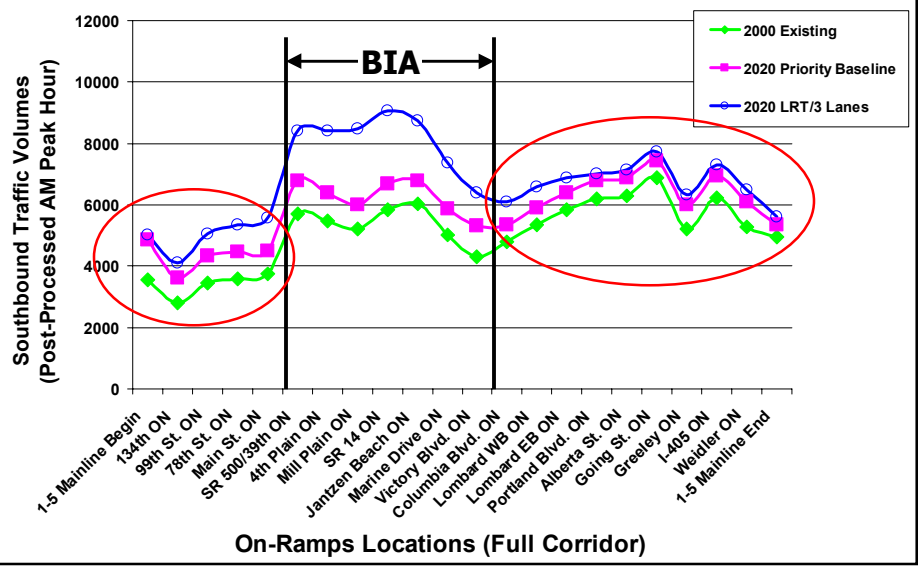
What about an Arterial-Only Bridge?

- A two lane arterial-only bridge (no increase in freeway lanes) will not address the problems on the freeway.
- The arterial-only connection would only slightly improve freeway performance by removing local trips.
- Users of the freeway system would continue to experience a significant increase in congestion and delay throughout the I-5 corridor.

Potential Traffic Impacts from Increased BIA Capacity

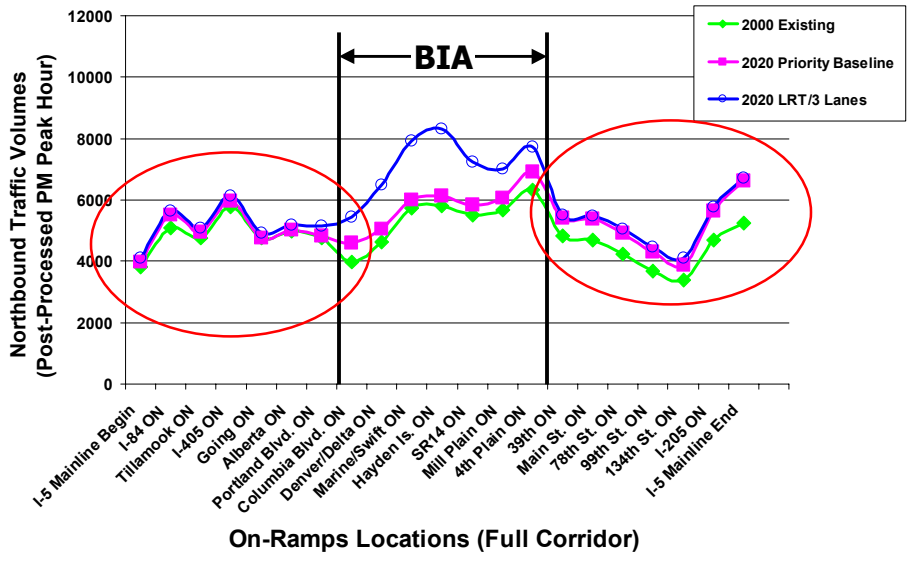
Southbound Travel Volumes

Along I-5 (AM Peak Hour)



Northbound Travel Volumes

Along I-5 (PM Peak Hour)



Changes in Travel Demand on Other Major Corridors

- BIA improvements are likely to result in minimal traffic increases on I-5 outside the Bridge Influence Area.
- In Portland, traffic will increase on arterials near the BIA (Denver, MLK, Columbia), but the effect of the capacity increase is dispersed as you travel away from the BIA.
- In Vancouver, BIA capacity increases will result in additional growth in traffic on SR 500 and SR 14 (beyond the background changes from 2000 to 2020).

