

The Alaskan Way Viaduct & Seawall Replacement Program



**Central Waterfront**

**Admiral Neighborhood Association**  
**Feb. 10, 2009**

Matt Preedy

- Thank you for inviting us to speak with your group today and provide some of the details about how we're going to replace the Alaskan Way Viaduct.

## Central Waterfront

# Bored Tunnel Hybrid Alternative

On Jan. 13, 2009, Governor Gregoire, King County Executive Sims and Mayor Nickels announced that the bored tunnel hybrid alternative was their preferred solution to replace the central waterfront portion of the viaduct.

Matt Preedy

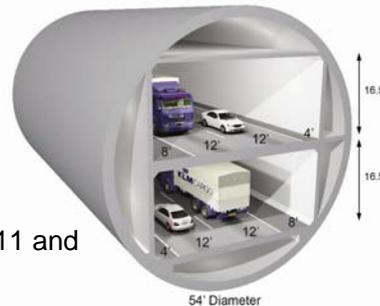
Broad agreement means we can move full speed ahead to replace the viaduct.

- A majority of the people and interest groups we heard from agreed that this option was the right choice and met the most objectives. That input plus the agreement of the three executives means we can move ahead quickly to build the bored tunnel and take down the viaduct before Mother Nature does it for us.
- It's a different approach that addresses much of the past opposition to the cut-and-cover tunnel. It moves the tunnel away from the central waterfront avoiding lengthy construction disruptions and invests in other modes of travel reducing the number of lanes on SR 99.
- Single bored tunnel under First Ave., two-lanes in each direction.
- Southern portal near Qwest and Safeco Fields, connecting to Aurora Ave. north of the Battery Street Tunnel.
- Replacement of Seattle's seawall from Colman Dock to Pine St.
- A new surface boulevard from S. Royal Brougham Way to Western Ave.
- Investments in Mercer and Spokane streets.
- Increased transit service to improve access to and through downtown Seattle.
- First Avenue street car is added.
- Improvements to I-5 are still necessary and there were a lot of good ideas that came out of the scenario review process. Those ideas are now being pursued under a separate project.

## Bored Tunnel Hybrid Alternative

### SR 99 Tunnel:

- 54' diameter, single bore tunnel.
- Two lanes of traffic in each direction.
- Approximately 1.7 miles long.
- Between 30 and 200 feet underground.
- Construction is expected to begin in 2011 and be open to drivers in 2015.

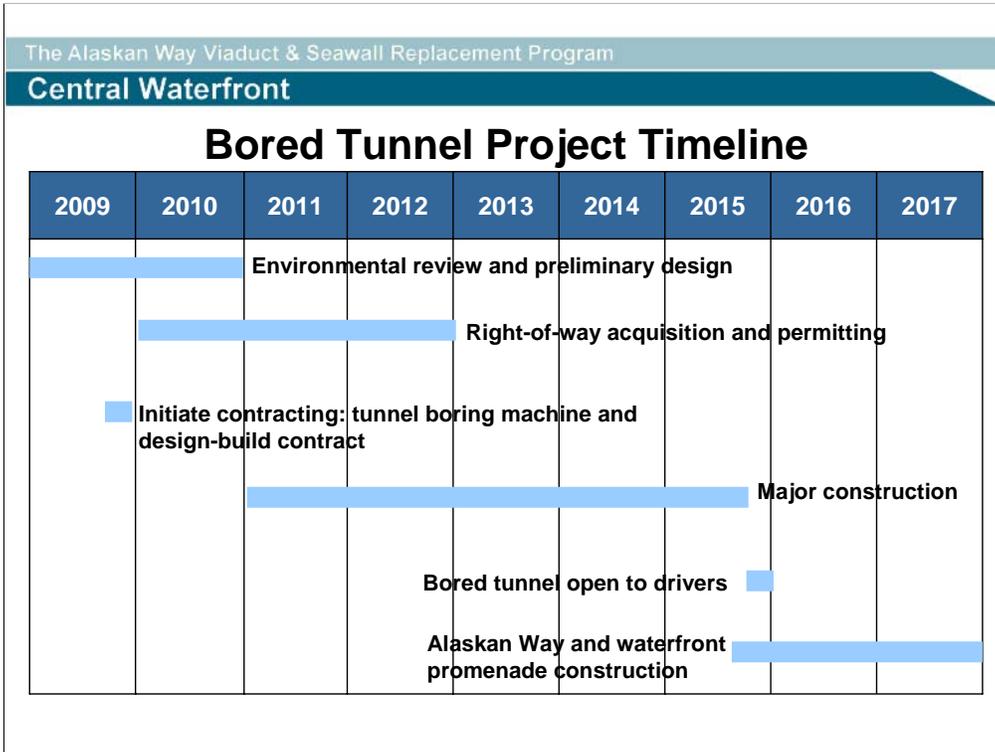


### Alaskan Way surface street:

- Four-lane roadway with two lanes in each direction.
- Carries approximately 25,000 vehicles per day.

