



**Washington State
Department of Transportation**

Application to the TIGER Discretionary Grants Program

Highway Project

**SR 520 Bridge Replacement and HOV Program
Medina to SR 202: Eastside Transit and HOV Project—
Enhancing safety and mobility for economic expansion**

Submitted to:

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A. Project Name

SR 520 Bridge Replacement and HOV Program Medina to SR 202: Eastside Transit and HOV Project

B. Contact Information

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C. Project Description

SR 520 Bridge Replacement and HOV Program

State Route 520 (SR 520) is one of two east-west highways crossing Lake Washington in the Seattle metropolitan area; Interstate 90 (I-90) is the other. Approximately 155,000 people cross the SR 520 Evergreen Point floating bridge every day, travelling in some 115,000 vehicles.

Built in 1963, the Evergreen Point Bridge and the Portage Bay Bridge are vulnerable to windstorms and earthquakes (Exhibit 1 and Exhibit 2). A collapse of these bridges or their approach

structures could cause serious injuries or loss of life, and could overwhelm all major regional highways with rerouted traffic.¹



Exhibit 2. Hollow columns support the floating bridge approaches, shown here damaged by a barge in 1999.

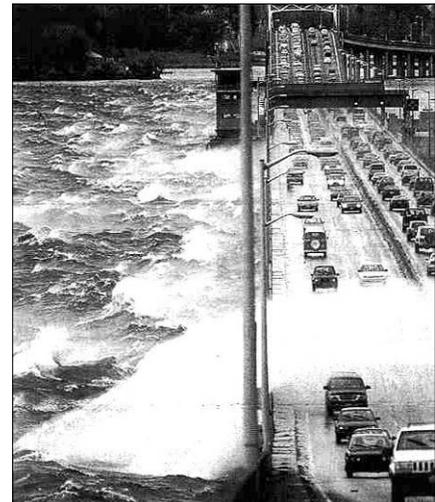


Exhibit 1. The Evergreen Point floating bridge under high winds.

SR 520 is also a crucial and often-congested corridor linking critical job centers that support approximately one half of the state's employment (Exhibit 3). The route is heavily congested during peak commute times – seven hours on an average weekday – with travel speeds less than 20 mph during these congested times. The corridor's incomplete high occupancy vehicle (HOV) lanes are a major gap in the region's 200+ mile HOV system. These improvements, consistent with local and regional land use and transportation plans, will serve to keep new growth, as it occurs, within the targeted urban growth areas.

¹ To view simulated visualizations of how the SR 520 bridge may fail in either an earthquake or a windstorm, visit:
Earthquake: <http://www.youtube.com/watch?v=qliuDUGvZpY>
Windstorm: <http://www.youtube.com/watch?v=qchD9ltCPG8>

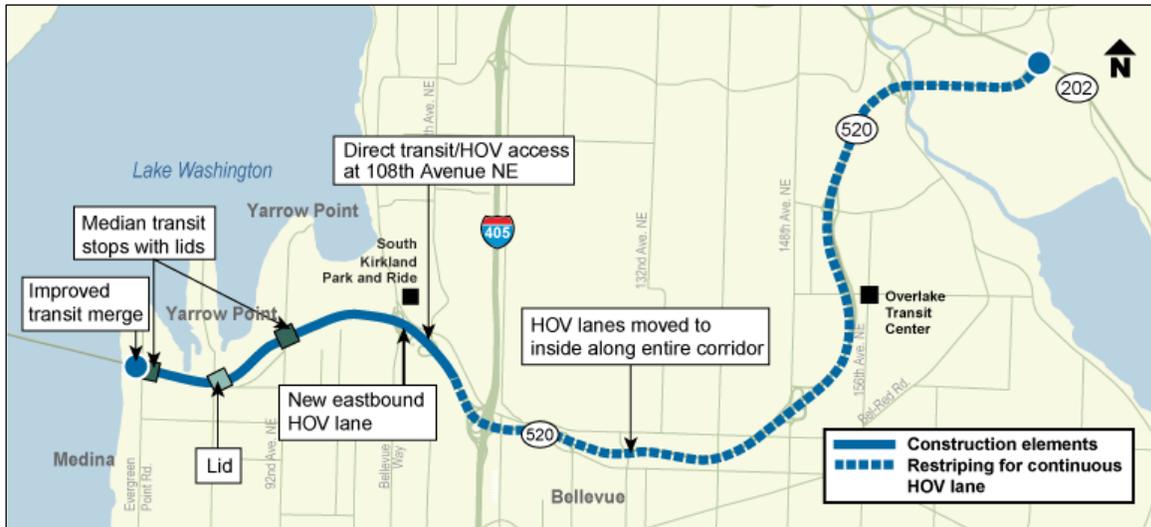
Exhibit 4. The Eastside Project is one of four projects that comprise the SR 520 Bridge Replacement and HOV Program. The Pontoon Construction Project will be conducted in Grays Harbor County, WA.



Medina to SR 202: Eastside Transit and HOV Project

This application is to fund the Medina to SR 202: Eastside Transit and HOV Project, the first shovel-ready highway portion of the program. The Eastside Project **will reduce travel times for transit and carpools** and **enhance travel time reliability, mobility, access, and safety** for all users of the SR 520 corridor east of Lake Washington (Exhibit 5). The project will **construct continuous HOV lanes** between Lake Washington and SR 202 in Redmond. The estimated project cost is \$776 million. With the \$300 million requested in this grant application, the project will be ready to advertise for design-build delivery within 45 days of award of the TIGER grant. More information on project costs and funding is available in [Section E](#).

Exhibit 5. Medina to SR 202: Eastside Transit and HOV Project area and key features.



Construction elements of the Eastside Project include:²

- Build a new eastbound HOV lane from Lake Washington to the existing HOV lane east of I-405. This will **eliminate one of the last gaps in the region’s core HOV system and improve travel time reliability** for buses and carpools in the project area.
- Relocate the westbound HOV lane to the inside lane between Lake Washington and I-405. This will **enhance safety by eliminating the need for merging vehicles to weave across the faster-moving HOV lanes** to reach the general-purpose lanes.
- Construct three lids over SR 520, two with access to transit stops (Exhibit 16, page 13).
- Construct new HOV **direct-access ramps** at 108th Avenue NE in Bellevue that connect to SR 520, **saving transit travel time** by eliminating the need to access the park and ride via local streets.
- Add a bicycle/pedestrian path from Lake Washington to 108th Avenue NE. This will **facilitate non-motorized use of SR 520, provide transit connections for bicycles and pedestrians, and complement the existing trail network.**
- Reconfigure the existing interchange at Bellevue Way NE to streamline traffic operations and provide space for stormwater ponds and stream habitat improvements.
- Enhance existing park and ride lots to **“NewMobility Hubs” that improve real time commuter information, for better trip decisions** regarding travel mode, time of day and route.

How do lids improve community livability?

The term "lid" is short for "lidded structural crossing". Lids are wide bridges that cover a length of highway. Lid surface areas will carry paths and trails to **reconnect communities** across SR 520, and **create open space and places for passive recreation**. They can include items such as arbors, seating, and transit connection areas.

