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**SR 520 Bridge Replacement
and HOV Project Draft EIS**

**Addendum to
Description of
Alternatives
and Construction
Techniques Report:
6-Lane Alternative Options**



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Sound Transit

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BMP	best management practice
EIS	Environmental Impact Statement
HCT	high-capacity transit
HOV	high-occupancy vehicle
WSDOT	Washington State Department of Transportation

Description of Options

The 6-Lane Alternative is one of the two build alternatives being evaluated in the SR 520 Bridge Replacement and HOV Project Environmental Impact Statement (EIS). Washington State Department of Transportation (WSDOT) is considering several design options that could enhance the 6-Lane Alternative and/or reduce some of its effects. This memo describes why we are considering options for the 6-Lane Alternative, how we identified and chose the options, and how the designs differ from the original 6-Lane Alternative.

Why are we considering options to the 6-Lane Alternative?

We are considering options in an effort to respond to some communities' and agencies' concerns and interests regarding the 6-Lane Alternative. Neighborhoods adjacent to the highway expressed concern that the proposed 6-Lane Alternative was too wide through the corridor. We also held workshops with representatives from Sound Transit, King County Metro, Kirkland, and Bellevue to look at developing better connections between SR 520 and the South Kirkland Park-and-Ride. While working with community leaders, we identified the following community-based goals:

- Narrow the width of the 6-Lane Alternative.
- Improve transit connections.
- Improve HOV access.
- Design the project to enhance local communities.
- Design a facility that is structurally feasible and cost effective.
- Preserve options for future high-capacity transit (HCT)
- Provide a better connection to the proposed Sound Transit Light Rail Transit Station at Husky Stadium.

During the course of their continuing involvement with communities in the SR 520 project area, we developed design options for the 6-Lane Alternative, in an effort to achieve these goals.

How did we identify the options?

In response to the communities' and agencies' concerns and interests, we convened two workshops to brainstorm a list of possible design options that could reduce the width of the 6-Lane Alternative, provide transit opportunities in the corridor, and address community issues. Workshop participants included experts in the fields of transportation, construction, and context-sensitive design. They met over three days, during which there were several breakout group sessions. On the first day, there were four focus groups:

- The transit service group explored possible transit service changes and the effects along the corridor. These changes included evaluating the removal of transit stops and direct access opportunities.
- The highway operations group looked at opportunities to reduce the width of the 6-Lane Alternative throughout the corridor. They evaluated the feasibility of dropping the auxiliary lanes between I-5 and Montlake, but determined that there would be safety and operational concerns for merging traffic between the I-5 and Montlake interchange. They also evaluated moving/reconfiguring the Montlake interchange.
- The bridge design and construction group focused on the feasibility of design, construction, and scheduling techniques, primarily centering on the rehabilitation, retrofit, and reuse of existing structures compared to complete replacement.
- The context sensitivity and community issues group considered and made recommendations for design options and design opportunities that would help the facility better fit into its neighborhood context.

After these sessions, the groups reconvened and reported their findings and recommendations to the larger group. Thus, ideas introduced by one group were discussed by other groups in subsequent breakout sessions.

Day two of the workshop used the key findings from day one to formulate various design options that would reduce overall footprint while maintaining safety, mobility, and operational efficiency along the corridor. Several different groups convened in an effort to mix and match the group expertise. During the first half of the day two groups

worked to develop design options for the corridor by exploring different lane configurations, interchange designs, transit applications, and context sensitivity. The afternoon working session built upon the corridor design option findings from the morning session. Further refinement of the design options was performed and a list of pros and cons were developed for each of the options.

On the final day of the workshop, a smaller group convened to review and develop the list of options to carry forward for analysis. The list of options was then evaluated through a screening process, one for Seattle and another for the Eastside. To be consistent with the project's past approaches to screening, the options were evaluated using criteria first developed in October 2000 for first-level screening in the Trans-Lake Washington Project. Information about the design, traffic operations, and the environmental analysis of the various design options proposed for the 6-Lane Alternative helped us determine which options would receive further review.

The following options in Seattle were selected for further study:

- Pacific Street Interchange
- Second Montlake Bascule Bridge
- No Montlake Freeway Stop

The following options on the Eastside were selected for further study:

- Bicycle/Pedestrian Path to the North
- No Evergreen Point Freeway Transit Stop
- Kirkland Park-and-Ride Transit Access (Bellevue Way and 108th Avenue Northeast)

What is the Pacific Street Interchange option?

The Pacific Street Interchange option would not alter the original 6-Lane Alternative in either the Lake Washington or the Eastside project areas.

