Jan. 22, 2014

TO: Secretary Lynn Peterson
   Washington State Department of Transportation

FROM: Julie Meredith, Director
   SR 520 Bridge Replacement and HOV Program

SUBJECT: SR 520 Bridge Replacement and HOV Program Sustainability Report

Dear Secretary Peterson,

Sustainable transportation is a field growing in both complexity and importance, with the Washington State Department of Transportation actively implementing new practices that ensure our transportation system and projects support Washington’s economy, preserve the environment and enhance our communities. Gov. Inslee and you have already demonstrated that environmental protection and sustainability are high priorities for the administration and WSDOT.

With these goals and values in mind, I am pleased to provide the first sustainability report from the SR 520 Bridge Replacement and HOV Program. While environmental protection and sustainability have been hallmarks of the SR 520 Bridge Replacement and HOV Program since its inception in 1997, we have undertaken additional efforts in the past three years to address sustainability in our corridor projects and to establish sustainability as a fundamental value of the SR 520 program.

These efforts have included sustainability requirements developed in the Request for Proposal for the Floating Bridge and Landings project, and an increased focus on sustainability in planning and design on future west side construction phases. As you will see, we are both meeting the Floating Bridge and Landings project sustainability goals, and capitalizing on that effort by applying sustainability lessons into the remaining phases of the SR 520 program.

As we implement your new strategic plan for WSDOT, I look forward to working with you to further the sustainability efforts on the SR 520 program, and apply lessons learned throughout the department.

In 2011, WSDOT completed environmental analysis necessary for the SR 520 program. Required mitigation and other community commitments related to construction and operations of the new SR 520 corridor are included in the projects’ respective Records of Decision.

I appreciate your time in reviewing this report and look forward to working together on these important issues.

Sincerely,

Julie Meredith, Director
SR 520 Bridge Replacement and HOV Program
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SR 520 program overview
The SR 520 Bridge Replacement and HOV Program will enhance safety by replacing the aging floating bridge and will keep the region moving with vital transit and roadway improvements throughout the corridor. The new SR 520 will include a floating bridge and highway with six lanes, including two general-purpose lanes, one new transit/HOV lane in each direction, and a bicycle/pedestrian path.

The SR 520 highway connects the University of Washington and the high-tech corridor in South Lake Union in Seattle to growing communities and major employers on the Eastside. When construction is complete, bicyclists, pedestrians, transit riders and drivers will benefit from a safer, more reliable floating bridge and highway.

Why does sustainability matter to WSDOT?
The Washington State Department of Transportation (WSDOT) is engaged in a range of sustainability efforts aimed at reducing greenhouse gas emissions, conserving fuel and energy through technology, promoting alternative fuels and electric-car usage; and protecting our natural environment while keeping people and goods moving.

In particular, an executive order issued by WSDOT in 2012 provided examples of sustainable transportation practices that include:
1. Producing a transportation system that operates effectively and lasts for decades;
2. Considering economic, environmental and community concerns in agency operations;
3. Promoting sustainable maintenance, preservation, and safety;
4. Reducing energy consumption, reducing greenhouse gas, and conserving resources;
5. Adapting to a changing climate;
6. Supporting livable communities through transportation and land-use decision linkages; and
7. Improving mode choices, accessibility and mobility.

More broadly, sustainability conversations have evolved from defining the concept to determining appropriate action. Determining how to accommodate the mobility needs of urban populations while simultaneously ensuring livability requires both a vision for a sustainable future and a roadmap to make the transition feasible.

Prior to establishing the executive order, WSDOT leadership was developing its sustainability program and agreed in 2011 that the SR 520 program could serve as a sustainability pilot for projects of this size, capacity and complexity. Building on the executive order and Moving Washington, the SR 520 program was determined to move forward with sustainable solutions as the project timelines, budget and technical requirements took shape. Additionally, each project within the SR 520 program would incorporate lessons learned from previous projects to inform the process and create additional sustainability tools for the SR 520 program.

Secretary Lynn Peterson’s new Strategic Plan defines the agency’s commitment to sustainability in many ways. WSDOT’s vision is: Be the best at providing a sustainable and integrated multimodal transportation system.

The commitment goes on. One of six mission statements says:

Sustainability – We make decisions and take actions that promote the conservation of resources for future generations by focusing on the balance of economic, environmental, and community needs.

In addition, two goals are:
• Efficient Use of Resources: Be strategic and innovative in prolonging asset service life.
• Environmental Stewardship: Promote sustainable energy practices to reduce greenhouse gas emissions. In addition, protect and improve wildlife habitat and water quality.
Why does sustainability matter on the SR 520 program?

The SR 520 corridor crosses through multiple environments, including dense urban and suburban residential areas, near key regional institutions, over water, and through parks and green spaces. Additionally, many stakeholders on both sides of Lake Washington are deeply invested in the future of the SR 520 corridor, including engaged community members, elected officials, advocacy groups, businesses, regional institutions, and local, state and federal agencies. The SR 520 program is committed to preserving the longevity of these environments for all stakeholders.