Environmental and community benefits include:

- **Healthier stream habitat** from realigning portions of the Yarrow Creek channel and shortening culverts.
- **Restored fish passage** and new connections to habitats that are currently inaccessible to salmon and other fish, including endangered species.
- On-site **stream improvements** and **wetland improvements** through mitigation efforts at a site or sites as determined in cooperation with permitting agencies.
- Retaining walls and **stormwater management system improvements.**
- **Decreased highway noise from new sound walls** near residential areas.



Exhibit 6. Artist’s rendering of a NewMobility Hub.

² To view a visualization of Eastside Project features, visit <http://www.youtube.com/watch?v=-1ZQF6UIKos>

NewMobility Hubs

A **public-private partnership** has been formed between WSDOT, Ford Motor Company, Microsoft, Inrix, and the University of Washington to implement a NewMobility Hubs project in the cross-Lake Washington travelshed. NewMobility Hubs integrate information technology, clean energy, sustainable transportation, and smart-growth principles to provide commuters with more travel options and connections. The project will transform existing park and ride lots into high-tech multi-modal hubs where people can charge electric vehicles, board transit, meet rideshare partners, access shared cars or bikes, and get real-time traffic information. People living and working in the SR 520 corridor will benefit from strategically located hubs and kiosks along SR 520 and in the cross-Lake Washington travelshed.

Commuters will be able to:

- Plan a trip online, from home, work, at smart kiosks and via mobile devices with the successful integration of technologies using Ford and Microsoft's SYNC platform.
- Make commute choices en route based on real-time information including traffic congestion, toll prices, transit arrival times, and available park and ride stalls.
- Find vanpool and carpool partners through a ride-matching system, or connect to corporate or local shuttles.
- Purchase products such as tolling transponders and regional transit cards.
- Reserve a shared electric car or bike.
- Charge an electric vehicle or reserve an electrified parking spot.



Exhibit 7. Sample locations for NewMobility Hubs serving SR 520 commuters.

Exhibit 7 illustrates opportunities to construct NewMobility Hubs in the SR 520 corridor relative to existing and planned light rail. Locations one (1) and two (2) are park and ride lots that can be converted to NewMobility Hubs; those labeled three (3) and four (4) show locations of planned light rail and multi-modal transit stations.

A result of this innovative public-private partnership will continue the region's investment in vehicle electrification to reduce greenhouse gas emissions, create green jobs, and advance energy independence. See [Appendix F](#) for additional details on the NewMobility Hub project.

D. Project Parties

The Washington State Department of Transportation (WSDOT) is the party seeking the grant. WSDOT is responsible for more than 20,000 lane-miles of roadway, nearly 3,000 vehicular bridges and 524 other structures. Even though the state highway system accounts for less than 11 percent of the total state lane-miles, it accounts for over half of the vehicle miles traveled (56.2 percent).³ In addition, project stakeholders and partners include the following (Exhibit 8):

Exhibit 8. Project Stakeholders

Regional and local agencies (counties, cities, towns, and transit agencies)	
City of Bellevue	City of Seattle
City of Clyde Hill	King County Metro
City of Kirkland	Puget Sound Clean Air Agency
City of Medina	Sound Transit
City of Mercer Island	Town of Hunts Point
City of Redmond	Town of Yarrow Point
Tribes	
Duwamish Tribe*	Suquamish Tribe
Muckleshoot Indian Tribe	The Tulalip Tribes
Snoqualmie Nation	Yakama Nation
State agencies	
Department of Archaeology and Historic Preservation	Washington State Department of Natural Resources
Washington State Department of Ecology	Washington State Recreation and Conservation Office
Washington State Department of Fish and Wildlife	
Key businesses and institutions	
Microsoft Corporation	The University of Washington
Ford Motor Company	Inrix
Federal agencies	
Environmental Protection Agency	U.S. Coast Guard
Federal Highway Administration	U.S. Army Corps of Engineers
National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries)	U.S. Fish and Wildlife Service
National Park Service	

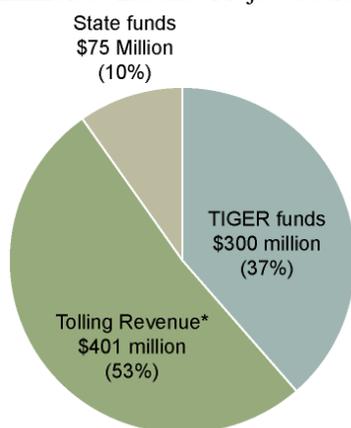
*Note: The Duwamish Tribe is not federally recognized.

³ Washington State Department of Transportation, "2007 Key Facts," December 2007. <http://www.wsdot.wa.gov/publications/manuals/fulltext/M0000/keyfacts.pdf>

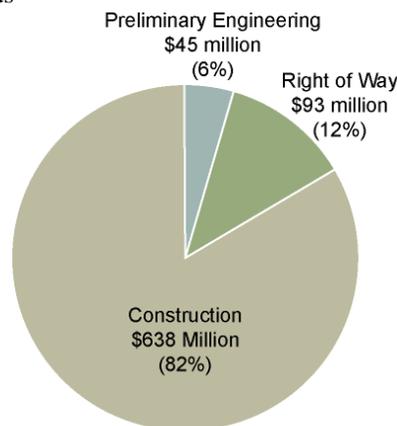
E. Grant Funds and Sources and Uses of Project Funds

WSDOT is requesting \$300 million in TIGER grant funds for the Eastside Project,⁴ with a total cost of \$776 million. Sources and uses, in dollars and percentage, are illustrated in Exhibit 9.

Exhibit 9. Eastside Project Sources and Uses of Funds



Total funding: \$776 million



Total project costs: \$776 million

* Note: Toll revenue subject to legislative approval.

Financing for the Eastside Project will be complete assuming award of the TIGER grant. In 2009, the Washington State Legislature authorized the sale of up to \$1.9 billion in bonds backed by toll revenues to support the SR 520 bridge replacement. (Reference HB 1272 and ESHB 2211.) With a \$300 million TIGER grant, the Legislature is poised to take final action to begin construction on the Eastside Project. The Legislature would only need to allow a portion of the already authorized bond sales, \$401 million, to be used for the project, a move which also ensures adequate funds for the bridge replacement. This use of funds is within the overall SR Bridge Replacement and HOV Program's financial plan.

F. Selection Criteria

1) Primary Criteria

a) Long-Term Outcomes

i) State of Good Repair

Consistent with plans; state of good repair

Replacing the SR 520 bridge and upgrading the SR 520 corridor has been a regional priority for over 10 years and is part of regional⁵ and state⁶ Transportation

⁴ The NewMobility Hub project would comprise \$7.2 million (2.4 percent) of the total \$300 million grant funding requested. A pro forma detailing the sources and uses of the \$7.2 million is attached as [Appendix F](#).

⁵ See <http://www.psrc.org/projects/tip/currenttip/2007-2010RegionalTIPAmendment.pdf> p. A-544.

Improvement Plans. We will replace the existing four-lane SR 520 bridge with a new structure to accommodate four general purpose lanes, two HOV lanes, and a bicycle and pedestrian path. The Eastside Project configuration will match the new floating bridge, allowing traffic to flow and improving safety and livability. Completing the HOV lanes on SR 520 will fill one of the few remaining gaps in the region's 200+ mile HOV system.