The intent of the Pacific Street Interchange option is to reduce the traffic effects of the Montlake interchange on the surrounding neighborhood and to narrow the SR 520 footprint through the Montlake community and across Portage Bay. To do this, the Montlake interchange along with the existing transit stops on SR 520 would be removed and

replaced with a new Pacific Street Interchange to the east. The new interchange would be primarily located over the WSDOT-owned peninsula near the Washington Park Arboretum. The new interchange would include transit/HOV direct access ramps for the westbound off-ramp and eastbound on-ramp, as well as a new general-purpose interchange that would extend to the north via a new bridge over Union Bay and to the south over the Arboretum to Lake Washington Boulevard. Other improvements would occur at the Pacific Street/Montlake Boulevard intersection and along Montlake Boulevard, Pacific Street, and Pacific Boulevard. **Exhibits 1a through 1e** show the footprint of the Pacific Street Interchange option.

This option would not alter the original 6-Lane Alternative at the I-5/SR 520 Interchange.

See *Description of Alternatives and Construction Techniques* (CH2M HILL 2005; Appendix A to the Draft EIS) for a detailed description of this feature.

How would this option affect Seattle?

Bridges over SR 520

Like the original 6 Lane Alternative, four bridges over SR 520 would be rebuilt to provide room to widen SR 520:

- 10th Avenue East
- Delmar Drive East
- Montlake Boulevard
- 24th Avenue East

This option would only differ from the original 6-Lane Alternative at Montlake Boulevard, where Montlake Boulevard would be narrower because the on- and off-ramps to SR 520 would be removed. Montlake Boulevard would be four lanes wide (versus six lanes with the original 6-Lane Alternative) with bike lanes and turn lanes as necessary between Lake Washington Boulevard and the Montlake Bridge.

Portage Bay Bridge

The Portage Bay Bridge would be the same as the original 6-Lane Alternative, except that it would be narrower with six lanes (versus nine lanes with the original 6-Lane Alternative). **Exhibit 2a** shows the lane configuration. There would be four general-purpose lanes and two high-occupancy vehicle (HOV) lanes. Unlike the original 6-Lane

Alternative, there would be no auxiliary lanes or transit-only lane between I-5 and Montlake Boulevard.

Montlake Interchange

This option would differ substantially from the original 6-Lane Alternative at the Montlake interchange. The on- and off-ramps to SR 520 would be removed, along with the transit stops. **Exhibit 2b** shows the new lane configuration without the ramps and the transit stops. As shown, there would be no access to and from SR 520 at this location and SR 520 would be narrower, with six lanes (four general-purpose lanes and two HOV lanes) versus eight lanes plus the interchange ramps under the original 6-Lane Alternative.

Pacific Street Interchange

The Pacific Street interchange was not proposed as part of the original 6-Lane Alternative. This option would construct a new interchange to replace the function of the Montlake interchange. **Exhibits 2c and 3** show the lane configuration. This option would be constructed east of the Montlake interchange and over the Arboretum. It would be a full diamond interchange, except that it also would provide direct access ramps for transit and HOV coming from or going to the east. As such, the interchange would function with a signal at the general-purpose westbound on- and off-ramps, a signal at the transit/HOV direct access ramps, and a signal at the eastbound on- and off-ramps (see **Exhibit 3**).

Union Bay Bridge

The Union Bay Bridge was not proposed as part of the original 6-Lane Alternative. This bridge would be a column-supported ramp of four general-purpose lanes (two lanes in each direction) that would extend over Union Bay from the Pacific Street interchange over the Arboretum through the University of Washington Husky Stadium parking lot to the intersection of Pacific Street and Montlake Boulevard (**Exhibits 2b and 2c**). The new bicycle/pedestrian path across SR 520 would connect to the Pacific Street/Montlake Boulevard intersection via the Union Bay Bridge.

The navigational channel crossed by the new Union Bay Bridge would be the same width as the existing Union Bay reach (175 feet), with a

vertical clearance of either 70 or 110 feet.¹ Columns would be placed just outside the width of the ship canal to not block boat traffic.

Lake Washington Boulevard Ramps

Like the original 6-Lane Alternative, the existing Lake Washington Boulevard ramps and the ramps from the never-completed R.H. Thompson Expressway would be removed. The Lake Washington Boulevard ramps would be slightly different from the original 6-Lane Alternative because the ramps proposed under this option would connect to the Pacific Street interchange (see **Exhibit 2b**). The Pacific Street interchange would provide more access to SR 520 via eastbound on- and off-ramps and westbound on- and off-ramps.