From the launch of the Trans-Lake Washington Study in 1997, the region’s leaders were committed to a new cross-lake corridor that included several key environmental improvements:

- Transit and HOV capacity
- Bicycle and pedestrian access
- Fish passage
- Noise reduction
- Stormwater treatment

The Trans-Lake Washington Study began in 1997 and analyzed a wide variety of options to improve cross-lake travel.
Following legislative direction and funding, initial work analyzed by the Trans-Lake Washington Study would eventually become the SR 520 Bridge Replacement and HOV Program. Following publication of the project’s draft environmental impact statement in 2006 and at the direction of the Washington State Legislature, the SR 520 program conducted several other studies to analyze the integration between proposed transportation improvements in the SR 520 program and the communities surrounding the project area. These studies led to several reports further clarifying a sustainability ethic. These reports, which are linked in Appendix A, include:

- Health Impact Assessment (2008)
- Project Impact Plan (2008)
- High Capacity Transit Plan (2008)
- Washington Park Arboretum Mitigation Plan (2010)
- Design Refinements and Transit Connections (2010)
- Seattle Community Design Process (2012)

In 2011, WSDOT completed environmental analysis necessary for the SR 520 program. Required mitigation and other community commitments related to construction and operations of the new SR 520 corridor are included in the projects’ respective Records of Decision.

**History of sustainability on the SR 520 program**

WSDOT has considered sustainable solutions from the start of the planning and environmental approval process for the SR 520 corridor. For example, the SR 520 Health Impact Assessment report is a unique and effective assessment and tool that provided indicators for success from both a community and a sustainability perspective.

Sustainability took a more specific role in the SR 520 program with the Floating Bridge and Landings Project (FB&L). In fall 2010, SR 520 program leadership began an evaluation of how sustainability measures could be introduced into the upcoming design-build contracting and construction method for the FB&L Project. WSDOT realized there was an opportunity to integrate sustainability into the contract documents, and for the first time in WSDOT history and one of the first times in the nation, sustainability criteria were included in the Request for Proposals, solidifying WSDOT’s commitment and ensuring that the successful bidder would need to develop and implement sustainability measures into construction planning.

Additionally, the SR 520 sustainability program is supported by and aligned with the sustainability intent of the governor, the Legislature, the United States Department of Transportation, and the Federal Highway Administration. More information about state and national precedents the SR 520 program aligns with are included in Appendix B.
How does WSDOT define sustainability for the SR 520 program?

WSDOT defines sustainable transportation as a durable, adaptable and integrated statewide transportation system that supports Washington's economy, preserves the environment and enhances our communities. The Washington transportation system is strategically managed and operated to meet society’s present needs without compromising the ability of future generations to meet their own needs. Specific to the SR 520 program, sustainability considers the long-term environmental, social and economic effects of project plans in addition to safety and mobility benefits.

Golden Thread Vision for Sustainability

SR 520 program management and staff collaboratively created a sustainability vision. Integrated strategically across the SR 520 program through a sustainability Golden Thread, individual projects are evaluated against the vision for further actions that can strengthen their sustainability effectiveness. For more information on the Golden Thread goals and how they relate to SR 520 projects, see Appendix C.

What does the SR 520 Sustainability Report cover?

This SR 520 Sustainability Report captures efforts to introduce sustainability principles and practices in all projects within the SR 520 corridor. This is the first sustainability report published by the SR 520 program to document and evaluate the sustainability efforts made to date, and to preview plans to integrate sustainability in future SR 520 construction projects.

This report covers the following topics:

- Overview of how sustainability is included in projects currently underway (Floating Bridge and Landings Project, Eastside Transit and HOV Project, Pontoon Construction Project)
- How sustainability can be implemented in future work on the west side of the SR 520 corridor
- WSDOT’s efforts to communicate sustainability
- Conclusions and next steps
What is the SR 520 program?

The SR 520 Bridge Replacement and HOV Program consists of four already funded construction phases, and remaining unfunded projects west of the SR 520 floating bridge.

Construction underway

• **The Floating Bridge and Landings Project** will replace the existing floating bridge with a new six-lane floating bridge that includes two general-purpose lanes and one transit/HOV lane in each direction, as well as a bicycle/pedestrian path. The bridge will be built to modern safety standards and will be able to resist windstorms of up to 89 mph. Construction started in 2012. This project also builds 44 of the 77 total pontoons needed for the new bridge. The West Connection Bridge is under construction as part of this phase, which will temporarily connect the new floating bridge to the existing west approach.

• **The Medina to SR 202: Eastside Transit and HOV Project** will complete and improve the 8.8-mile HOV system from Evergreen Point Road to the SR 202 interchange. The improved six-lane corridor will include two general-purpose lanes and one transit/HOV lane in each direction. The project also includes regional bicycle and pedestrian paths, new lids at Evergreen Point Road, 84th Avenue Northeast and 92nd Avenue Northeast, median transit stops at two of the lids, noise walls, fish-friendly culverts, and stormwater treatment and detention facilities. Construction started in 2011.

• **The Pontoon Construction Project** includes building a new casting basin and 33 pontoons. Twenty-one of these pontoons will be the largest ever built in Washington, at 360 feet long. Three of six cycles in Aberdeen are currently complete. Construction started in 2011.

Next phase of construction

• **The West Approach Bridge North Project** will construct a new bridge designed to modern earthquake standards that will connect six lanes of traffic and a bicycle/pedestrian path from Seattle’s Montlake interchange to the new floating bridge. Construction will begin in summer 2014.
Future construction

- **The remainder of I-5 to Medina**: Bridge Replacement and HOV Project elements from I-5 to the Montlake interchange and the West Approach Bridge South are currently unfunded for construction. When these elements are funded, WSDOT will build two lids, widen the corridor to six lanes, improve bicycle and pedestrian connections, and build new, safer bridges designed to modern earthquake standards.