### Matt Preedy

- The bored tunnel will be approximately 1.7 miles long . It will carry approximately 85,000 vehicles through downtown Seattle.
- We expect to begin construction in 2011 and open the tunnel to drivers in 2015.
- Alaskan Way will carry 25,000 vehicles each day -- some of the increase will be from the traffic that currently gets on the viaduct using the ramps at Elliott and Western avenues. Depending on their destinations – these trips will have two choices in the future: they can use Alaskan Way on the waterfront to get through downtown Seattle or they can enter the tunnel north of Denny Way.
- I am sure many of you have heard from drivers that use these ramps today and are unhappy about the change in their driving route, which will take longer than today. In addition to drivers, it also affects companies that transfer freight and fishing supplies (including hazardous oil) between the SODO and Port industrial areas and the Interbay industrial area.
- We will be setting up a regular working group with freight interests and other representatives from the NW Seattle neighborhoods to work through these issues and identify the best strategies for addressing those impacts.



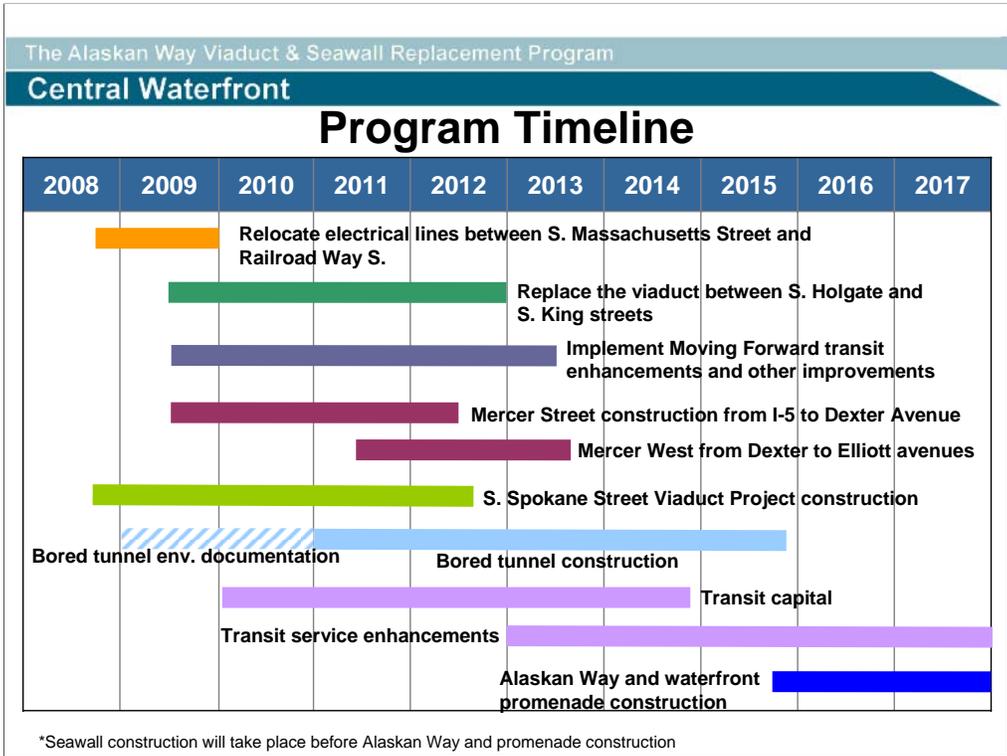
Matt Preedy

- For the bored tunnel, we will complete the environmental review and preliminary design by the end of 2010.
- Major construction will begin in 2011 and we will be able to open the bored tunnel to drivers in 2015.



Eric Tweit

- The bored tunnel alternative is made up of more than just the bored tunnel.
- It includes a new Alaskan Way along the waterfront, as well as a pedestrian promenade. It also includes improvements to several city streets including Mercer and Spokane streets, and increased transit service.
- I want to take a few minutes to talk about the other pieces of this alternative.

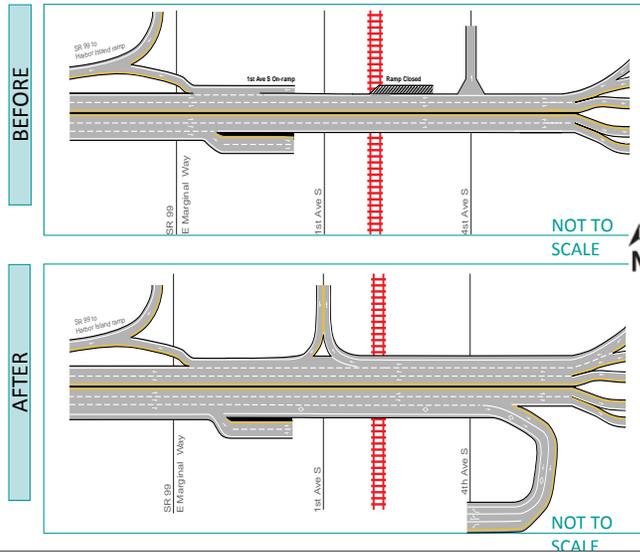


Eric Tweit

- Construction will start this year on the south mile of the viaduct, and transit and city street investments to keep people and goods moving during the work.
- The Mercer Street and Spokane Street projects will be completed in 2012.