HOV/Transit Direct Access Ramps

Direct access ramps were not proposed as part of the original 6-Lane Alternative. This option would provide direct access ramps for transit and HOV coming from or going east at the new Pacific Street interchange (**Exhibit 3**). A more direct connection between SR 520 and the proposed Sound Transit North Link Station at Husky Stadium would be provided via the Union Bay Bridge to the University area.

Pacific Street and Montlake Boulevard Intersection

Improvements to the Pacific Street/Montlake Boulevard intersection were not proposed as part of the original 6-Lane Alternative. This option would add lanes to and lower the intersection of Pacific Street and Montlake Boulevard 8 to 10 feet from the existing elevation. New pedestrian bridges would be constructed to allow pedestrian access over the vehicular traffic. **Exhibits 2c and 4** show the lane configuration.

Montlake Boulevard

Improvements to Montlake Boulevard were not proposed as part of the original 6-Lane Alternative. This option would widen Montlake Boulevard to six lanes north of the Pacific Street intersection (see **Exhibits 2c, 2d, and 4**). The new southbound lane would extend from

¹ The establishment of a new governing clearance would prevent any vessel with a higher clearance requirement from traveling east from the Montlake Cut to Lake Washington north of the Evergreen Point Bridge. Before establishing a new governing clearance, the Coast Guard will consider whether vessels requiring a higher clearance have an essential use in north Lake Washington. Two vessels with a vertical clearance higher than 70 feet are known to travel this part of Lake Washington. No vessels with a vertical clearance higher than 110 feet travel this part of the lake.

25th Avenue Northeast to the intersection and a new northbound lane would extend from the intersection to 45th Street just east of the 45th Street viaduct.

In addition, the Pacific Street/Pacific Place intersection would be improved. This option would add a new left-turn lane on Pacific Street and a new lane to Pacific Place.

What would the lids look like?

Like the original 6-Lane Alternative, two 500-foot-long lids would be built in Seattle: one connecting Roanoke/Portage Bay with North Capitol Hill and the other connecting the Montlake neighborhood. One lid would carry 10th Avenue East and Delmar Drive East over SR 520, and the other would carry Montlake Boulevard over SR 520. The lids would provide new landscaped, passive open space that would better connect the adjoining communities. WSDOT would work with the city of Seattle and the affected neighborhoods to complete the designs, if the 6-Lane Alternative is selected as the preferred alternative. See Appendix A to the Draft EIS, *Description of Alternatives and Construction Techniques* (CH2M HILL 2005) for depictions of local residents' ideas about the look and feel of the lids.

The lids are proposed to be 500 feet long because this is the estimated maximum tunnel length allowed before installation of ventilation systems would be necessary. If the 6-Lane Alternative were selected as the preferred alternative, WSDOT would conduct a detailed analysis to determine the exact maximum length for each lid at each location.

Would there be sound walls?

The sound walls proposed under this option would be similar to those for the 6-Lane Alternative, and would run along both sides of SR 520 for most of the project corridor. No major differences would occur, other than the walls at the Pacific Street interchange. In some locations the wall heights would differ because of roadway geometry. **Exhibit 5** shows the locations and heights of the proposed sound walls in Seattle.

The height measurements shown on these exhibits are the height of the wall above the grade of the highway; these measurements do not include any retaining walls that may be added during final design. The exception to this is the 8-foot-high sound wall between Lake Washington Boulevard and SR 520 in the Montlake area, where the 8-foot height is assumed to be above the retaining wall of the depressed

highway. The only sound walls along both sides of the Union Bay Bridge would be the standard concrete traffic barriers.

What is the Second Montlake Bridge option?

The intent of the Second Montlake Bridge option is to narrow the SR 520 footprint through the Montlake neighborhood, and provide transit (bus) access between SR 520 and the University of Washington. To do this, the Montlake transit stops would be removed and a second Montlake bridge would be constructed across the Montlake Cut.

Exhibits 6a and 6b show the footprint of the Second Montlake Bridge option.

The Second Montlake Bridge option would only alter the original 6-Lane Alternative near the Portage Bay Bridge, the Montlake interchange, and the Montlake Bridge, as follows:

- The Portage Bay Bridge would be the same as the original 6-Lane Alternative except that it would be narrower. **Exhibit 7a** shows the lane configuration. The bridge would be eight lanes wide (versus nine lanes with the original 6-Lane Alternative), with four general-purpose lanes, two HOV lanes, and two auxiliary lanes. Unlike the original 6-Lane Alternative, there would be no transit-only lane.
- The Montlake interchange would be the same as the original 6-Lane Alternative except that the SR 520 footprint would be slightly narrower because the transit stops would be removed. **Exhibit 7b** shows the lane configuration.