Without the Eastside Project, SR 520 would be due for repaving in 2020. The project will defer the \$11.5 million cost.⁷ Five bridges in the project area are in various states of disrepair and, without this project, would require increased maintenance and preservation spending.

Future economic growth and stability

SR 520 is a major corridor in the state's largest metropolitan area, which is home to half of Washington's jobs (1.42 million out of the 2.86 million statewide estimated in June 2009).⁸ SR 520 connects Seattle's downtown employment centers, housing base and the University of Washington with the vibrant high-tech employment centers and housing on the east side of Lake Washington. A failure of the SR 520 bridge or any part of the corridor connecting these critical employment and housing centers would have severe impacts on mobility and the region's economy.

When traffic on the SR 520 corridor moves freely, the travel time between Redmond and Seattle is about 15 minutes. **During the congested peak period, travel time can be three times longer** (45 minutes). Forecasts show that by 2030 the same trip could take up to 75 minutes compared to today. The Eastside Project is projected to generate **\$467.2 million in travel time savings** when discounted at 7 percent (\$860.1 million at a 3 percent discount rate).



Exhibit 10. Variable-rate tolling on the SR 520 bridge will help provide project funding. WSDOT uses the Good to Go! electronic tolling system to collect tolls throughout the state.

Appropriately capitalized; sustainable revenue

In addition to the multiple sources of funding, the Eastside Project is **eligible to access a sustainable source of revenue – tolls – to help fund long-term operations and maintenance** (Exhibit 10). Legislation passed in 2009 authorizes WSDOT to use tolling on the bridge for revenue generation as well as for traffic management purposes.⁹

Asset management practices

WSDOT employs asset management techniques to minimize maintenance costs and is recognized by FHWA as a model for other states. The pavement management system exemplifies the agency's approach to asset management. WSDOT maintains over 20,000

⁶ See http://www.wsdot.wa.gov/NR/rdonlyres/AA0A033A-D4A7-41DC-A757-78C6E154F6E0/0/WSDOT_SR520_STIP.pdf

⁷ Estimates based on previous repaving schedules and WSDOT forecasts.

⁸ Preliminary estimates for June 2009 released July 29, 2009. Bureau of Labor Statistics, Current Employment Statistics. (see <http://www.bls.gov/sae/>)

⁹ See <http://apps.leg.wa.gov/documents/billdocs/2009-10/Pdf/Bills/Session%20Law%202009/2211-S.SL.pdf>

lane miles of highway, all of which are assessed annually using an automated pavement condition vehicle, as opposed to models or sampling techniques.

WSDOT uses a combination of ratings to determine when pavement is due for rehabilitation, based on Lowest Life Cycle Cost management. Performance measures used to make investment decisions include pavement structural condition, rutting, and the International Roughness Index.

ii) Economic Competitiveness

U.S. economic competitiveness; quality of jobs

As Washington's largest metropolitan area, the strength of the central Puget Sound region's economy is a key to the state's overall economic health. Business, industry, education and health care are served by the SR 520 corridor, home to nationally significant enterprises including Microsoft, Amazon.com, the University of Washington Medical Center (one of the country's top 10 medical facilities), and the Fred Hutchinson Cancer Research Center, one of the country's premier cancer research centers. These institutions are powerhouse employers, and their economic, technological and medical contributions are felt across the country. They provide quality, high-wage jobs, though many have been lost in the current recession.



Exhibit 11. Congestion on SR 520.

The region has a **strong planning framework linking transportation and land use**. The Puget Sound Regional Council's Vision 2040¹⁰ designates the Seattle and Bellevue cores as growth centers, absorbing much of the anticipated 40 percent and 45 percent increase in population and employment, respectively, between now and 2040. **Completing the improvements to the SR 520 corridor supports the regional vision that focuses future job development in this corridor.**

As determined in the original Trans-Lake Washington Study (WSDOT 1999), the performance of the SR 520 corridor is linked to and influences I-90, the parallel cross-Lake Washington route. SR 520 must operate effectively to ensure that freight can flow on I-90. As the designated freight route across the lake, I-90 is used by Boeing, the Port of Seattle and other "logistics" companies to transport goods and people in and through the region to statewide, national and international markets.

Collisions affect SR 520's performance. Over the past three years, the SR 520 corridor has had over 500 collisions a year. In the Eastside Project area, an average of 135 collisions occur per year, or almost three each week (2008 data). According to WSDOT

¹⁰ Puget Sound Regional Council, "Vision 2040: The Growth Management, Environmental, Economic, and Transportation Strategy for the Central Puget Sound Region," February 2008.
<http://www.psrc.org/projects/vision/pubs/vision2040/index.htm>

data, the average incident on SR 520 takes nearly 20 minutes to clear. Each minute of an incident can lead to another four to 10 minutes of delay, depending on traffic volumes.¹¹

Because SR 520 operates at or near capacity most of the day, these **collisions can result in up to three additional hours of delay**, affecting livability, vehicle emissions and the movement of people and goods. Adding wider lanes and full shoulders will improve the per-lane capacity, allow disabled vehicles to pull out of traffic, reduce the number of collisions and related congestion, and decrease the amount of vehicle emissions – all while benefiting the economy.

Recession and recovery in the region

Consistent with new criteria published by FHWA on Aug. 24, 2009, **King County qualifies as an Economically Distressed Area** due to recession-related business closures and restructuring in the last year, which resulted in a loss of 6,500 jobs and exceeded 1 percent of the county’s workforce.¹² These included the closure of Washington Mutual’s Seattle headquarters and workforce restructuring at Microsoft and Boeing.

The ARRA targets areas “most impacted by the recession.” The central Puget Sound region has been hard hit **with over 53,000 job losses since December 2007** – approximately half of the jobs lost in the entire state (Exhibit 12).

Exhibit 12. Job losses in the Seattle Metropolitan Area and Washington State

	Total Non-Farm Employees (thousands)		Change (thousands)
	Dec-07	Jun-09*	
Seattle-Bellevue-Everett, WA Metropolitan Division	1,475.8	1,422.6	-53.2
Washington State	2,963.4	2,858.1	-105.3
Job losses in Seattle-Bellevue-Everett, WA Metropolitan Division as proportion of total in Washington State			51%
* June 2009 data preliminary. Source: Current Employment Statistics, Bureau of Labor Statistics, accessed July 28, 2009			

The **area’s unemployment rate has doubled** (from June 2008 to June 2009). This represents a **higher rate than more than two thirds of all 372 metropolitan areas** for which the Bureau of Labor Statistics reported data. Job losses have been particularly severe in construction, and heavy and civil engineering construction categories, down 14 percent from the same period a year ago (Exhibit 13).