## Spokane Street Project

- Provides critical connections between the Port, West Seattle, I-5, I-90 and SR 99.
- Improves westbound traffic flow and safety.
- Minimizes conflicts between freight, rail, commuters and ferry traffic.



Eric Tweit

- The Spokane Street Project will provide new connections between West Seattle and downtown.

The Alaskan Way Viaduct & Seawall Replacement Program					
Central Waterfront					
Fiscal Responsibility					
	Proposed Project Implementation Responsibility				Costs
	State	King County MVET	City of Seattle	Port of Seattle ***	
Moving Forward and Prior Expenditures	\$600 million			\$300 million	\$900 million*
SR 99 Bored Tunnel	\$1.9 billion**				\$1.9 billion
Alaskan Way Surface Street and Promenade	\$290 million		\$100 million		\$390 million
Central Seawall			\$255 million		\$255 million
Utility Relocation			\$250 million		\$250 million
City Streets and Transit Pathways		\$25 million	\$190 million		\$215 million
Transit Infrastructure and Services		\$115 million	\$135 million		\$250 million
Construction Transit Service	\$30 million	\$50 million			\$80 million
<b>Total</b>	<b>\$2.82 billion</b>	<b>\$190 million</b>	<b>\$930 million</b>	<b>\$300 million</b>	<b>\$4.24 billion</b>
Transit Operations Annual Cost		\$15 million			\$15 million

\*Reflects cost savings from Moving Forward program realized by not repairing the viaduct from Lenora to Battery Street Tunnel and not completing the second phase of fire and life safety upgrades to the Battery Street Tunnel.  
\*\*Reflects the most likely cost based on a conceptual design. The potential cost range is between \$1.2 billion and \$2.2 billion.  
\*\*\*Agreement in concept for up to \$300 million subject to Port of Seattle Commission review and approval.

Eric Tweit

The plan makes financial sense and will support a strong economy.

- The state, county, and city have all agreed to be part of making this solution a reality by working with their legislative bodies to fund portions of the project. The Port of Seattle has also committed to work toward funding a portion of the project.
- State - \$2.82 billion
  - Transportation Partnership Program
  - Nickel Gas Tax
  - Federal Sources (\$200 m)
- King County - \$190 million
  - Motor vehicle excise tax requires legislative authorization
  - Federal economic recovery funds (\$8 m)
  - Federal grants (\$10 m)
- City of Seattle - \$957 million
  - Parking tax (\$200 m)
  - LIFT and /or LID (\$300 m)
  - Transportation benefit district (\$65 m)
  - Utilities (\$252 m)
  - Transportation improvement board (\$5 m)
  - Federal grants (\$55 m)
  - Federal economic recovery funds (\$80 m)

## Motor Vehicle Excise Tax (MVET)

### What is it?

- Tax based on value of vehicle paid at the time of registration.
- Need Washington State legislative authority to impose MVET.
- Asking for a 1% MVET on all vehicles in King County (medium and heavy duty trucks exempt)

### What can the 1% King County MVET do?

- Estimated annual yield of \$120 million to \$145 million.
- Approximately \$100/vehicle.
- Revenues will be used to:
  - Fund transit service associated with the project.
  - Fill the Metro sales tax shortfall.
  - Expand Metro's transit system.
- Provides stable revenue source to sustain ongoing transit service

### Matt Preedy

- To help pay for the King County portion of the bored tunnel hybrid, we are proposing a 1% MVET for all motor vehicles in King County, medium to heavy duty trucks are exempt.
- We will need legislative authority to charge this tax through King County Council action.
- We estimate that this authority would generate \$120 million and \$145 million in funding each year, costing the average vehicle owner \$100.
- Funding will be used to fund the transit service as part of the bored tunnel recommendation, fill the county's current sales tax shortfall, and expand Metro's transit service throughout the county.

## **Next Steps**

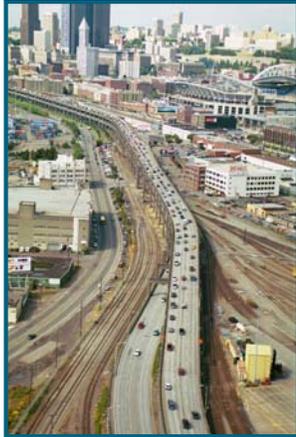
- Coordinate with freight community to ensure viable freight routes and connections.
- Get legislative approval for necessary funding.
- Work with the City, County and Port to coordinate project implementation.
- Complete environmental review process.
- Develop additional preliminary engineering and soils exploration.
- Meet with community groups and businesses to finalize design.