Other Transportation Performance Issues

What about HOV?

- A corridor-wide HOV lane is a possibility with a new river crossing
- HOV utilization and performance is highly dependent on how it is designed
  - Direct access ramps should be considered at key locations (i.e., SR 500)
  - Bridge design affects HOV performance (a supplemental bridge splits freeway traffic, which limits HOV access)
- Further design work in an EIS is needed to ensure that it will operate well and have good utilization

How is Safety Addressed?

- All concepts reduces merging and weaving -- traffic safety concerns result from the high number of closely spaced entrances and exits
- None of the concepts encroach on the restricted air space for the Pearson Air Park.
- Bridge concepts that minimize number of crossings are more desirable for marine navigation
- Replacement bridge concept allows the shipping channel to move -- would virtually eliminate the need for barge operators to navigate a curved path between the bridges.
- All new bridges would be built to current standards and would have a higher probability of withstanding a major earthquake.

How will improvements help freight mobility and the economy?

- The BIA improvements will:
  - Reduce bottlenecks on the freeway and balance traffic flow
  - Improve key freight interchanges including Columbia Blvd., Marine Drive, and Mill Plain Blvd.
  - Increase reliability and predictability on I-5
  - Improve bi-state transit service

What about freight mobility and the economy? - Cont.

- The benefits for the economy and freight include:
  - Improved access to and from key industrial destinations such as Port of Vancouver, and Rivergate, Columbia Corridor
  - Improved access to and from key employment centers such as downtown Portland and downtown Vancouver, Columbia Corridor, Swan Island, Lloyd Center
  - Improved travel times and reduced congestion on I-5
  - Increased reliability and predictability in transit service
- The benefits of BIA improvements help to create a positive business climate and helps make the region an attractive place to locate and expand business.

What are the Potential Costs and Impacts?

Estimated Costs

Concept	BIA Estimated Costs $2001 dollars - in millions*				
	LRT	Arterial	Freeway	Capital Maintenance And Seismic	Total
Ten- lane Freeway Concepts					
5-lane southbound supplemental bridge for freeway traffic w/LRT, lift Bridge	$82	$0	$969	$150**	$1,200
10-lane double deck, replacement bridge, plus LRT on separate new bridge – No lift	$186	$0	$989	$0	$1,175
Eight freeway lanes plus two-lane arterial					
8-lane freeway concept, plus new LRT bridge with two-lane arterial, lift bridges	$82	$137	$793	$150**	$1161

* Costs of potential improvements from SR 500 to Columbia Blvd, plus the Delta Park to Lombard widening. ** Estimated Costs for continued use of existing bridges.

Cost Findings

- Potential highway and transit costs in the BIA are all in the range of $1.2 billion (in 2001 dollars). This estimate includes major maintenance and seismic retrofit costs for the existing bridges.
- There is not a significant enough cost differential to eliminate any of the options based on cost alone. A full exploration of life cycle costs of the existing bridges and seismic retrofit costs should be completed during the EIS.

Potential Property Impacts

	Concept #1: 5-lane southbound supplemental bridge for freeway traffic w/LRT		Concept #4: 10-lane double deck, replacement bridge, plus LRT on separate new bridge		Concept #6: 4-lane supplemental collector-distributor bridge w/LRT, plus 6 lane freeway		Concept #7: 8-lane freeway concept plus new LRT bridge with two-lane arterial	
	Resi-dential	Non-Resi-dential	Resi-dential	Non-Resi-dential	Resi-dential	Non-Resi-dential	Resi-dential	Non-Resi-dential
Displacements								
Vancouver	0	0	0	1	0	2	0	0
Portland	8	16	6	8	20	21	6	17
Total	*8*	*16*	*6*	*9*	*20*	*23*	*6*	*17*
Encroachments								
Vancouver	21	15	9	8	15	26	13	10
Portland	0	17	0	27	1	17	0	19
Total	*21*	*32*	*9*	*35*	*16*	*43*	*13*	*29*

Property Impacts

- Potential property impacts vary depending on the Concept.
- Potential impacts range between 15-43 displacements and 42-59 encroachments for the full bridge influence area (SR 500 to Columbia Blvd.).
- Generally, for all Concepts, the greatest number of potential displacements and encroachments would be to non-residential properties.