The second Montlake bridge was not proposed as part of the original 6-Lane Alternative. This option would construct a new bascule (draw) bridge located parallel to and just east of the existing Montlake Bridge. **Exhibit 7b** shows the lane configuration. The two bridges would operate as one-way in opposite directions. Each bridge would have three lanes, bike lanes, and sidewalks. The bridges would match the existing roadway at Pacific Boulevard to the north and between Hamlin and Shelby to the south.

What is the No Montlake Freeway Transit Stop option?

The intent of the No Montlake Freeway Transit Stop option is to narrow the SR 520 footprint through the Montlake neighborhood. By eliminating the Montlake freeway transit stops, this option would slightly reduce the original 6-Lane Alternative's footprint through the Montlake neighborhood. The function of the Montlake freeway transit stop would be assumed to occur at the University of Washington and would be closer to the proposed Sound Transit North Link station.

See **Exhibit 8** showing the reduced footprint from this option.

What is the Bicycle/Pedestrian Path to the North option?

The intent of the Bicycle/Pedestrian Path to the North option is to (1) eliminate the multiple hard turns and crossings of the SR 520 bicycle/pedestrian path as it extends east from the SR 520 east highrise and (2) combine the alignment of the bicycle/pedestrian path with the local Points Loop Trail, while providing a separation barrier between the two paths. The option reduces the steep grade for users of the bicycle/pedestrian path at Points Drive.

This option would only alter the original 6-Lane Alternative by placing the 14-foot-wide SR 520 bicycle/pedestrian path on the north side of SR 520 as it extends east off of the SR 520 east highrise. The path would be coupled with the realigned Points Loop Trail as it moves eastward following the northern edge of the SR 520 footprint. A 4-foot-wide physical barrier, of a type to be determined, would separate the bicycle/pedestrian path and Points Loop Trail. The bicycle/pedestrian path would extend approximately 1,500 feet farther east than the original 6-Lane Alternative; the path would be built on wall and fill as it follows the alignment of Points Drive.

See **Exhibit 9** for a visual simulation of this option.

What is the No Evergreen Point Freeway Transit Stop option?

The intent of the No Evergreen Point Freeway Transit Stop option is the same as the Bicycle/Pedestrian Path to the North option, except that it

would further narrow the SR 520 footprint through Medina by eliminating the freeway transit stop at Evergreen Point. The function of the Evergreen Point freeway transit stop would be absorbed by the Yarrow Point freeway transit stop. No physical changes to the Yarrow Point freeway transit stop would be necessary or provided. This option would shift the southern SR 520 footprint farther north in Medina than the original 6-Lane Alternative.

See **Exhibit 10** showing the reduced footprint from this option.

What is the South Kirkland Park-and-Ride Transit Access – Bellevue Way option?

The intent of the South Kirkland Park-and-Ride Transit Access – Bellevue Way option is to improve access for buses to and from the South Kirkland Park-and-Ride. This option would add a new lane on the eastbound SR 520 to northbound Bellevue Way loop ramp that would be striped to serve transit vehicles only. The lane would continue north on Bellevue Way and connect with Northrup Way east of the Bellevue Way/Northrup Way intersection. This intersection would have a signal to control the northbound right-turn movement.

The northbound Bellevue Way to westbound SR 520 loop ramp would be reconfigured to originate from Northrup Way just west of the former Northrup Way Park-and-Ride lot. A second eastbound lane would be added to Northrup Way between the new intersection and the location on Northrup Way where there are two through lanes in the existing configuration. See **Exhibit 11** showing the changes in footprint and lane configuration from this option.

What is the South Kirkland Park-and-Ride Transit Access – 108th Avenue Northeast option?

The intent of the South Kirkland Park-and-Ride Transit Access – 108th Avenue Northeast option is the same as the Bellevue Way option, but uses a different approach. To do this, a new transit/HOV-only eastbound off-ramp to 108th Avenue Northeast and a new transit/HOV-only westbound on-ramp from 108th Avenue Northeast would be added. Signal adjustments would eliminate the westbound

access onto SR 520 from northbound 108th Avenue Northeast.

Exhibit 12 shows this option's footprint.