Matt Preedy

We have a lot to do over the next several months, including:

- Coordinate with freight community to ensure viable freight routes and connections.
- Get legislative approval for necessary funding.
- Work with the City, County and Port to coordinate project implementation.
- Complete environmental review process.
- Develop additional preliminary engineering and soils exploration.
- Meet with community groups and businesses to finalize design.

## **Alaskan Way Viaduct and Seawall Replacement Program**

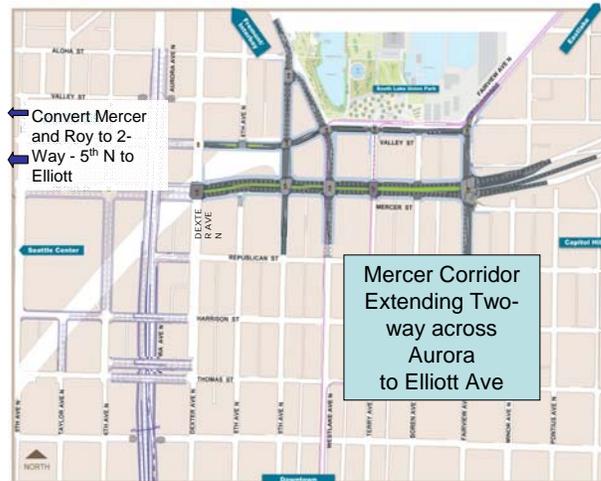


**Follow our progress: [www.alaskanwayviaduct.org](http://www.alaskanwayviaduct.org)**

Back Pocket

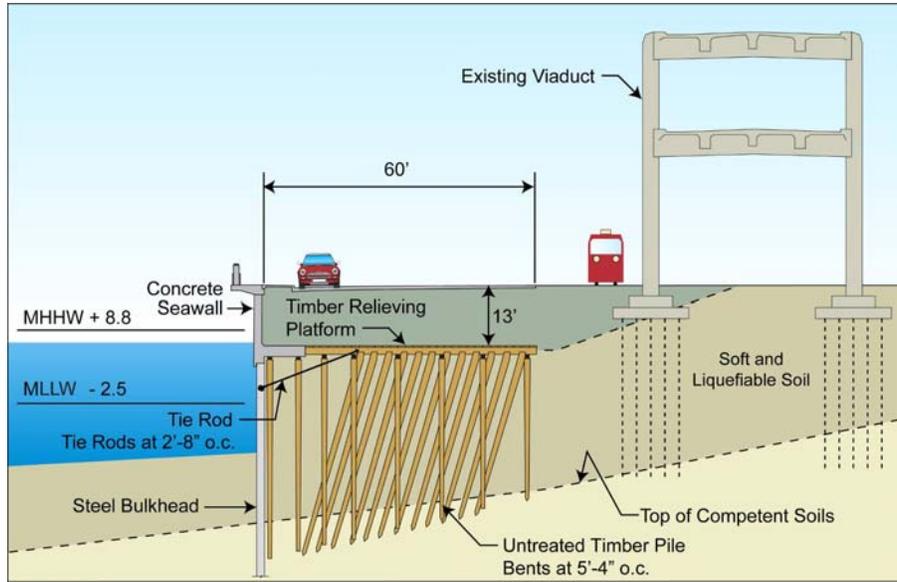
## Mercer Corridor Project

- Creates enhanced east-west connections.
- Improves connections from Ballard/Magnolia/Interbay to I-5 and the bored tunnel.
- Removes barriers, such as turn restrictions, and makes it easier to get around by car, truck, foot or bike.
- Enhanced connections between high density neighborhoods as well as the Seattle Center.



Central Waterfront

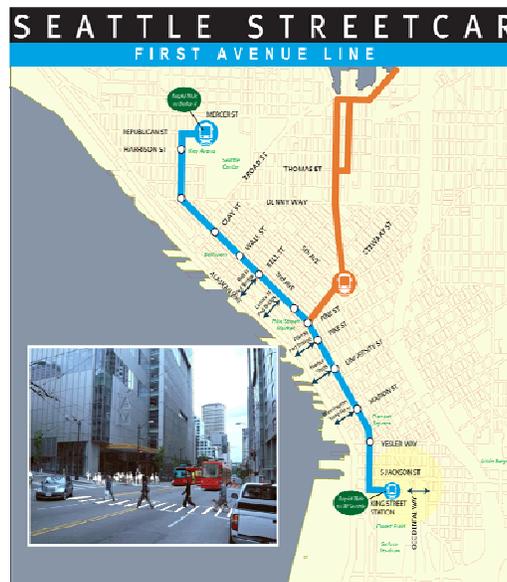
# Replacing the Seawall (Washington to Pine)



## Central Waterfront

# First Avenue Streetcar

- Connects to the First Hill Streetcar.
- Connects to Ballard and West Seattle RapidRide lines.
- Connects to Amtrak, Commuter Rail and Light Rail at King Street Station.
- Provides easy access to Colman Dock.
- Connects major activity centers: Seattle Center, Pike Place Market and the stadium area.