**Sustainability in the Floating Bridge and Landings Project**

**The Floating Bridge and Landings Contract**

The Floating Bridge and Landings (FB&L) Project served as an opportunity for WSDOT to present an agency wide commitment to sustainability in a community where a strong commitment to sustainability at any rate would be required. WSDOT integrated sustainability into the core of the project by including sustainability as a key element of the Request for Proposals for the first time in WSDOT history. Kiewit/General/Manson, A Joint Venture (KGM), won the design-build contract and has been implementing WSDOT’s sustainability commitments.

**Design-Build Commitments**

WSDOT required the winning design-build contractor, KGM, to draft and implement a Sustainability Practices Plan (SPP) (see Appendix D). The purpose of the plan is to describe and quantify the specific strategies and actions undertaken during design and construction to meet sustainability goals, as well as to lay a foundation for continuous improvement in sustainability throughout the life of the project.

**Sustainability Task Force**

Throughout the project, a standardized monthly report communicates results to the FB&L Sustainability Task Force. The task force is composed of the SR 520 program sustainability and communications staff, design-build staff, and WSDOT project staff. The task force works collaboratively to review sustainability goals and achievements, and to ensure adherence to the SPP.

The task force includes several reporting mechanisms to communicate progress toward sustainability goals:

- Monthly sustainability reporting through a dashboard, which shows progress against the goals defined in the SPP.
- Annual reports of project performance, data, outcomes and findings; the first annual report was completed in July 2013 (see Appendix A).
- A final, project-end report documenting performance across the entire life of the project.
Baseline Sustainability Practices

Since adopting the SPP in April 2012, KGM has been committed to strategically improving the sustainable practices on the FB&L project. The strategies detailed in the SPP are designed to achieve:

- Increased materials reuse and recycling
- Reduced fossil-fuel use in transportation
- Reduced energy use in design and construction
- Reduced water use in design and construction
- Improved environmental quality for people and the natural environment.

KGM has collected and analyzed data to measure sustainability indicators and evaluate progress toward established goals and the strategies used to achieve them. For some sustainability indicators, baseline levels needed to be established before progress could be measured. During the first year of the project KGM collected data to establish baseline numbers for various metrics. These metrics include numbers such as “how much water and energy crews use at a specific site during construction cycles.” Baseline data allows KGM to develop targets for its sustainability goals. Types of targets are:

- Quantitative reduction targets: e.g. a 5 percent reduction per year
- Continuous improvement targets: e.g. this year’s metric improved from last year’s metric
- High initial targets based on industry benchmarks: e.g. a 75 percent reduction of project waste

Sustainability Results

The FB&L project has already begun to see results from its sustainability practices, with the first year setting the baseline in most areas of performance. Multiple strategies in the SPP rely on implementation of best management practices (BMPs) to establish a high level of performance as the basis for reaching higher levels of performance over the life of the project. Where BMPs have been identified as a component of analysis for a given performance area (or a specific metric), the industry best practice was identified as the baseline. The first year of tracked performance was used as the benchmarking year for future improvement when generally accepted BMPs were not available.

KGM has developed several specific design innovations to reduce the overall amount of materials required and amount of work done on Lake Washington. These include:

- **Innovative column design:** reduces overall material use and significantly reduces on-water concrete work, providing benefits both to habitat and water quality.

Solar panels power tilt meters on the pontoons.

On Oct. 29, 2013, KGM was recognized as one of the top 50 greenest businesses in Washington state.

KGM was recognized for the incorporation of the Sustainability Practices Plan, the Sustainability Task Force, and establishing sustainability baselines and metrics for its construction work on the SR 520 Floating Bridge and Landings Project.
• **Footing design**: reduces concrete requirements by 12,500 cubic yards, equivalent to a reduction of 3,100 tons of greenhouse gas emissions, and reduces impacts to aquatic habitat.

• **High-strength rebar**: reduces the amount of rebar needed by as much as 260 tons.

• **Minimized grinding**: improves local air quality and minimizes the need for future roadway resurfacing.

• **Stormwater mitigation on new bridge**: limits vehicle pollution from entering Lake Washington.

Additionally, KGM developed the following construction innovations:

• **Waste diversion and recycling**: crews are recycling nearly 80 percent of project waste.

• **Reduced travel distance for concrete trucks**: reduction in nearly 200,000 miles of travel distance.

• **Use of lake water for pontoon ballast**: saved approximately 1.76 million gallons of potable water.

• **Use of electric power**: reduces noise, air pollution, and greenhouse gas emissions.

• **New storm water infrastructure**: provides on-site treatment and infiltration of water on construction sites.

As part of the ongoing quality assurance process for the FB&L sustainability program, the Sustainability Task Force holds quarterly construction site visits. Site visits to the Kenmore and Tacoma construction sites have resulted in the addition of sustainability-related signage and discussions with workers on-site about sustainability goals. In general, the sustainability efforts at the sites are well-understood, documented and managed.

The FB&L project has now reached the end of the baseline year and monthly dashboard reporting has proven useful as a management tool. The Sustainability Dashboard is displayed prominently at construction sites and used as part of regular “toolbox” conversations with all on-site workers.