Exhibit 13. Construction Employment Loss in Seattle Metropolitan Area

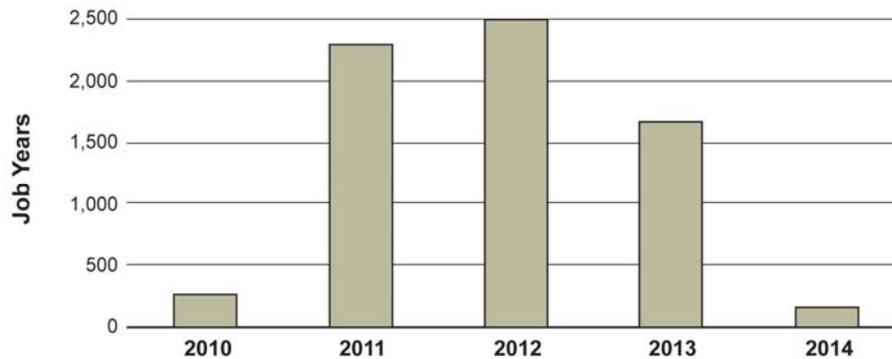
Industry Sector	Employment* (thousands)			Percent change	
	June-07	June-08	June-09**	June-07 to June-09	June-08 to June-09
Construction	101.7	98.4	86.3	-15%	-12%
Heavy and Civil Engineering Construction	10.4	9.6	8.3	-20%	-14%
* Data are not seasonally adjusted.					
** June 2009 data preliminary. Source: Current Employment Statistics, Bureau of Labor Statistics, accessed July 28, 2009.					

¹¹ <http://www.wsdot.wa.gov/Operations/IncidentResponse/>

¹² Per U.S. Commerce Secretary’s Aug. 24, 2009 definition of special need circumstances.

The most immediate economic benefit from the TIGER grant will be in short-term construction jobs (Exhibit 14). In the first full year of work, over 2,000 new jobs will be created, equal to about 3 percent of regional job losses since 2007. (The Eastside Project will generate 6,900 jobs over the life of the project – Exhibit 21, page 19.) In addition, there will likely be more permanent or long-term job creation as the improved travel time along the corridor should help the relocation and expansion of existing businesses as well as the potential formation or relocation of other businesses.

Exhibit 14. Short-Term Employment from Project, by Year Generated



iii) Livability

Community partnerships for transportation and quality of life benefits

The **Eastside Project supports regional land use plans** and this application uses several metrics to reflect the improvements to an existing corridor. Completing the HOV system and relocating the HOV lane to the inside lane of the highway would create the most quantifiable livability benefits:

Travel time savings will be gained primarily by transit and HOV commuters. The Eastside Project is projected to generate **\$467.2 million in travel time savings** when discounted at 7 percent (\$860.1 million at a 3 percent discount rate).



Exhibit 15. Cyclists will have the option to ride their bikes or use the bus to cross Lake Washington on SR 520. (Source: King County Metro)

Vehicle operating costs include the out-of-pocket expenses associated with owning, operating, and maintaining a vehicle. **Vehicle operating cost benefits from the Eastside Project are projected to be \$41.6 million** when discounted at 7 percent (\$75.4 million at a 3 percent discount rate). The cost components measured in this analysis include fuel and oil consumption, maintenance and repair, tire wear and vehicle depreciation, and are based on projections of vehicle miles traveled.

Affected communities and scale of project

Travel time and vehicle operating cost savings will benefit transit riders, HOV users and other 520 commuters. In addition, bicycle commuters, recreational cyclists and

pedestrians will be able to cross Lake Washington on the **regional bicycle and pedestrian path**. Residents closest to the project area will benefit from environmental features that include lids and noise walls and transportation features that include increased modal choices and access to transit stops and local and regional paths, particularly the addition of a NewMobility Hub at the South Kirkland Park and Ride (Exhibit 7, Location 1, page 6).

In addition to the quantitative benefits discussed above, extensive community engagement efforts have influenced designs for the Eastside Project. These designs will improve the quality of life in several ways:

Reconnecting communities; improving access to transit, bike and walking paths

Three highway lids will **reconnect commercial and residential communities** divided when the highway was first built over 40 years ago. Two lids will connect to transit stops, increasing access to transit. The combined 6.8 acres of lids are all designed for significant plantings and amenities such as green spaces, plazas, and access to new and existing bicycle and pedestrian paths (Exhibit 16).



Exhibit 16. The lid at Evergreen Point Road features a park and ride, transit station access, community gathering places, and connections to pathways and a park. (Click to Enlarge)

Quieter living

Three miles of noise walls will be added, reducing the existing highway noise levels that exceed federal noise standards at 105 residences and one elementary school.

Reduced congestion and increased reliability

The Eastside Project will save drivers an estimated 1.4 million hours of travel time every year. Widened lanes and shoulders and relocated HOV lanes will increase travel reliability due to fewer collisions. Easier access to shoulders will reduce delays due to stalled vehicles.

WSDOT's extensive outreach efforts are described at greater length in the secondary criteria section.

iv) Sustainability

Reduce emissions

Decreased congestion resulting from the Eastside Project will **reduce annual output of nearly two tons of nitrogen oxide and over six tons of other volatile organic compounds**. These savings are calculated using TIGER grant guidelines. Together, these

improvements are estimated to **save \$0.2 million in emission costs at a 7 percent discount rate** (\$0.3 million at a 3 percent discount rate).¹³

Reduce dependence on oil

The Eastside Project will reduce dependence on oil by adding new, and linking to existing, bicycle and pedestrian paths. It is estimated that there will be a **0.1 percent decrease in fuel consumption** in the year 2030 as a result of the project.

Increase energy efficiency

Providing new HOV lanes and restriping existing lanes will complete the SR 520 HOV system, improving travel times for transit and carpool users, saving energy and improving energy efficiency. Compared to a no-build alternative in 2010, the completed Eastside Project will result in a **0.1 percent decrease in vehicle miles while increasing the number of people traveling in the corridor.**

Direct-access ramps and in-line transit stops—Adding direct-access ramps to the HOV lanes and in-line transit stops will improve day-to-day transit energy and operational efficiency by eliminating the need for buses to exit and enter the freeway multiple times, or use surface streets to access park and rides. These improvements will reduce traffic weaves, increasing safety and improving energy use as a result.

Benefit the environment

The Eastside Project provides many environmental benefits, including restoring endangered species habitat, with the following improvements:

Fish passable culverts—The project is improving habitat for fish, including several endangered species, on three streams and three tributaries by removing, replacing or upgrading 17 existing fish passage barriers with fish-passable structures.¹⁴

New culvert designs will provide conditions suitable for passage of all adult and juvenile fish species likely to inhabit the streams. Interior conditions within the structures will emulate natural stream functions present in open-water areas.

Increase open channel habitat—Project-wide channel realignments and culvert removals and replacements will add 980 linear feet of open-channel habitat within fish-bearing streams, and eliminate 857 linear feet in streams confined in culverts.

Restore Yarrow Creek system—The project will enhance riparian buffers to many tributaries of Yarrow Creek to improve fish and riparian species habitat. These improvements will enhance connectivity between Lake Washington and upstream Yarrow Creek habitats that are isolated or impassable during certain times of the year.



Exhibit 17. Stream improvements will benefit habitat for local salmon species.

¹³ These emissions estimates are calculated using the TIGER guidelines published in the Federal Register and may differ from those in other estimations. TIGER guidelines require using EPA's Mobile 6.2; estimates derived using EPA's MOVES may differ slightly.

¹⁴ WSDOT typically assigns a benefit-cost ratio of four to one for fish habitat enhancement work.