- Connects to the existing South Lake Union Streetcar and the Sound Transit-funded First Hill Streetcar
- Connects to King County Metro's RapidRide bus rapid transit lines to Ballard and West Seattle
- Connects to Amtrak, Commuter Rail and Light Rail at King Street Station
- Easy access to Washington State Ferries
- Connects major activity centers including Seattle Center, Pike Place Market and Seahawks/Mariners stadium area.
- Expected to carry 4 million riders per year, comparable to Portland Streetcar and San Francisco Embarcadero Line.
- \$135 M, including 8-vehicle fleet capable of providing service every 6 minutes.

## Transit Investments

Transit is critical to the success of the Bored Tunnel Hybrid.

- Systems approach
- Enhanced service to accommodate demand
- Access to downtown
- Construction mitigation
- Environment



Transit is critical to the success of the Bored Tunnel solution

### Systems approach

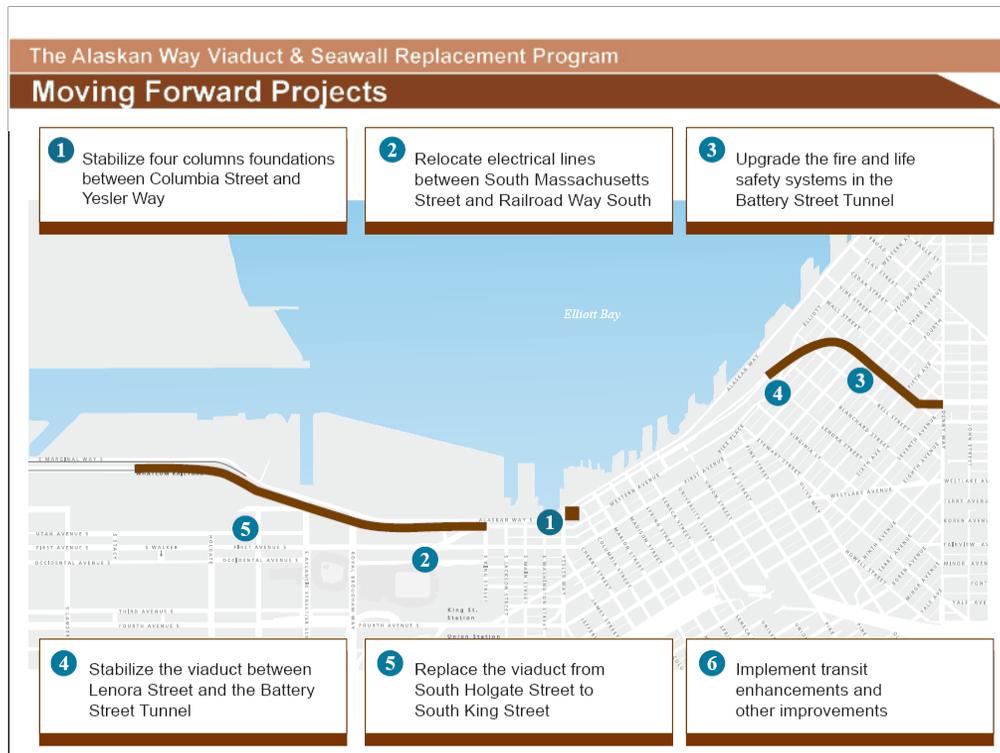
State Route 99 is part of the whole transportation system that encompasses, highways, surface streets, transit and other tools that move people and goods through the Puget Sound region. The state, county and city executives agreed that a solution to replace the AWV should consider this entire system, and should look at how we might use I-5, transit, surface streets, and policy and management tools to provide mobility rather than simply rebuilding all the capacity wholly in the SR-99 corridor. Additionally, public and stakeholder input for the Viaduct replacement identified transit as a vital element.

### Enhanced service to accommodate demand

Expanded transit will be needed to accommodate increases in travel demand that will come with the expected growth in the region. Buses are projected to provide between 34 and 39 percent of all morning peak period trips to downtown. Without improved transit, many of these trips will be taken by other means such as private vehicle.

### Access to downtown

The bored tunnel will provide a through route for traffic to bypass downtown Seattle. With this alternative, SR 99 will no longer have



- The agreement to move forward on the north and south end improvements means we will be taking a significant step forward to reduce the risk to public safety posed by the viaduct.
- However, we still have an important decision to make on the central waterfront section of the viaduct as well as the seawall. We will talk more about this in a few minutes.
- The improvements will cost approximately \$900 million. The money was included in the budget passed by the Legislature and signed by the Governor.
- All of these improvements will be designed and constructed to work with any potential solution on the central waterfront - be it below ground, surface, or above ground.
- We are working to deliver these projects on time and on budget.