WSDOT and KGM’s first year showed significant progress in both meeting established goals and establishing baselines.

On the following page are samples of the dashboard that KGM and WSDOT use to review results:
### MATERIALS

<table>
<thead>
<tr>
<th>Recyclers Waste Using Recycled Material</th>
<th>Using Recycled Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kenmore/Floating Bridge CTC</td>
<td>Kenmore/Floating Bridge CTC</td>
</tr>
<tr>
<td>= 20 tons recycled material</td>
<td>= 20 tons recycled material</td>
</tr>
<tr>
<td>98%</td>
<td>81%</td>
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### RESOURCE USAGE

#### Job Site Water Usage

<table>
<thead>
<tr>
<th>Kenmore/Floating Bridge</th>
<th>CTC</th>
</tr>
</thead>
<tbody>
<tr>
<td>47 Gallons of water used per cubic yard of concrete</td>
<td>6,336 Gallons of water used per cubic yard of concrete</td>
</tr>
<tr>
<td>No Data on Gallons of process water treated per cubic yard of concrete</td>
<td></td>
</tr>
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</table>

#### Job Site Energy Usage

<table>
<thead>
<tr>
<th>Kenmore/Floating Bridge</th>
<th>CTC</th>
</tr>
</thead>
<tbody>
<tr>
<td>184 kWh / CY CONCRETE</td>
<td>1,083 kWh / CY CONCRETE</td>
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</table>

### EMPLOYEE COMMUTE

#### Carpooling/Public Transportation

<table>
<thead>
<tr>
<th>Kenmore/Floating Bridge</th>
<th>CTC</th>
</tr>
</thead>
<tbody>
<tr>
<td>19%</td>
<td>11%</td>
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</table>

#### Regionally Sourced Materials

<table>
<thead>
<tr>
<th>Kenmore/Floating Bridge</th>
<th>CTC</th>
</tr>
</thead>
<tbody>
<tr>
<td>85% of overall material by ton</td>
<td>16% of overall material by ton</td>
</tr>
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</table>
Sustainability in other SR 520 construction projects underway

Eastside Transit and HOV Project – Sustainability practices

When the Eastside construction project was launched in 2011, contractor Eastside Corridor Constructors (ECC) was not required to include sustainability requirements. However, ECC had included several sustainability measures in its proposal. In early 2011, SR 520 program staff began to meet with the Eastside construction team to discuss the sustainability elements included in the proposal, how to implement elements of the proposal and possible enhancements of the sustainability effort. The following are sustainability practices that have been employed by the Eastside project.

The design-builder’s sustainability practices include but are not limited to:

- Reuse existing structures where possible to reduce demolition
- Incorporate reclaimed asphalt pavement to reduce material use and hauling
- Recycling of concrete debris
- Reuse of vegetation as topsoil and removed trees as in-stream fish habitat
- Implementation of a project wide no-truck-idling policy.
- Strategies to reduce idling from traffic delayed by construction
- Collection and reuse of stormwater runoff for dust abatement

Pontoon Construction – Sustainability practices

Similar to the Eastside project, the Pontoon Construction Project was launched without sustainability requirements in the contract. During the contracting process, however, the successful contractor included a design innovation that substantially reduced the need for concrete in the casting basin. While WSDOT had proposed a casting basin with a concrete floor and walls, the contractor’s proposal was to build rock walls as opposed to concrete walls, reducing the amount of concrete by 12,800 cubic yards. In addition, the pontoon project met other sustainability goals such as reuse of a brownfield site, developing a water treatment system for construction water, and developing an innovative way to protect fish during the float-out processes. The project also provides an economic benefit to the local community by providing more than 300 jobs.

Beyond required environmental mitigation efforts like the Grass Creek Mitigation Site, the Pontoon Construction Project has achieved the following sustainability results:

- Reduced greenhouse gas emissions by 3,200 tons based on innovative design for the casting basin
• Implemented fish-handling procedure for pontoon float-outs that ensured fish were safely gathered from the casting basin, inspected, and returned to the Chehalis River

**Sustainability opportunities in future design and construction**

**West Approach Bridge North**

The next full construction project for the SR 520 Bridge Replacement and HOV Program is the West Approach Bridge North (WABN). When complete, the WABN project will connect westbound-traveling cars, buses, bicycles and pedestrians traveling from the floating bridge to the Montlake area, providing six lanes of travel between Montlake and the Eastside. The WABN project also advances aquatic and wetland mitigation.

WABN offers an opportunity to fulfill vision-related goals identified in the 2011-2012 Seattle Community Design Process, described below. Throughout the design period the team has included opportunities to incorporate strategies recommended in the Golden Thread:

Reduce, reuse, recycle:

• Stormwater treatment facility design
  o Minimize the use of walls/concrete.
  o Build permanent features where possible.

• LED lighting
  o Use LED for regional shared-use path.

Reduce greenhouse gases:

• Column/shaft size reduction
  o Reduce the column/shaft size, with a resultant savings of 6,250 tons of carbon dioxide.

• Tree retention
  o Develop and implement a tree and vegetation management plan.
  o Reduce net tree and vegetation loss.

Improve access:

• Complete regional shared-use path.

• Maintain and enhance transit infrastructure (such as the northbound/southbound Montlake Boulevard transit stops, SR 520 westbound transit stop, and bike lockers).