Property Impacts - Cont.

- Replacement bridge has the least number of likely property impacts -- structure follows near the existing bridge and freeway alignment.
- The majority of impacts would occur in Portland where improvements cross Hayden Island.
- Additional survey, engineering and design work in the EIS process is needed to determine actual number and extent of the displacements and encroachments.

Fish Habitat

- All concepts have the potential for impacts to fish habitat associated with Columbia River, North Portland Harbor and Columbia Slough crossings
- Concept 4, the replacement bridge has the most crossings, while Concept 1 has the fewest.
- Impacts are dependent on the number bridges and their type, size and location
- Impacts will need detailed evaluation in an EIS and ultimately will need mitigation

Wetlands and Parks

- Potential impacts to the radio tower wetland and Delta Park
- All concepts, except concept 1, have encroachments onto Delta Park (60-120 feet depending on concept)
- All concepts, except concept 4, have encroachments onto the radio tower wetlands site (100-240 feet depending on concept)
- Impacts will depend on the design of improvements and will need detailed evaluation in an EIS

Historical

- All concepts have encroachments onto the Ft. Vancouver Historical Site (60-120 feet depending on concept).
  - An encroachment over 60' would impact the FHWA building, however no historic buildings would be impacted
- Concept 4, a replacement bridge, would involve a full impact to the Columbia River Bridge. Supplemental bridges would also impact the Columbia River Bridge, but to a lesser degree.
  - The existing northbound bridge is listed on the National Register of Historic Places and the southbound bridge is eligible for listing.

Key Resources - EIS Work

- Actual impacts to natural, cultural and historic resources will need to be determined in an EIS process. Mitigation may be required for some impacts.
- If a park, historic or cultural resource is impacted, federal regulations require a determination in the EIS process that there is no feasible or prudent alternative. While this standard is quite high, it is balanced with the overall needs of the community.

Implementation Issues

Promising Options

- Concepts with 10 freeway lanes, and concepts with 8 freeway plus arterial lanes, appear promising and should both continue into an EIS for further detailed study to specifically identify:
  - Optimal amount of capacity
  - Optimal balance of freeway and arterial lanes
  - Specific impacts and costs

Concepts that Don't Address Problem

- Collector-distributor bridge systems have design problems and therefore provide little transportation benefit; such design problems will be difficult to overcome.
- An arterial only bridge

Supplemental vs. Replacement Bridges

- Further study is needed to determine whether new bridge should be a replacement or supplemental.
- Several factors will influence decision:
  - optimizing traffic operations (replacement is easier)
  - costs
  - right of way impacts (replacement appears to have fewer impacts)
  - impacts to cultural and historic resources (both supplemental and replacement bridges have trade-offs)

Joint Use (Hwy/Light Rail) Bridge

- A joint use (hwy/lrt) bridge could be cost effective, but there are other important factors to consider:
  - right of way impacts
  - construction staging
  - optimal alignment for LRT and hwy, and
  - light rail station siting

Joint Use vs. Separate Bridges

- If subsequent studies indicate that the two modes can and should be considered separately, there are potential timesaving for LRT, which may be implemented in a shorter time period given that substantial environmental and design work has already been completed in the South/North EIS.

Use of Existing Bridge for LRT

- Some River Crossing concepts include the conversion of one of the existing freeway bridges for LRT use.
- While that is technically feasible, the cost of retrofitting the bridges to include the modified decking, electric systems, cathodic protection, and other conversion costs would be significant.
- If upgrading the bridge to meet current seismic standards is required, the retrofit costs could easily exceed the costs of a new LRT bridge.
- Further study of this concept would require a detailed investigation of the retrofit costs, and a comparison of those costs to a new bridge.

Bottom Line Findings

- Concepts with 10 freeway lanes, and concepts with 8 freeway plus arterial lanes, appear promising.
- Trade-offs need to be evaluated in future studies, including the balance of traffic on the freeway vs. local streets
- Draft recommendations for the BIA and the river crossing support the Task Force's Problem, Vision and Values statement.