## Guiding Principles

The three executives agreed that any solution for the Alaskan Way Viaduct needed to be grounded in a commitment and integration across six guiding principles:

- Improve public safety.
- Provide efficient movement of people and goods now and in the future.
- Maintain or improve downtown Seattle, regional, the port and state economies.
- Enhance Seattle's waterfront, downtown and adjacent neighborhoods as a place for people.
- Create solutions that are fiscally responsible.
- Improve the health of the environment.

- In 2007 the three executives agreed to six guiding principles – on the screen you see a summary of these principles.
- These principles guided the development of eight scenarios, the agency's recommendation to focus on two hybrid alternatives, and were used by the executives in making their final recommendation. The public, a stakeholder group and executive oversight committee also provided input on these principles before they were finalized.
- While all the principles were important, there were five that stood out in the public comments – improving public safety, being fiscally responsible, providing mobility and capacity, minimizing disruptions to businesses during construction, and creating a great waterfront.

## Decision-Making Process

Along the way, three groups met regularly to review technical analysis and weigh-in on the options considered for replacing the central waterfront. Those groups were:

- Stakeholder Advisory Committee
- Interagency Working Group
- Executive Oversight Committee

### Stakeholder Advisory Committee

- 29 individuals representing communities, economic interests and cause-driven organizations.
- Met 16 times over a 13-month period to review and provide comment to program staff.

### Interagency Working Group

- 14 agencies reviewed and provided input on the technical details of waterfront replacement options.

### Project Oversight Committee:

- Included the Governor, King County Executive, Mayor, State Senate Transportation Chair, State House Transportation Chair, King County Council Transportation Chair and Seattle City Council Transportation Chair.
- Reviewed options and analysis throughout the 13-month period.

## Improve Public Safety

The bored tunnel alternative keeps the public safe by:

- Improving lane and shoulder widths.
- Installing modern fire protection safety equipment, including emergency exits.

Tunnels perform better in earthquakes than bridges.

- Structural engineers agree that tunnels are one of the safest places to be during an earthquake because a tunnel moves with the earth.

- The bored tunnel will be designed to safely accommodate all vehicles, including freight, and will meet today's national safety standards with ventilation systems, emergency access, and wider lanes and shoulders than are on the viaduct today and can accommodate disabled vehicles. As with the Battery Street Tunnel, vehicles carrying flammable materials will not be allowed in the bored tunnel.
- There have also been concerns expressed about whether a tunnel is a safe place to be in an earthquake. Structural engineers will tell you that tunnels are one of the safest places to be in an earthquake – the BART tunnel under San Francisco Bay in the late 1980s was re-opened hours after the earthquake and after safety inspections were conducted.
- Drivers in the Puget Sound region are also use to driving in tunnels – there are tunnels on I-90 in Seattle and Mercer Island; the Battery Street Tunnel is on the north end of the viaduct today; and riders will traveling under Beacon Hill in a bored tunnel later this year when LINK light rail opens.

## Central Waterfront

### **Efficient Movement of People and Goods**

- The tunnel will carry 85,000 vehicles through downtown Seattle each day at year of opening (with room to grow). Surface Alaskan Way will carry about 25,000 vehicles per day.
  - Viaduct carries approximately 110,000 vehicles each day.
- Maintains today's travel times for trips through downtown.
- Accommodates in-city trips through new investments in local streets and transit.
  - New bus service will carry approximately 17,000 additional daily riders, primarily serving northwest and southwest Seattle.
- Improvements to I-5 further expand north-south vehicle capacity and provide improvements in travel times.

- The bored tunnel will carry 85,000 vehicles each day through downtown Seattle in 2015 when it opens, and has capacity to accommodate more as the region grows. It also maintains today's travel times for through trips. This will keep vehicles off the downtown street system, creating a better environment for bikes, walkers, and transit.
- In addition, the other investments made in city streets and transit will carry approximately 17,000 additional daily riders, primarily serving the west Seattle neighborhoods, like Ballard and West Seattle, that rely on the viaduct to get to or through downtown today.

## Central Waterfront

### Support a Strong State and Regional Economy

The bored tunnel alternative:

- Maintains capacity in the SR 99 corridor.
- Preserves I-5 for state and regional through trips.
- Provides room for freight and port traffic to grow.
- Minimal impacts to waterfront businesses and the local community.
- Maintains and creates 10,000 jobs each year over the course of the project.



- Since the project began and even more so during these difficult economic times we have heard many questions about disruptions during construction. Many supporters of this option like the fact that it give us the opportunity to keep traffic on the viaduct during construction and moves construction under downtown Seattle. It also minimizes construction impacts on waterfront businesses, which was a significant concern about the proposed cut-and-cover tunnel.
- A construction project of this size will also create jobs – we estimate that 10,000 jobs will be supported by this project each year.
- It also preserves I-5 as a through route for the region and state and ensures future investments accommodate expected growth.