• Enhance nonmotorized access across SR 520.

Finally, WSDOT is considering a number of opportunities to strengthen construction sustainability for WABN, and the SR 520 program team is focused on finding the right approach to sustainability within the design-bid-build contracting method. Some of the opportunities being considered will build on the construction approach used on the FB&L Project.
Design and construction of the west end: I-5 to Montlake

WSDOT is still seeking funding for the remainder of the I-5 to Medina project. In August 2011, WSDOT began the Seattle Community Design Process (SCDP) in order to inform the public about the project’s baseline design, seek community input and support for a refined vision, and develop design preferences for areas between I-5 in Seattle and the floating bridge. The SCDP included representatives from local communities as well as representatives from local interest groups and agencies.

WSDOT with the assistance of the Seattle Design Commission developed a vision statement for the west side

Our vision for the SR 520 corridor is to become the premier gateway for the City of Seattle by reconnecting to the early Seattle vision of Nature meets City.

WSDOT intends to implement the remainder of the I-5 to Medina project in a manner that yields cost-effective solutions and fosters sustainability practices that support regional and local connectivity, ecology and the use of low-carbon materials.

Based on the commitment to sustainability in the SR 520 program and the intent from the west side communities, the I-5 to Medina project represents an opportunity to integrate urban design and sustainability principles into design and construction. Strategies to accomplish this are identified for the following areas and lead to three primary outcomes:

Connectivity:

• Increase transit and HOV access.
• Complete regional bicycle and walking facilities.
• Connect communities situated north and south of the corridor.
• Help complete the Olmstedian vision of connected parks and greenways.
• Improve public access to Lake Washington and Portage Bay shorelines.

Ecology:

• Restore natural habitat.
• Collect, treat and return water run-off to the natural environment.
• Reduce noise and pollution during construction and for the life of the corridor.
• Reduce the accumulation of greenhouse gases (GHG) from construction materials, traffic delays during construction, and ongoing operation of the corridor.

Materials:

• Reduce use of new materials through use of recycled materials and product innovation.
• Obtain locally sourced materials to help the regional economy and reduce transportation-generated GHG.
• Reduce the use of carbon-intensive materials.
• Select materials and systems on a life-cycle cost basis.

Outcomes:

• Improved transit, cycling and walking options can lead to more economically robust and livable communities.
• Increased modal options, decreased congestion due to construction, improved long-term operations of the highway, and use of lower carbon intensive materials can lead to improved short-term and long-term air quality.
• Life-cycle material and systems selection leads to better long-term value.

For more information about the west side sustainability urban design strategy and outcomes, see Appendix E.

SCDP resulted in a final report published in December 2012 (see Appendix A) that addresses many of the items listed above. When funding becomes available, future detailed designs will identify specific sustainability actions that will be incorporated in construction documents.

**Communicating sustainability**

In early 2011, WSDOT began creating internal and external strategic communications regarding the SR 520 program’s sustainability initiative. Internal efforts include:

• Extensive training for program staff and project team members in sustainable design and construction practices.
• Team engagement with sustainability experts consulted both for the FB&L project and for the Seattle Community Design Process.
• Briefings of SR 520 leadership on sustainability progress and challenges.
• Briefings of WSDOT sustainability and environmental staff on SR 520 program efforts.
• Participation in broader WSDOT sustainability efforts such as the review of the Federal Highway Administration’s sustainability measurement tool.

External communications include:

• A sustainability folio that is available in print and through the program’s website.
• Extensive materials and presence for the Seattle Community Design Process that illustrate sustainable options and features.
• Briefings for the Seattle Design Commission on the integrated sustainability elements.
Conclusion

WSDOT indicated an early commitment to sustainability in the FB&L project by including sustainability in the Request for Proposals, producing the Sustainability Practices Plan, and continually reporting on and being accountable to sustainability metrics. The success of this project has carried forward into planning for the inclusion of sustainability elements in the next construction phases: the West Approach Bridge North and the “rest of the west” from I-5 to Montlake.

During the remainder of the SR 520 program, WSDOT will continue to assure the quality and continuity of the sustainability program through monitoring projects in construction, encouraging and supporting sustainable choices through the design process, and designing each new construction project with the findings and improvements of the previous projects embedded into the approach.

WSDOT leadership and the SR 520 Bridge Replacement and HOV Program leaders have made specific commitments to sustainability, with a clear and specific vision and approach tied to measurable goals and deliverables. This is an unprecedented program in many ways – from the unique and powerful environmental and community processes to its commitment to transparency and excellence in sustainable delivery.

The program wide approach to sustainability builds on this commitment and extends WSDOT’s vision of great transportation solutions that support healthy communities and a thriving future.
Appendices

APPENDIX A: Links to additional reference materials

APPENDIX B: Overview of the Requirements, Executive Orders and Guidelines that were consulted and used to design and define the SR 520 Sustainability Program.

APPENDIX C: SR 520 Golden Thread

APPENDIX D: The Floating Bridge & Landings Sustainability Practices Plan

APPENDIX E: SR 520 sustainability+urban design strategies and outcomes for westside design and construction

Appendix A – Further References

- Health Impact Assessment (2008)
- Project Impact Plan (2008)
- High Capacity Transit Plan (2008)
- Washington Park Arboretum Mitigation Plan (2010)
- Design Refinements and Transit Connections (2010)
- Seattle Community Design Process (2012)
- WSDOT Sustainable Transportation
- FB&L Sustainability Report (2013)

Appendix B – Requirements, Executive Orders, and Guidelines

This appendix provides an overview of the Requirements, Executive Orders and Guidelines that were consulted and used to design and define the SR 520 Sustainability Program.