The South Kirkland Park-and-Ride Transit Access – 108th Avenue Northeast option would only alter the original 6-Lane Alternative in the vicinity of 108th Avenue Northeast. East of Bellevue Way, the SR 520 footprint would be extended approximately 2,000 feet to the east and widened slightly to accommodate the new HOV direct-access ramps.

This option would widen and improve both 108th Avenue Northeast and Northup Way. **Exhibit 13** shows the lane configuration. One lane would be added to 108th Avenue Northeast between the eastbound on-ramp and 38th Place Northeast. Along with the additional through lane on 108th Avenue Northeast, the northbound leg of the 108th Avenue Northeast/Northup Way intersection would be channelized to include two exclusive left-turn lanes, a through lane, and a shared through/right-turn lane. This option would also add a second westbound left-turn lane at the 108th Avenue Northeast/Northup Way intersection.

How would the options differ from the original 6-Lane Alternative?

The options would not alter the following features of the 6-Lane Alternative:

- Navigation channels
- Bridge operations facility
- Pontoon anchors
- Aurora Borealis sculptures
- Tolls
- Flexible Transportation Plan
- Sound walls

See Appendix A to the Draft EIS, *Description of Alternatives and Construction Techniques*, for a detailed description of these features.

Bicycle/Pedestrian Path

The Pacific Street Interchange option would change the bicycle/pedestrian path connection from the Montlake interchange to the Pacific Street interchange. Instead of connecting to the Montlake interchange as in the original 6-Lane Alternative, the bicycle/pedestrian

path would follow the Union Bay Bridge from SR 520 and would end at the Burke-Gilman trail over the Pacific Street interchange (see **Exhibits 2b and 2c**). All other aspects of the bicycle/pedestrian path would be the same as the 4-Lane and 6-Lane Alternatives.

Stormwater Treatment

This section provides an overview of the stormwater treatment facilities that would be constructed for each of the options. For more detailed information about stormwater treatment, see the *Addendum to Stormwater Management Report* (CH2M HILL 2006).

Pacific Street Interchange Option

This option would extend the project footprint north of the Ship Canal and would affect city and county sewer systems in those areas. In general, stormwater north of the Ship Canal flows either to Portage Bay through University of Washington storm drainage pipes or to a King County combined sewer overflow pipe near the University of Washington Medical Center (University of Washington 1999; City of Seattle 2003). Storm drainage also flows to city combined sewer collector pipes, which connect to a King County sewer trunkline that flows north on Montlake Boulevard, under the Montlake Cut, then west on Pacific Street.

This option would construct additional lanes on southbound and northbound Montlake Boulevard Northeast. Because these lanes would contribute more flow to the city storm drains, new stormwater detention and treatment facilities would be constructed, as shown on **Exhibits 1a through 1e**. All of the new facilities would be built inside the right-of-way required for the roadway.

Along the SR 520 mainline, this option would include some footprint and profile changes from the original 6-Lane Alternative. The most notable of these changes would be the larger impervious surface area associated with the Pacific Street structure and the connecting ramps. In addition, the bridge pier wetlands proposed to be constructed between the peninsula and Foster Island under the original 6-Lane Alternative have been eliminated. Instead, use of these wetlands would be limited to areas east of Foster Island because of the separated roadways and piers in this area.

Second Montlake Bridge

The locations of stormwater treatment facilities would differ between the original 6-Lane Alternative and the Second Montlake Bridge option. **Exhibits 6a and 6b** show the locations of the proposed facilities.

Stormwater is currently conveyed along Montlake Boulevard to existing inlets and catchbasins at the intersections. It then flows to the city combined sewer system located on the north and south ends of the Montlake Bridge. Flows are then directed to a county trunkline that extends north under the Montlake Cut, then west along Pacific Street. The existing Montlake Bridge has grated decking, so precipitation falls directly off the bridge instead of generating stormwater.

Under the Second Montlake Bridge option, the new bridge would include an impervious deck surface that would convey stormwater off the bridge. In addition, this option would construct two new treatment and detention facilities on the north and south ends of the bridge that would collect and discharge stormwater to the city's combined sewer and the King County trunkline.

No Montlake Freeway Transit Stop

This option would slightly reduce stormwater flows compared to the original 6-Lane Alternative. Eliminating the transit stop at Montlake Boulevard would reduce the roadway footprint over Portage Bay and the Montlake interchange area. As a result, there would be less stormwater runoff and treatment facilities required at Portage Bay and Union Bay would be smaller. The stormwater treatment wetlands at Montlake and the Museum of History and Industry would also be smaller.