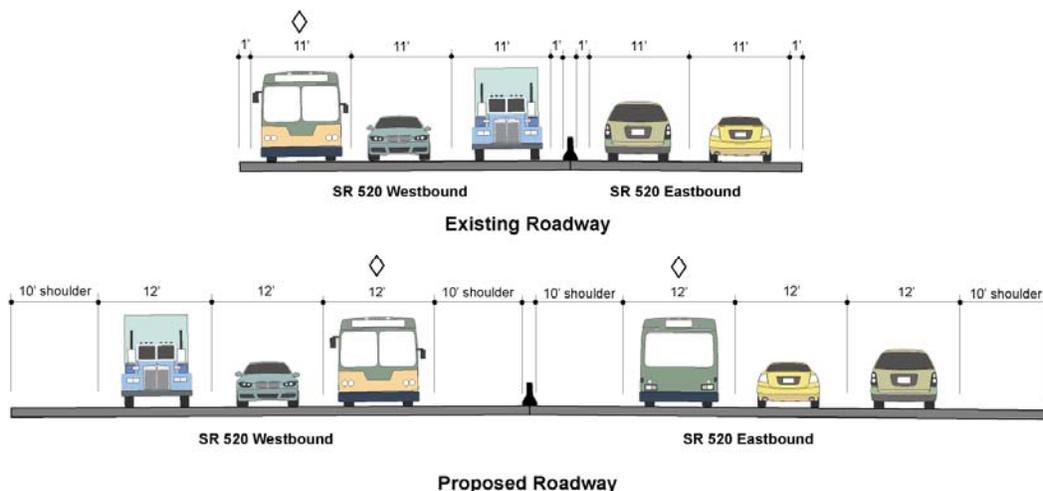
Construct a stormwater management system—A new stormwater treatment system will detain, treat, and slowly release stormwater runoff, designed to match runoff quality comparable to forested conditions (i.e., prior to development of the region).

v) Safety of facilities and systems

The Eastside Project will provide continuous HOV lanes and improve safety in the three miles of corridor where construction will take place (see Exhibit 5, page 4). **Safety improvements include widening the shoulders and lanes, extending the on- and off-ramp lengths, relocating an existing westbound HOV lane to the inside, improving bus access, and improving sight distances.**

Exhibit 18 compares the new roadway geometry with the existing condition. Roadway width improvements, including wider lanes and shoulders, are estimated to **reduce collisions by 7 percent to 20 percent.**

Exhibit 18. Existing and Proposed Roadway Geometry in Reconstruction Area (Typical)



Note: Bicycle/pedestrian path runs parallel to the roadway and is not shown in this illustration.

Safety benefits are likely to accrue to all users of the route, given the expected reductions in collisions related to merging and weaving across the existing outside HOV lane. These **safety benefits** of the project are estimated to **total \$11.9 million** when discounted at 7 percent (\$21.4 million at a 3 percent discount rate).

Evaluation of project costs and benefits

Results from the benefit-cost analysis produced benefit-cost ratios greater than 1 at both the 7 percent and 3 percent discount rates. It is important to remember that a benefit-cost analysis only presents those items that can be measured and monetized. In some areas, such as livability, benefits are difficult to measure and should be assumed to be additive

to the total benefits so that the true ratio of benefits is higher than those reported.¹⁵ Exhibit 19 summarizes the approach and findings of the benefit-cost analysis.

About 40 percent of the total project cost is assigned to building environmental mitigation and community enhancements, including: noise walls; lids that reconnect communities; bicycle and pedestrian paths; fish passage culverts and stream improvements; stormwater runoff detention and treatment. **These investments generate an array of social livability benefits** in addition to those quantified in Exhibit 19. They are discussed in the sections detailing livability and sustainability. **The overall benefit-cost assessment would be significantly higher** than those shown in the table.

Exhibit 19. Summary of Benefit-Cost Analysis

Selection Criterion	Description	Inputs	Value	Monetized Value (in \$ million)	
				Discount Rate 7%	Discount Rate 3%
State of Good Repair	<ul style="list-style-type: none"> Consistency with regional plans Address issues related to disrepair 	Maintenance preservation and cost savings on existing lanes	Annual savings of \$383,000	\$5.5	\$8.3
Economic Competitiveness	<ul style="list-style-type: none"> Increase in regional mobility improves efficiency Job creation potential in an area which has recently seen major unemployment 	Jobs and wages generated attributable to improvements in transportation system efficiency	Project construction activity generates the creation of 4,500+ jobs in the region.* Project completion induces 800+ jobs in the area over the analysis period.*	\$224.1	\$249.8
Livability	<ul style="list-style-type: none"> Increased mobility Improved connectivity 	VOC savings	\$4.3 million saved annually	\$41.6	\$75.4
		Travel time savings	1.4 million hours saved annually	\$467.2	\$860.1
Sustainability	Reduced pollution	Vehicle emission savings	Net reductions in NOX and VOC (2 and 6 tons, respectively)	\$0.2	\$0.3
Safety	Reduced collisions	Accident cost savings	15 incidents avoided each year	\$11.9	\$21.4
Total Benefits (\$ million)				\$744.9	\$1206.8
Total Costs (\$ million)				\$607.4	\$664.8
BENEFIT COST RATIO				1.23	1.82
Net Present Value (\$ million)				\$137.5	\$542.1
Economic Rate of Return (Nominal)				10.67 %	8.04 %

**Note: Jobs figures estimated using IMPLAN input-output model.*

¹⁵ For these reasons, the livability and sustainability benefits accruing to the SR 520 corridor from the NewMobility Hub project element has not been quantified and attributed to the primary Medina to SR 202: Eastside Transit and HOV project.

Benefit-cost analysis elements

Model inputs

Specific values used in this analysis are based on recommendations made in the Federal Register for the TIGER grant, USDOT studies and standard values from the transportation industry. Costs and benefits have been estimated over 30 years from the completion of the project. [Appendix B](#) provides the key values used.

Parameters

The analysis uses estimates for the value of time for general surface travel as per USDOT guidance in the Federal Register, and applies an evidence-based premium on that time spent in congestion, based on research on the valuation of travel time savings.¹⁶ In addition, the model incorporates shadow pricing (when the market costs of labor are lower than opportunity costs because of significant slack in the labor market) and adds the value of short-term job creation.

Costs

The full project cost, independent of funding source, is used for comparison with total benefits. Costs are discounted to the present with the same real discount rate as benefits. The project and expenditure schedules have been tracked to produce total discounted construction costs (at a 7 percent rate) of \$612.9 million (\$673.1 million at 3 percent).

Benefits

Key benefits from the Eastside Project are reduced congestion, faster travel times, and reduced vehicle operating, accidents, emission, and travel time costs. There are fewer miles traveled as a result of the project. The availability of transit and improved HOV facilities result in social cost savings associated reduced automobile use (compared to the base case).

Total expected congestion management benefits resulting from the project are estimated to total \$744.9 million when discounted at 7 percent, \$1,206.8 million when discounted at 3 percent. Without the congestion premium noted above, benefits would be lower.¹⁷

Additional economic benefits will arise from jobs generated through 2014 in addition to those directly related to construction. These are assumed to be new, and not diverted from other employment options, due to the region's significant recent job losses. If these were excluded, benefits would total \$520.8 million (using a 7 percent discount rate) and \$957.1 million (using a 3 percent discount rate).¹⁸

¹⁶ See "Valuation of Travel-Time Savings and Predictability in Congested Conditions for Highway User-Cost Estimation," National Cooperative Highway Research Program, report 431.