## Central Waterfront

# Enhance Seattle's Waterfront, Downtown and Adjacent Neighborhoods

The bored tunnel alternative:

- Moves SR 99 underground and eliminates noise, shadowing and view blockage from the existing viaduct.
- Reconnects downtown with the natural environment in Elliott Bay.
- Creates a memorable place for people to live, work and play.



- The bored tunnel also creates a world-class waterfront and helps ensure Seattle is a 21st Century city.
- A 21st Century city needs to send the right message to the world to attract visitors and investments. Removing the viaduct will re-connect the city with its waterfront and create a world-class destination. This will make our economy stronger and leave a legacy we can take pride in.
- The waterfront will also be better for people and the natural environment. The plan builds a new promenade for people to play and work without the noise, shadows, and dust from the viaduct. It also eliminates many of the 110,000 vehicles from the water's edge that contribute to air and stormwater pollution.

## Central Waterfront

### Improve the Health of the Environment

The bored tunnel alternative:

- Creates a new system to improve and handle storm water runoff.
- Creates new transit, bike and pedestrian connections.
- Adds one million hours of new transit service.



- And finally, the bored tunnel will help us improve the natural environment by removing the viaduct from the waterfront. This will allow us to better treat the stormwater run-off from the highway.
- It will also encourage people to get out of their cars and find new ways to move around downtown – whether it is by foot, bike, or on transit.

**Central Waterfront**

**How is the bored tunnel different from the cut-and-cover tunnel?**

<b>Bored Tunnel Hybrid Alternative</b>	<b>Previous Cut-and-Cover Tunnel Alternative</b>
<ul style="list-style-type: none"> <li>• Stacked with two lanes in each direction.</li> <li>• Constructed under First Avenue.</li> <li>• Top of tunnel is 30 to 200 feet below the surface.</li> <li>• Viaduct can stay open to traffic while the tunnel is being built.</li> <li>• Construction is estimated to take 4.5 years.</li> <li>• Limits impacts to waterfront businesses.</li> </ul>	<ul style="list-style-type: none"> <li>• Stacked with three lanes in each direction.</li> <li>• Constructed along the waterfront.</li> <li>• Top of tunnel is 10 feet below the surface.</li> <li>• Viaduct would have been closed for 3.5 years under the “short” construction plan.</li> <li>• Construction was estimated to take 7 years under the “short” construction plan.</li> <li>• Would cause major impacts to waterfront businesses.</li> </ul>

- It is easy to compare this tunnel with the cut-and-cover tunnel previously considered on the central waterfront – they are very different in fact.
- This bored tunnel moves the major construction area away from the central waterfront and loose fill to dense hard soil under downtown. It also gives us the opportunity to keep the viaduct open during construction to minimize impacts to the traveling public and business due to longer trips. The overall construction period is also shorter.
- And very importantly, it moves the major construction zone away from the waterfront, which limits the impacts on waterfront businesses. There will still be impacts during construction on the waterfront with the demolition of the viaduct, construction of a new surface street, and replacement of a seawall. However, it eliminates the need to dig a 60-foot deep trench outside their front doors.

## Alaskan Way Bored Tunnel vs. Boston's Big Dig

### More differences than similarities

#### Boston's Big Dig Central Artery/Tunnel

Substantially larger and more complex including:

1. Very disruptive cut-and-cover tunnel through the central city under the existing elevated roadway and 2 subway lines.
  2. A signature cable-stayed bridge over the Charles River, cut-and-cover through South Boston.
  3. Two sets of immersed tubes under the harbor to the airport and the complex interchange with very poor geotechnical conditions.
- Project was disruptive and required extensive traffic management and mitigation.
  - The initial project cost number did not include added scope, mitigation and environmental requirements, inflation and appropriate allowance for risk and escalation.
  - The Central Artery/Tunnel did not have a strong agency management or consistent leadership throughout the course of the project.
  - As a result, the project was delivered grossly over budget and years behind schedule.

	Bored Tunnel & South End Project	Big Dig Projects
Total Project Length	2.8 miles	8 miles
Number of tunnels*	1	3
Length of tunnels*	2 miles	5 miles
Total lane miles	12.8 miles	>161 miles

\*Boston Big Dig tunnels included cut-and-cover, immersed tubes, jacked tunnel and other special tunneling methods.

#### SR 99 Bored Tunnel

- Project will run 30-200 feet underground minimizing traffic disruption and impacts to the waterfront and downtown
- WSDOT uses the CEVP® process on all state projects over \$100M to ensure costs are complete, reasonable, defensible and appropriately represent risk and uncertainties.
- WSDOT is a strong owner in policy, management and technical capability and Governor Gregoire is project authority
- WSDOT will maintain this strength over the life of the project, assisted by eminent private-sector engineers and contractors
  - Accountable to the public, Governor and Legislature

- If you just consider the size and scale of the project you will see there are more differences than similarities.
- Our total project length, including the south mile of the viaduct which will begin construction this year, is 2.8 miles. The Big Dig was 8 miles long.
- We are proposing one tunnel. Three were built in Boston. This tunnel will be approximately 2 miles long; Boston's were 5 miles long.
- We have gone back and met with the program team and project owner to understand what worked and what didn't work on the Big Dig. We are then applying those lessons learned to this project and other WSDOT projects. One example is the CEVP process that we now use to estimate costs.