Bicycle/Pedestrian Path to the North

The Bicycle/Pedestrian Path to the North option would have relatively small stormwater effects because the length of the path is comparable to the one proposed for the original 6-Lane Alternative. Relocating the path to the north side of SR 520 would require small adjustments in roadway geometrics that would slightly reduce the roadway footprint near Fairweather Bay. This in turn would result in such changes as a reduction in the size of the proposed vault at Northeast 80th Street. The new trail adjustments could also change some vault locations near Cozy Cove Creek. Near 100th Lane Northeast, a water quality treatment vault could be installed under the path on the north side of SR 520 instead of along Hunts Point Drive. Similar to the original 6-Lane Alternative, the

vault would discharge treated stormwater to the Yarrow Bay wetland via a flow spreader, just west of a stream that flows into the wetland.

No Evergreen Point Freeway Transit Stop

This option would slightly reduce stormwater flows compared to the original 6-Lane Alternative. Eliminating the transit stop at Evergreen Point would reduce the SR 520 footprint in the Fairweather Bay area. As a result, there would be less stormwater runoff and the stormwater treatment vault at Northeast 80th Street would be smaller.

South Kirkland Park-and-Ride Transit Access – Bellevue Way

The revised ramp configuration at the Bellevue Way interchange (adding the westbound on-ramp) would increase the project's impervious surface area draining to Yarrow Creek by 11 percent. Stormwater from this new impervious area would be treated and discharged to Yarrow Creek near the Bellevue Way interchange. Similar to the South Kirkland Park-and-Ride Transit Access – 108th Avenue Northeast option described below, an additional treatment and detention vault at the former Northup Way Park-and-Ride lot is proposed to supplement the stormwater treatment wetland at the Bellevue Way interchange. This detention/wet vault with enhanced treatment, which would be located under the park-and-ride lot, would discharge to Yarrow Creek at the new westbound on-ramp and culvert.

South Kirkland Park-and-Ride Transit Access – 108th Avenue Northeast

The locations of stormwater treatment facilities would differ between the original 6-Lane Alternative and the South Kirkland Park-and-Ride Transit Access – 108th Avenue Northeast option. **Exhibit 12** shows the locations of the proposed facilities.

The existing stormwater system along SR 520 east of 108th Avenue Northeast consists of catch basins and storm drains that discharge to Yarrow Creek near the 108th Avenue Northeast interchange. There is also an existing biofiltration swale between the westbound off-ramp and the west SR 520 mainline, and an existing detention pond along westbound SR 520 approximately 1,450 feet east of the 108th Avenue Northeast.

The existing biofiltration swale would be displaced, but its function would be replaced and improved with a new facility. The existing

detention pond would not be substantially altered and could probably remain in the current location.

This option would extend the footprint of the project east on SR 520 and north along 108th Avenue Northeast, but would remain in the Yarrow Creek basin. Adding additional impervious surface to SR 520 and arterial streets would require additional detention and treatment facilities to control and treat flows to Yarrow Creek. The creek flows close to the city streets in this area, so large best management practice (BMP) facilities such as ponds would not fit without having to relocate the creek. This option would provide BMPs with space-efficient footprints.

In addition, the widening of the mainline west of 108th Avenue Northeast to accommodate new ramps would add impervious surface and additional detention/treatment facilities near the Bellevue Way interchange. Three new treatment and detention facilities would be constructed, as shown in **Exhibit 12**.

Construction Techniques

This section summarizes the major construction activities anticipated for completion of the SR 520 Bridge Replacement and HOV Project. More details about structures, including structure types, foundations, retaining walls, and sound walls are available in the *Bridge and Structures Working Paper* prepared by the Trans-Lake Washington Project Team (August 14, 2002).

The project is at a preliminary level of design. Thus far, the design team has determined that the build alternatives would mostly be constructed within the footprint boundaries of the alternatives shown in this Draft EIS. The project footprint would include a 5-foot buffer beyond the edge of the pavement or retaining wall. During the final design of the preferred alternative, the project team may identify other small areas outside of the footprint boundaries that the contractor might need in order to build the project. These areas would be used on a temporary basis during construction and restored when construction is complete. WSDOT plans to pursue agreements with local property owners to facilitate construction in these areas. If it is not possible to reach consensus about temporary use of local properties, other design options that would not require these properties could be pursued.

Generally, as described above, construction would occur within the permanent project footprint. The exception would be construction of the temporary work and detour bridges, which would result in additional temporary effects.

What types of construction techniques would be used?

The construction techniques described for the original 6-Lane Alternative would change only in regard to the temporary work and detour bridges.