Compatibility with Executive Orders

There are several Executive Orders related to climate change. Executive Order 07-02 specifically sets forth challenges to state agencies that translate to the program/project level. WSDOT subsequently issued a guidance document to help programs/projects reduce greenhouse gas emissions. Both of these documents are summarized below. As the practice of sustainability evolves nationally as well as on the SR 520 program, it is important to the SR 520 team to learn from other practitioners and to incorporate other best practices into the SR 520 program. Several documents have been particularly helpful, beginning with the Health Impact Assessment that was requested by the 2007 Washington Legislature.
Executive Order 07-02: Washington Climate Change Challenge
The Executive Order challenges state agencies to better reduce greenhouse gases, and envisions a future “...in which citizens and goods move more efficiently with less pollution; infrastructure investments and good planning create transportation choices and sustainable communities.” Suggested actions include: (1) Reducing greenhouse gases emissions and increasing transportation choices for the future, such as encouraging bicycle and pedestrian accessibility and (2) encouraging urban Brownfield redevelopment.

Executive Order 1082.00: Business Practices for Moving Washington
This Executive Order establishes the Moving Washington framework to help develop a 21st century transportation system through transparent, cost-effective decisions. Suggestions include conducting business in a way that is reliable, responsible and sustainable.

Washington State Department of Transportation Guidance for Project-Level Greenhouse Gas and Climate Change Evaluations (October 2010)
The greenhouse gases portion of this document acknowledges that there are four relevant components to GHG. To quote:

*There are four types of GHG emissions that may be considered at the project-level: operational, construction, embodied, and lifecycle emissions. WSDOT’s guidance focuses on operational and construction emissions, while acknowledging embodied and lifecycle emissions.*

**GHG emissions** released by vehicles using project roadways—these emissions are typically increased because of idling during construction delays

**Constructions emissions** are released during project construction and primarily come from fuel burned in the equipment used to build a project, such as bulldozers, pavers, and rollers. Construction emissions can also result from increased traffic congestion caused by construction activities.

**Embodied emissions** are the emissions generated in producing the materials that are used in the construction process and include emissions from sourcing the raw materials from the earth and their conversion into a usable form, including the energy used in processing.

Embodied emissions can be thought of as “cradle to site” emissions. For example, the emissions released while mining the coal used to manufacture the steel girders for a bridge would be considered embodied emissions.

**Lifecycle emissions** include emissions released during material production (embodied) and emissions released throughout a facility’s lifetime, including demolition and disposal. Unlike embodied
emissions, lifecycle emissions account for the durability of a product. Lifecycle emissions are often referred to as “cradle to grave” emissions.

The Guidance document goes on to suggest the following project-level actions that can help reduce greenhouse gas emissions:

- Reducing stop-and-go conditions
- Improving roadway speeds to a moderate level
- Improving intersection traffic flow to reduce idling
- Creating more safe and efficient freight movement
- Expanding transit and nonmotorized options for travelers
- Increasing the reliability of transit and HOV travel times
- Increasing vegetation density over pre-project conditions to sequester carbon.

**Alignment with the SR 520 Health Impact Assessment**

**SR 520 Health Impact Assessment**

In May 2007, Senate Bill 6099 directed that Puget Sound Clean Air Agency (PSCAA) and Seattle/King County (Public Health) conduct a health impact assessment (HIA) for the SR 520 Corridor with the following goals:

1. Assess the SR 520 Replacement Bridge and HOV Project’s impact on “air quality, carbon emissions and other public health issues” per SB 6099.
2. Protect the health of the public by raising awareness among decision makers of the relationship between health and the physical, social and economic environment, thereby ensuring that they include a consideration of health consequences in their deliberations.
3. Make recommendations to enhance the positive impacts and to remove or minimize any negative impacts on health.

There are 14 recommendations included in the four areas:

**Construction Period**

1. Reduce construction-related pollution.
2. Increase traffic management.
3. Provide for construction noise control.

**Transit, Bicycling, and Walking**

1. Increase and improve transit service to meet increased demand, attract more riders, and reduce air pollution.
2. Install connected walking and bicycling facilities throughout the corridor.
3. Create a common way-finding system.
4. Provide safe mobility on pedestrian and bicycling paths, and at transit stops and transfer points.
Landscaped Lids and Green Spaces
1. Include six landscaped freeway lids.
2. Use landscaping materials throughout the SR 520 corridor, along adjacent trails and roadways and at transit stops.
3. Improve and preserve the integrity of the Washington Park Arboretum, and the ability of visitors to enjoy it and other green spaces and naturals areas.
4. Preserve access to the waterfront for water-related activities.

Design Features
1. Reduce noise throughout the corridor.
2. Add to the adjacent communities’ visual character with art and design.
3. Utilize innovative storm water management practices along the SR 520 corridor to reduce vehicular pollution from entering Lake Washington.