**Central Waterfront**

## **State and Local Funding Partnership**

### **State - \$2.82 billion**

- Transportation Partnership Program
- Nickel Gas Tax
- Federal sources (\$200 m)

### **King County - \$190 million**

- Motor Vehicle Excise Tax approved by council (\$172 m)
  - 1% requires legislative authorization
- Federal economic recovery funds (\$8 m)
- Federal grants (\$10 m)

- The funding on this slide is subject to federal, legislature, county council, city council and port commission actions and approvals.

**Central Waterfront**

**State and Local Funding Partnership (cont'd)**

**City of Seattle - \$957 million**

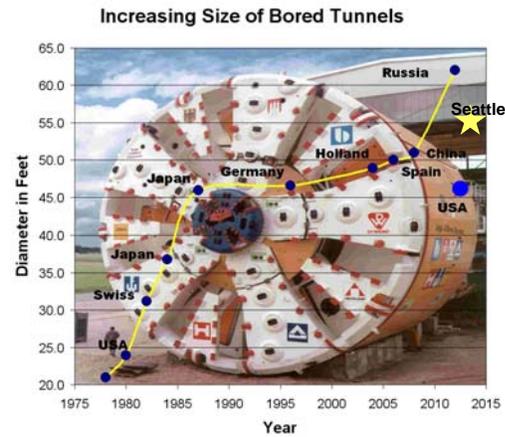
- Parking tax (\$200 m)
- LIFT and/or LID (\$300 m)
- Transportation benefit district (\$65 m)
- Utilities (\$252 m)
- Transportation Improvement Board (\$5 m)
- Federal grants (\$55 m)
- Federal economic recovery funds (\$80 m)

**Port of Seattle - \$300 million**

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## Tunneling Technology

- Tunneling technology is rapidly advancing, with tunnel boring machines as large as 62 feet in diameter on order.
- Successful tunnel boring machine projects:
  - Sound Transit Beacon Hill: 21 feet in diameter
  - Hamburg and Moscow: 46.6 feet in diameter
  - Madrid: 50 feet in diameter
  - Shanghai: 50.6 feet in diameter



## Tunneling in Seattle Soils

Numerous tunnel machines, including several in Seattle, have successfully excavated ground conditions similar to those anticipated. Over 150 tunnels have been constructed in Seattle since 1890, mostly in glacial soils.

Examples include:

- Sound Transit Beacon Hill:
  - Glacial sand, silt, clay and till up to 160-ft depth.
  - Soils were similar to the hard/dense soils along most of proposed alignment.
- Denny Way CSO:
  - Glacial sand, silt, clay and till up to 160-ft depth.
  - Soils were similar to hard/dense soils along most of proposed alignment.



## SR 99 Bored Tunnel Cost

**Risk-based estimating nationally recognized as a best practice for mega-projects**

**Cost  
(Millions)**

Construction Estimate (bored tunnel only)	\$944
Construction Management and Administration	\$118
Preliminary and Final Design	\$118
Contingency	\$150
Risk	\$268
Escalation (per Global Insight)	\$166
Right-of-Way Costs	\$149
<b>TOTAL</b>	<b>\$1,913</b>

# Successful Delivery of Bored Tunnel Projects

## Examples of Tunnel Excavation in Urban Areas

1. 4th Elbe River, Hamburg: Successfully excavated 1.6 miles at 46.6-ft-diameter.
2. Lefortovo Tunnel, Moscow: Rebuilt Elbe TBM successfully excavated 2 bores each 1.4 miles long at 46.6-ft-diameter. Same machine refurbished for another 2 tunnels in Moscow.
3. Madrid M30 EPB: Successfully excavated 2 bores each 1.3 miles long at 50-ft-diameter by 2 closed-face TBMs built by different manufacturers. M30 diameter was about 10 ft larger than previous TBMs (~50% greater face area).
4. Shanghai Yangtze River Mixshield: Successfully excavated 2 bores each 4.6 miles long at 50.6-ft-diameter. This TBM is the current record holder for diameter. Tunnel completed about a year ahead of original schedule.

## Pending Record Holder

Moscow Road/Rail Tunnel: A 62-ft-diameter Mixshield has been ordered. This diameter is 11-ft larger than Shanghai TBM, the current record holder.

Elbe Tunnel Slurry Machine



Madrid Calle M30



Seven tunnel boring machines will be used in the Madrid Calle 30 project