The options would not alter the following construction techniques as described for the original 6-Lane Alternative:

- Roadway reconstruction
- Retaining walls
- Sound walls
- Local street crossings

- Lids
- Bridge foundations
- Permanent bridges

See Appendix A to the Draft EIS, *Description of Alternatives and Construction Techniques*, for a detailed description of these features.

Temporary Work and Detour Bridges

Like the original 6-Lane Alternative, the Pacific Street Interchange option would construct temporary work bridges next to the Portage Bay Bridge and a detour bridge in the Arboretum area. The purpose for these work bridges is to allow vehicle traffic and construction activity to occur simultaneously in the project corridor. Most of the temporary work area would be located within the footprint of the proposed build alternatives, although, at times, the construction limits would extend beyond this area.

At Portage Bay, 30-foot-wide temporary work bridges would be located on the north and south sides of the existing bridge. **Exhibit 14** shows the locations of the work bridges that would be used to construct the Pacific Street Interchange option. At Union Bay and the Arboretum, a 60-foot-wide temporary detour bridge would be located on the south side of the existing bridge; this temporary bridge would provide a detour route for traffic on the existing west approach to the Evergreen Point Bridge. Like the original 6-Lane Alternative, the existing bridge would be used for work access and as a work platform. **Exhibit 15** shows the locations of the temporary detour bridges in Union Bay and at the Arboretum.

The temporary bridges would remain in place for approximately 4 to 5 years, depending on the location and the selected alternative and options. Like the original 6-Lane Alternative, the temporary bridges would need approximately 1,600 steel piles. All temporary bridge support structures would be removed at the end of the construction period and the areas would be restored.

Construction of the temporary work and detour bridges would begin by driving steel piles, installing a cap beam, and then installing the superstructure. A crane on the completed portion of the work bridge would reach out to construct the next span. Piles would be 18 to 24 inches in diameter. For detour bridges, the superstructure would be capped with an asphalt overlay.

Installing the foundations and erecting the new superstructure would take place from finger piers extending from the work bridge.

Once traffic is shifted to the new SR 520 roadway, the detour bridge would be used to erect additional work bridges for construction of the new Lake Washington Boulevard ramps and demolition of the existing ramps. All work and detour bridges and finger piers would then be removed; removal would begin at one end and work backwards by reaching out and removing the previous span.

Where the existing bridge is used as workspace, some reinforcement of the bridge may be necessary to support the load of the cranes. The weight of a crane when lifting a heavy load is greater than the weight used for designing the bridge for general traffic. During construction, the bridge would be analyzed to determine the specific reinforcement requirements. Reinforcement includes driving piles and erecting additional beams to provide more support of the existing bridge girders.

What types of construction equipment would be used?

The construction equipment described for the original 6-Lane Alternative would not change with any of the options. See Appendix A, *Description of Alternatives and Construction Techniques*, for a detailed description of the equipment.

Where are the construction staging areas?

The construction staging areas described for the original 6-Lane Alternative would not change with any of the options. However, the Pacific Street Interchange option could use portions of the University of Washington's Husky Stadium parking lot for staging, and the Second Montlake Bridge option could use properties adjacent and to the east of the new bridge. Staging scenarios and concepts will need to be coordinated with the University of Washington and possibly Sound Transit (depending on the timing of the proposed North Link station). See Appendix A, *Description of Alternatives and Construction Techniques*, for a description of other staging areas.

How long would it take to construct the project?

For the most part, the original 6-Lane Alternative and the options would be constructed in the same manner. However, there would be some differences because of additional construction segments related to the Pacific Street Interchange and the Second Montlake Bridge options. These differences are identified where appropriate. The construction staging described below is not the only way the project could be built, but it demonstrates a logical sequence.

The Pacific Street Interchange and Second Montlake Bridge options include more segments than the nine identified for the original 6-Lane Alternative. For this Draft EIS, we have assumed that all segments would be constructed together as one project, although the segments and the construction duration for each segment are shown in **Exhibits 16 and 17**.