Alignment with Nationally Recognized Sustainable Transportation Assessment Tools

FHWA Sustainable Highways (INVEST)-Project Development
The Federal Highway Administration (FHWA) has developed a prototype for a self-evaluation tool to help transportation agencies design, build, and maintain more sustainable highways. This self evaluation tool, INVEST (Infrastructure Voluntary Evaluation Sustainability Tool), was developed as a practical, web-based collection of voluntary best practices, called criteria, to help transportation agencies integrate sustainability into their programs and projects.

INVEST is still being refined to improve its usefulness. Based on best practices already being employed on SR 520 and other WSDOT programs, WSDOT provided FHWA with a list of recommendations that helped strengthen this version of INVEST.

The INVEST scorecard is broken into three modules that reflect project phases: System Planning, Project Development, and Operations & Maintenance. There are a total of 60 measurement areas across these three modules. INVEST provides good overall guidance that is particularly suited to agencies that are just beginning to manage more sustainably, but it often lacks the specificity to be useful on the SR 520 corridor.

ASCE Envision
The American Society of Civil Engineers (ASCE), American Consulting Engineers Council (ACEC), and American Public Works Association (APWA) have joined together to build a sustainable infrastructure rating system called Envision. Envision provides a holistic framework for evaluating and rating the community, environmental, and economic benefits of all types and sizes of
infrastructure projects. In particular, The Envision Rating System evaluates, grades and gives recognition to infrastructure projects that use transformational, joint approaches to assess the sustainability indicators over the course of the project's life cycle.

Envision™ can be used to:
- Meet sustainability goals.
- Be publicly recognized for high levels of achievement in sustainability.
- Help communities and project teams to collaborate and discuss “Are we doing the right project?” and “Are we doing the project right.”
- Make decisions about the investment of scarce resources.
- Include community priorities in civil infrastructure projects.

Further, The Envision™ tools help the design team:
- Assess costs and benefits over the project lifecycle.
- Evaluate environmental benefits.
- Use outcome-based objectives.
- Reach higher levels of sustainability achievement.

Envision includes 55 measures across the following five areas:
1. Quality of life
2. Leadership
3. Resource allocation
4. Natural world
5. Climate

Although Envision is intended to be applied across a broad range of civil engineering projects, it has a strong focus and specificity that better addresses the needs of SR 520 designers than the FHWA's tool. Envision also builds upon organizational PDCA (Plan, Do, Check, Act) processes and discipline to conform to the ISO 14000 family of standards on Environmental Management. As the SR 520 team continues to build its sustainability plan and processes, it will draw upon the Envision tool and ISO 14000 to strengthen SR 520's alignment with these nationally and internationally recognized bodies.

**PANYNJ Sustainability Guidelines**
The Port Authority of New York/New Jersey has developed an extensive Sustainability checklist to guide all of its infrastructure projects. Although the SR 520 program is not using the checklist per se, there are some good examples of sustainable approaches in the PANYNJ design manual and guidelines.
Appendix D – Sustainability Practices Plan

Plan Elements

Part 1: Sustainability Framework and Plan Context
Part 1 describes the overall framework used by Kiewit/General/Manson - A Joint Venture (KGM), in partnership with WSDOT, in approaching sustainability planning, monitoring, and reporting on this project. It defines:

- The relationship between desired sustainability outcomes
- The areas of environmental performance that contribute to that outcome
- The associated metrics or indicators that will be used to measure progress in each performance area
- The actions that will be taken by the contractor in the sustainability plans to achieve those outcomes

This section also discusses the context of the development of this framework as a pilot within a larger context of WSDOT sustainability initiatives.

Part 2: Sustainability Plans & Strategies
Part 2 describes the sustainability strategies to be implemented in five main areas:

- Increased materials reuse and recycling
- Reduced fossil-fuel use in transportation
- Reduced energy use in design and construction
- Reduced water use in design and construction
- Improved environmental quality for people and the natural environment

Part 3: Sustainable Practices – Monitoring & Reporting
Part 3 establishes the system by which the contractor will monitor and report progress on elements of the sustainability plan to WSDOT.

Part 4: Sustainability Personnel, Communications & Training
Part 4 defines and describes the personnel and their roles for participating in the Sustainability Task Force, and establishes the Sustainability Communications Protocol.

It also describes the training of relevant staff and vendors in sustainable practices contained in this plan and in tracking and monitoring progress.
Plan Phases
The Plan Elements above are being developed and applied in the following phases:

Phase I – CTC & Kenmore Job Sites
The first phase is the application of these elements to the job sites at Concrete Technology Corporation (CTC) and Kenmore as they begin building pontoons, anchors and deck panels, and other early-phase construction.

Timeline & Milestones
- Plan delivery to WSDOT – Jan 27, 2012
- Key staff in-person orientation and feedback session (trainings) for CTC & Kenmore – Late January / Early February
- On-demand video training developed for delivery – Mid-February

Phase II – Floating Bridge and Landings Construction
Phase II integrates the analysis from Phase I – CTC and Kenmore into establishment of Communications, Sustainability Strategies, and Monitoring for the full floating bridge and landings construction process.

Timeline & Milestones
- Plan delivery to WSDOT – early March 2012
- Staff training updated and developed for use at all sites – March 2012

Phase III – Lessons Learned and Initial Review
Phase III will result in an initial report of progress to date on sustainability metrics and lessons learned from the plan development process.