¹⁷ \$464.6 at 7 percent discount and \$690.8 at a 3 percent discount rate. This would result in benefit cost ratios of 0.76 and 1.04, and net present values of -\$142.8 million and \$26.0 million, at 7 percent and 3 percent discount rates, respectively.

¹⁸ These lower benefits estimates would result in benefit cost ratios of 0.86 and 1.44, net present values of \$292.3 million and -\$86.6 million, and economic rates of return of 6.75 percent and 9.37 percent, at 7 percent and 3 percent discount rates, respectively.

Financial metrics

When using a 7 percent discount rate, **the ratio of measured benefits to costs of the Eastside Project is 1.23**, indicating a worthy project producing **benefits that are \$137.5 million greater than costs** over the period including construction and thirty years of full operations. The results using a 3 percent discount rate are more favorable (benefit-cost ratio of 1.82 and a net present value of \$542.1 million).

Project investments generate an array of social livability benefits in addition to those quantified above, and discussed in the sections detailing livability and sustainability. **The overall benefit-cost assessment would be significantly higher** than those estimated.

Evaluating project performance

WSDOT will work with USDOT to provide a plan for evaluating and reporting the success of the Eastside Project, measuring short- and long-term performance, specifically with respect to economic recovery and long-term outcomes. WSDOT's ARRA reporting Web page provides an example of how the agency meets reporting requirements: <http://www.wsdot.wa.gov/Funding/stimulus/Reporting.htm>.

b) Job creation and economic stimulus

The Eastside Project is in a position to move quickly, leading to a rapid economic benefit to an area with almost half of the state's total jobs lost (see page 11). Using methodology detailed by the Council of Economic Advisors (CEA), the Eastside Project is expected to generate 6,906 jobs (Exhibit 21).

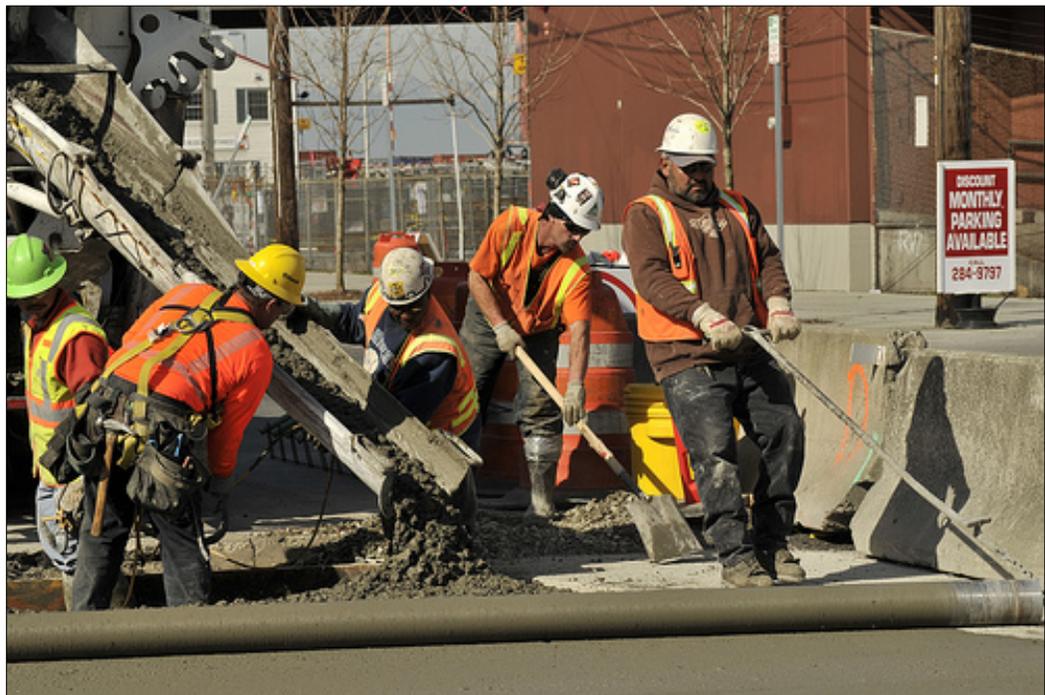


Exhibit 20. The Eastside Project will generate 6,906 new jobs.

Exhibit 21. Estimating Economic Impacts of Construction Using CEA Guidance¹⁹

Date	Construction Cost (\$ million)	Direct Jobs	Indirect Jobs	Induced Jobs	Total Jobs	Cumulative Jobs Years
2010 Q3	\$0.4	2	1	1	4	4
2010 Q4	\$26.0	126	53	102	281	285
2011 Q1	\$29.2	14	61	114	317	602
2011 Q2	\$52.4	25	108	204	567	1,169
2011 Q3	\$64.1	312	134	250	696	1,865
2011 Q4	\$63.3	308	132	247	687	2,552
2012 Q1*	\$62.7	304	130	245	679	3,231
2012 Q2	\$58.6	284	122	228	634	3,865
2012 Q3	\$58.7	285	122	229	636	4,501
2012 Q4	\$51.4	251	107	201	559	5,060
2013 Q1	\$55.1	268	114	215	597	5,657
2013 Q2	\$53.1	258	111	207	576	6,233
2013 Q3	\$31.6	152	65	123	340	6,573
2013 Q4	\$14.9	72	30	58	160	6,733
2014 Q1	\$10.8	52	21	41	114	6,847
2014 Q2	\$5.6	27	11	21	59	6,906

*Feb. 17, 2012 goal of substantial completion of elements using TIGER grant funds and full expenditure of award.

The CEA does not provide guidance on quantifying other economic impact metrics or how to report the employment impact at the regional/local level. Our analysis uses an input-output based economic impact modeling system (see [Appendix B](#)). Estimates of cumulative job creation from construction spending through the second quarter of 2014 using IMPLAN and its region-specific database are higher than the estimates using the CEA report as guidance (11,567 compared to 6,906).

The jobs generated by the Eastside Project will benefit a variety of workers. The majority of the jobs will be in construction – “direct” jobs due to building the project. The construction sector traditionally employs large numbers of low- and moderate-income workers and therefore this group should be expected to benefit early. Indirect jobs arising from additional business spending also impact other sectors that traditionally hire low- and moderate-income workers, as well as truck transportation, services to buildings/dwellings and food services sectors. These jobs historically go to displaced low- or moderate-income workers.

Project construction will lead to indirect jobs for higher-wage workers, such as those in architectural and engineering services and management. Induced economic impacts – associated with increased labor income that accrue to workers and is spent on household goods and services in the area – will also generate a significant economic impact, buttressing the foundation for increased long-term economic growth.

As is the case for all WSDOT Projects the agency assures full compliance with Title VI of the Civil Rights Act of 1964 prohibiting discrimination based upon race, color, national origin and sex.

¹⁹ Using the White House Council of Economic Advisers estimate that \$92,136 of government spending creates one job-year. The IMPLAN input-output model was used to estimate direct, indirect and induced jobs figures.

Preference for quick-start activities

Schedule and cash flow

Exhibit 22 shows the Eastside Project schedule. Thousands of new jobs will be created quickly, with over 2,000 jobs in the first full year of construction in 2011, and 6,900 jobs over the life of the project. While the entire project will not be complete until 2014, the portion of the project that is being funded by the TIGER grant will be substantially complete by February 2012 as shown in Exhibit 23. A detailed project schedule is shown in [Appendix C](#).

Exhibit 22. Project Schedule (Click to Enlarge)

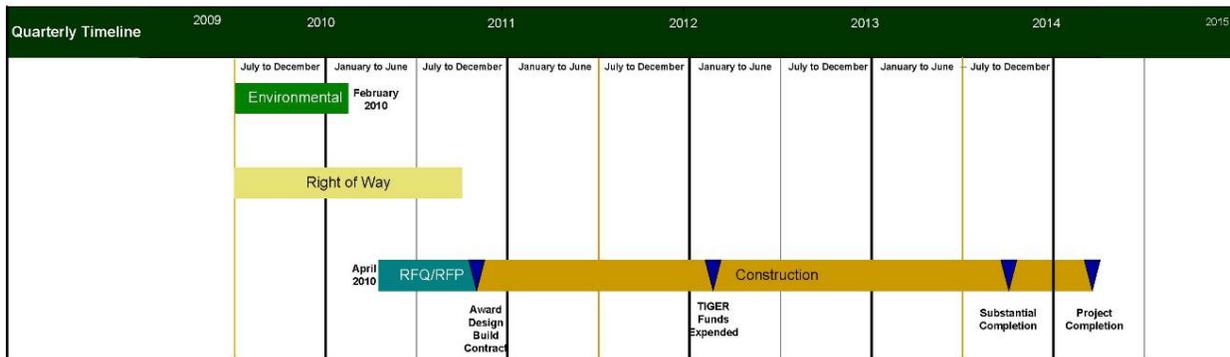
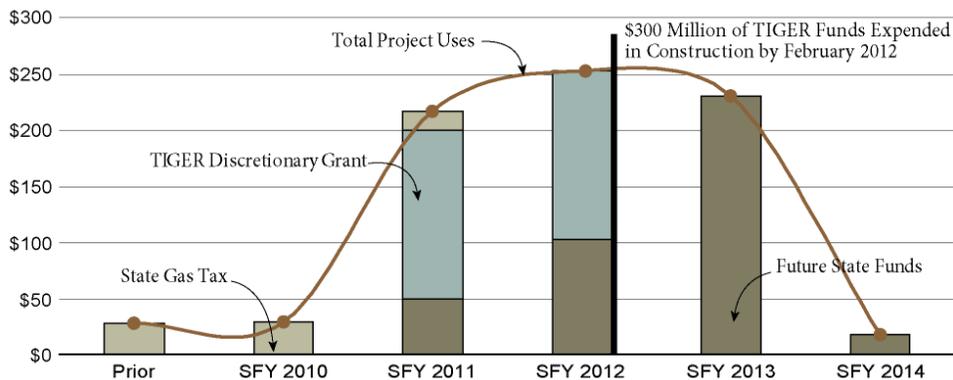


Exhibit 23. Project Sources and Cash Flow shown in State Fiscal Years (SFY) July 1 to June 30 (Click to Enlarge)



	Prior	SFY 2010	SFY 2011	SFY 2012	SFY 2013	SFY 2014
State Gas Tax	\$28	\$29	\$17	\$0	\$0	\$0
TIGER Discretionary Grant	\$0	\$0	\$150	\$150	\$0	\$0
Future State Funds	\$0	\$0	\$50	\$103	\$231	\$18
Total Project Uses	\$28	\$29	\$217	\$253	\$231	\$18

Environmental approvals

The Eastside Project has been working to secure all environmental approvals per the timeline below. Exhibit 24 summarizes permit application dates and the anticipated approvals timeline.

Exhibit 24. Federal and State Permits and Approval Dates

Permit or approval	Issuing Agency	Actual or Anticipated Submittal Date	Actual or Anticipated Issuance Date
NEPA and Section 4(f)	Federal Highway Administration	November 12, 2009*	February 2010
Section 404 Individual Permit	U.S. Army Corps of Engineers	June 3, 2009*	December 2009
Section 401 Certification	Wash. Dept. of Ecology	June 3, 2009*	December 2009
Coastal Zone Management Act Consistency Determination	Wash. Dept. of Ecology	June 3, 2009*	December 2009
Hydraulic Project Approval	Wash. Dept. of Fish and Wildlife	November 2009	December 2009
NPDES Construction Stormwater General Permit	Wash. Dept. of Ecology	October 2010	December 2010
Endangered Species Act Compliance	U.S. Fish and Wildlife and National Marine Fisheries Service	June 19, 2009*	July 30, 2009 (USFWS)* September 2009 (NMFS)
Section 106 Concurrence	Wash. Dept of Archeology and Historic Preservation	September 2009	October 2009

Note: *Actual date of permit submittal or issuance.

Legislative approvals

WSDOT has secured legislative and gubernatorial approvals for the SR 520 Bridge Replacement and HOV Program, most recently as demonstrated through Engrossed Substitute House Bill 2211, passed by the 2009 Legislature and signed by the Governor. Among other items, the bill directs WSDOT to apply for federal stimulus funds to help fund projects within the SR 520 corridor.²⁰ Letters from the chairs of the State House and Senate Transportation Committees also indicate their support for this effort (see [Appendix A](#)).

State and local planning

The SR 520 Bridge Replacement and HOV Program is included in the Puget Sound Regional Council's 2007 to 2010 Transportation Improvement Plan (TIP), and the WSDOT's 2009 to 2012 State TIP.^{21 22}

Technical feasibility

Preliminary Engineering (PE) is at approximately the 30 percent completion level. The design concept is premised on minimizing or mitigating right-of-way impacts. WSDOT's Cost Estimate Validation Process (CEVP) and Value Engineering process have been employed to identify and address technical risks.

²⁰ See <http://apps.leg.wa.gov/documents/billdocs/2009-10/Pdf/Bills/Session%20Law%202009/2211-S.SL.pdf>

²¹ See <http://www.psrc.org/projects/tip/currenttip/2007-2010RegionalTIPAmendment.pdf> p. A-544.

²² See http://www.wsdot.wa.gov/NR/rdonlyres/AA0A033A-D4A7-41DC-A757-78C6E154F6E0/0/WSDOT_SR520_STIP.pdf

PE development has proceeded in coordination with the environmental analysis to ensure that all necessary mitigation measures are addressed, as discussed throughout this proposal. The environmental assessment and regulatory permits are scheduled to be completed before the TIGER grant award date of February 17, 2010. The project will be ready to advertise for design-build delivery within 45 days of award of the TIGER grant.

Financial feasibility

The project financing will be complete assuming the availability of the requested TIGER grant funds. In 2009, the Legislature authorized the sale of up to \$1.9 billion in bonds backed by toll revenues for SR 520 construction. In addition, WSDOT has a successful project delivery record, with 90 percent of projects on time and 86 percent under or on budget.²³

2) Secondary Criteria

a) Innovation

As a nationwide leader in new traffic technology, WSDOT is improving commutes with new tools to reduce collisions and smooth out traffic flow on some of the state's busiest routes. At the same time, we are innovating to improve the livability of adjacent communities and we employ new methods to deliver projects quickly and efficiently.