Timeline & Milestones
- Plan delivery to WSDOT – early summer 2012
- Annual reporting through physical completion
- Final Report – At project completion

Appendix E – SR 520 Sustainability+Urban Design Strategies and Outcomes for Westside Design and Construction
(See insert on page 27)
SR 520 sustainability

The SR 520 Bridge Replacement and HOV Program is the first program in the U.S. working to implement measurable sustainability criteria across an entire corridor. These criteria seek to improve the environmental, social, and economic welfare of communities affected by construction and operation of public infrastructure.

### SR 520 Golden Thread

The SR 520 Program includes a **Golden Thread of Sustainability**, four key sustainability goals that are woven through the design, construction, and operation of the new SR 520 corridor. These goals are:

- **Reuse, reduce, or recycle** construction materials
- **Reclaim existing sites and facilities** for new uses
- **Reduce greenhouse gases** during construction and for the life of the corridor
- **Improve access** for all users to transportation options and community space

#### Eastside Transit and HOV Project

- Enhance public open space.
- Improve transit access and quality of experience.
- Recycle construction materials.
- Improve fish passage.
- Provide continuous HOV lanes.

#### Floating Bridge and Landings

- Reduce stormwater pollution discharges to the lake.
- Minimize in-water impacts.
- Reduce construction duration.
- Increase structural durability and life-cycle costs.
- Decommission the existing floating bridge.
- Use existing industrial sites.

#### Westside Design and Construction

- Assure integration of urban and sustainability design principles.
- Increase transit and HOV access.
- Increase access to public open space.
- Reduce infrastructure impacts on the natural environment.
- Reduce construction-related noise and pollution.

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- **Rendering of Evergreen Point Road lid with improved transit operations and new open space.**
- **New and wider culverts will provide better fish passage on the Eastside.**
- **Pontoon construction under way at an existing site in Tacoma.**
- **Rendering of the new path on the floating bridge that will connect cyclists and pedestrians to regional trails on both sides of Lake Washington.**
The SR 520 Bridge Replacement and HOV Program is the first program in the U.S. working to implement measurable sustainability criteria across the design, construction, and operational phases of the project as well as across an entire corridor. These criteria seek to improve the environmental, social, and economic welfare of communities affected by construction and operation of the corridor.

- Complete regional bicycle and walking facilities.
- Connect communities situated north and south of the corridor.
- Help complete the Olmstedian vision of connected parks and greenways.
- Improve public access to Lake Washington and Portage Bay shorelines.
- Reduce use of new materials through use of recycled materials and product innovation.
- Obtain locally sourced materials to help the regional economy and reduce transportation-generated GHG.
- Reduce the use of carbon-intensive materials.
- Select materials and systems on a life-cycle cost basis.
- Restore natural habitat.
- Collect, treat and return water run-off to the natural environment.
- Reduce noise and pollution during construction and for the life of the corridor.
- Reduce the accumulation of greenhouse gases (GHG) from construction materials, traffic delays during construction, and ongoing operation of the corridor.

Improved transit, cycling and walking options can lead to more economically robust and livable communities. Increased modal options, decreased congestion due to construction, improved long-term operations of the highway, and use of lower-carbon-intensive materials can lead to improved short-term and long-term air quality. Life-cycle material and systems selection leads to better long-term value.
SR 520 Sustainability: Urban Design Strategies and Outcomes for West Side Design and Construction

The SR 520 Bridge Replacement and HOV Program is the first program in the U.S. working to implement measurable sustainability criteria across the design, construction, and operational phases of the project as well as across an entire corridor. These criteria seek to improve the environmental, social, and economic welfare of communities affected by construction and operation of the corridor.

**Complete regional bicycle and walking facilities.**
Increase transit and HOV access.
Connect communities situated north and south of the corridor.
Help complete the Olmstedian vision of connected parks and greenways.
Improve public access to Lake Washington and Portage Bay shorelines.

**Connectivity**

- Increase transit and HOV access.
- Complete regional bicycle and walking facilities.
- Connect communities situated north and south of the corridor.
- Help complete the Olmstedian vision of connected parks and greenways.
- Improve public access to Lake Washington and Portage Bay shorelines.

**Materials**

- Reduce use of new materials through the use of recycled materials and product innovation.
- Obtain locally sourced materials to help the regional economy and reduce transportation-generated GHG.
- Reduce the use of carbon-intensive materials.
- Select materials and systems on a life-cycle cost basis.

**Ecology**

- Restore natural habitat.
- Collect, treat and return water run-off to the natural environment.
- Decrease noise and pollution during construction and for the life of the corridor.
- Reduce the accumulation of greenhouse gases (GHG) from construction materials, traffic delays during construction, and ongoing operation of the corridor.

**Outcomes**

- Improved transit, cycling and walking options can lead to more economically robust and livable communities.
- Increased modal options, decreased congestion due to construction, improved long-term operations of the highway, and use of lower-carbon-intensive materials can lead to improved short-term and long-term air quality.
- Life-cycle material and systems selection leads to better long-term value.

**Community connections**

- Multimodal options
- Locally sourced materials
- Collect and treat run-off
- Community connections
For more information:

E-mail: SR520Bridge@wsdot.wa.gov
Website: www.wsdot.wa.gov/Projects/SR520Bridge

Mail: Washington State
      Department of Transportation
      SR 520 Program Office
      999 3rd Avenue, Suite 900
      Seattle, WA 98104

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