The Eastside Project features several innovations:

- **Active traffic management (ATM). Real-time driver information and variable speed limits to enhance safety and operational efficiency.** Variable message signs to provide updates to motorists about road conditions and travel times (Exhibit 25).
- Intelligent transportation systems (ITS) with new **data stations to collect and monitor real-time traffic information.**
- **Open road tolling.** Electronic, variable rate tolling to manage congestion.
- **Lidded structural crossings** Three widened bridges will accommodate path and trail connections, local surface streets, and will reconnect neighborhoods that were



Exhibit 25. Conceptual rendering of a WSDOT ATM gantry.

²³ See <http://www.wsdot.wa.gov/NR/rdonlyres/4FFE6F8D-6545-4CAF-9801-B46D66DF3A80/0/GrayNotebookMar09.pdf>

divided when the original SR 520 was built in the 1960s. Open spaces and community gathering areas on the lids will create space for passive recreation. Two of the lids include transit plazas equipped with real-time bus information and access to in-line transit stops in the highway median.

- **Design-Build** procurement will deliver the project as quickly as possible.
- **The NewMobility Hub project** deploys next-generation intelligent transportation systems with smart-charging for electric vehicles, enhanced mobility options, real-time traveler information, and shared vehicle and bike programs accessible from home, work, cell phone, smart kiosk, or in-vehicle communication systems.

b) Partnership

i) Jurisdictional and stakeholder collaboration

The SR 520 Bridge Replacement and HOV Program has a ten-year history of coordination and collaboration with jurisdictions and stakeholders.

The Trans-Lake Washington Study, which began in 1998 and led to the SR 520 Bridge Replacement and HOV Program, addressed traffic congestion across and around the lake. The study involved a 47-member stakeholder group that evaluated a broad range of potential modes and routes for crossing Lake Washington. Its work formed the basis of the SR 520 Bridge Replacement and HOV Program.

In 2000, the environmental impact statement was initiated. This included establishing a series of committees (executive, technical, and advisory) to help provide project oversight, guidance and public involvement. These committees, active until 2006 (the executive committee was active until 2007), consisted of elected officials, staff and other people from **23 community, business and environmental groups; nine jurisdictions, 11 regional, state and federal agencies; and two state legislators.** They collaborated on defining the purpose and need screening criteria for evaluating alternatives.

From 2000 to 2004, WSDOT held **15 community design workshops and roundtables.** Project designs and environmental mitigation concepts were refined in response to feedback and suggestions provided by community members at these meetings.

In 2006, WSDOT hosted a **corridor aesthetics Design Advisory Group (DAG), made up of neighborhood representatives and jurisdictions** in the SR 520 corridor. Members provided feedback on corridor themes and design elements which were summarized in the [*Corridor Aesthetics Handbook: Ideas for Urban Corridor Design*](#).²⁴

In 2007, WSDOT held **four design collaboration workshops** with mayors and staff from all seven Eastside jurisdictions that touch the SR 520 corridor. These workshops



Exhibit 26. WSDOT shares project plans with the public.

²⁴ Citizens' Design Advisory Group and Washington State Department of Transportation, August 2006.

built on the feedback and advice provided by the public during previous workshops to further develop design concepts for the corridor. At the workshops, WSDOT and the jurisdictions achieved consensus on potential roadway and interchange configurations, transit stop locations, lid concepts, bicycle and pedestrian facility alignments, and storm water treatment facilities.



Exhibit 27. Community members provide input on project designs.

From 2007 and continuing today, WSDOT, the Puget Sound Regional Council and King County collaborated obtain a \$154 million Urban Partnership Grant from FHWA to add variable tolling and active traffic management to the existing SR 520 bridge, accompanied by increased transit service. The project is on target to meet the 2010 deadline to implement tolling on the bridge.

In 2008 and 2009, WSDOT conducted **six public workshops** with community members, mayors, and staff to advance design options for several elements including transit stops, lid landscapes, pathways, and corridor walls and landscape elements. Decisions and feedback from these collaborations formed the basis of preliminary designs.

Public-private partnership

WSDOT is working with **Ford Motor Company, Microsoft, Inrix** and the **University of Washington** to implement the NewMobility Hub portion of this TIGER grant proposal (further detailed in [Appendix F](#)).

ii) Disciplinary Integration

The Eastside Project has benefited from extensive participation by non-transportation agencies and tribes with ongoing government-to-government consultations. Forums for technical input from agencies and tribes include the Regulatory Agency Coordination process and associated technical working groups, the Endangered Species Act Steering Group, the Multi-Agency Permitting Team, the Demonstrative Approach Team, and technical coordination meetings or individual briefings with agencies and tribes. A full list of agencies and tribes involved with the project and how they participated is shown in [Appendix D](#).

Program Specific Criteria: Bridge Replacements

Not applicable.

G. Federal Wage Rate Requirement

WSDOT, as administrator of highway construction projects and signatory to the 2008 Federal-Aid Highway Program Stewardship and Oversight Agreement with Federal Highways, and by use of federal funds, will comply with title 40, United States Code (Federal wage rate requirements). See [Appendix E](#) for the signed letter.

H. National Environmental Policy Act Requirement

The NEPA process is under way and the environmental assessment is scheduled for publication on Nov. 12, 2009 with a Finding of No Significant Impact (FONSI) anticipated on Feb. 12, 2010.

All impacts to the natural environment are being mitigated within the project right-of-way or at an in-basin mitigation site in the case of wetlands. Impacts to the social environment are being mitigated by project features such as noise walls and plantings. There are no impacts to the economic environment; construction and operation of the project will provide both short- and long-term economic benefits to the region.

I. Environmentally Related Federal, State and Local Actions

Federal and State Permits and Approvals

Exhibit 24, page 21, details the federal and state permits and approvals required for the project.

ESA Consultation

A draft biological assessment has been prepared and was submitted on June 24, 2009 to NOAA Fisheries and US Fish and Wildlife Service to satisfy consultation requirements under Section 7 of the Endangered Species Act. WSDOT anticipates that formal consultation will be completed with NOAA Fisheries and informal consultation will be completed with US Fish and Wildlife Service in October 2009, prior to issuing the environmental assessment.

Local Permits

- City of Bellevue – Critical Areas
- City of Kirkland – Critical Areas
- City of Medina – Shoreline Substantial Development Permit
- City of Redmond – Shoreline Substantial Development Permit
- Town of Hunts Point – Shoreline Conditional Use Permit

Permits are anticipated to be received by December, 2009. Other local permits, such as traffic control permits, will be acquired as needed throughout the project.

J. Protection of Confidential Business Information

Not applicable.

Appendices

NOTE: Appendix titles link to contents.

[Appendix A: Letters of Support](#)

- **Sen. Mary Margaret Haugen, Chair, State Senate
Transportation Committee**
- **Rep. Judy Clibborn, Chair, State House Transportation
Committee**
- **City of Clyde Hill**
- **City of Kirkland**
- **City of Medina**
- **City of Redmond**
- **Town of Hunts Point**
- **Town of Yarrow Point**
- **Microsoft**
- **Ford Motor Company**
- **Inrix**

[Appendix B: Benefit Cost Analysis and Economic Impact Analysis](#)

[Appendix C: Detailed Project Schedule](#)

[Appendix D: Agencies and Tribes Involved in the Project](#)

[Appendix E: Federal Wage Rate Certification](#)

[Appendix F: NewMobility Hub Project](#)