Exhibit 16. Construction Duration of the Original 6-Lane Alternative and the Seattle Options

Segment	Original 6-Lane Alternative	Pacific Street Interchange Option	Second Montlake Bridge Option
I-5/SR 520 Interchange	15 months	15 months	15 months
Portage Bay Bridge	28 months	28 months	28 months
Montlake Interchange	26 months	18 months – a shorter duration with less intense construction	26 months
Union Bay Bridge	None	24 months	None
Pacific Street/Montlake Boulevard Intersection	None	12 months	None
Pacific Street Interchange	None	Included in west approach construction	None
Montlake Boulevard	None	Included with the intersection construction	None
Second Montlake Bridge	None	None	18 months
West Approach	52 months	60 months – a longer duration with the construction of the Pacific Interchange	52 months
Floating Section of Evergreen Point Bridge	75 months	75 months	75 months

Exhibit 17. Construction Duration of the Original 6-Lane Alternative and the Eastside Option

Segment	Original 6-Lane Alternative	South Kirkland Park-and-Ride Transit Access
East Approach to Evergreen Point Bridge	43 months	43 months
Evergreen Point Road	25 months	25 months
84th Avenue Northeast and 92nd Avenue Northeast	23 months	23 months
Bellevue Way and 108th Avenue Northeast	13 months	26 months – a longer duration with the reconfiguration of the interchange and addition of the direct access ramps

Temporary work bridges would have to be built before construction could begin on the Portage Bay Bridge and Evergreen Point Bridge west approach. These would take about 6 to 8 months to construct.

Two lanes in each direction would be maintained on SR 520 and the temporary detour bridge during peak weekday traffic. On- and off-ramps to Montlake Boulevard would be reconstructed while open to traffic, with lane shifts, as needed, using temporary ramp connections. Lake Washington Boulevard ramps would be closed for the duration of construction of the west approach. SR 520 and its associated ramps could be closed at nights and weekends during construction.

6 Lanes with Pacific Interchange

If all of the segments were constructed together as one project, the total duration of construction would be approximately 7 to 8 years.

Construction adjacent to or on University of Washington property would have to be coordinated with the University and Sound Transit to minimize construction effects. This could include setting a construction schedule to avoid road and parking lot closures during football season or to schedule road closures during the summer when fewer classes are in session.

Second Montlake Bridge

If all of the segments were constructed together as one project, construction of the Second Montlake Bridge option would take approximately 7 to 8 years.

What is the construction sequence of the options?

For the most part, the original 6-Lane Alternative and the options would be constructed in the same manner. See Appendix A, *Description of Alternatives and Construction Techniques*, for a description of the original 6-Lane Alternative sequence. Differences between the original 6-Lane Alternative and the options is described below.

Pacific Street Interchange Option

This option would not alter the construction sequence described for the original 6-Lane Alternative. Construction of the Union Bay Bridge, the Pacific Street interchange, the Pacific/Montlake Boulevard intersection, and Montlake Boulevard would occur in conjunction with the rest of the SR 520 construction (as described in Appendix A to the Draft EIS) as follows:

Pacific Street Interchange

Construction of the Pacific Street interchange and its west approach would require closure of the Lake Washington Boulevard ramps. Access to SR 520 at Montlake Boulevard would remain open during construction of the new interchange. The new interchange would be constructed in conjunction with the west approach construction, but it could be independent from the Pacific Street/Montlake Boulevard intersection construction.

The interchange would be constructed in the following stages:

Stage 1 - Detour Trestle Construction

- Construct a detour trestle to the south of the existing structure (see Appendix A to the Draft EIS).
- Close Lake Washington Boulevard ramps.
- Tie detour trestle to the existing structure.
- Shift eastbound and westbound traffic to the detour trestle.

Stage 2 - West Approach and Pacific Street Interchange Construction

- Construct the new west approach structures.
- Construct the Pacific Street interchange structures and associated ramps.

- Construct the depressed Pacific Street/Montlake Boulevard intersection and the Union Bay Bridge (see below).
- Shift traffic to the new structures. The traffic shift must be coordinated with construction of the adjacent segments.
- Remove detour trestle and finger piers.

Union Bay Bridge

Timing of construction of the Union Bay Bridge would depend on both the Pacific Street interchange and the Pacific Street/Montlake Boulevard intersection. Construction of these two segments would have to be completed before the Union Bay Bridge could operate.

Construction would occur as follows:

- Construct foundations on the south side of Marsh Island from the Pacific Street interchange work bridges.
- Construct foundations from barges on the north side of Marsh Island.
- Close the staging area at the University of Washington parking lot and prepare parking lot access for construction.
- Construct the bridge superstructure.
- Restore the parking lot and open the bridge to traffic.

Pacific Street/Montlake Boulevard Intersection

The Pacific Street Interchange option would depress the intersection at Pacific Street and Montlake Boulevard. The depressed intersection would allow a pedestrian crossing or a plaza to be built that would not obstruct and/or minimize views from the University of Washington's Rainier Vista.

Sound Transit plans to have an underground station for its North Link line in the vicinity. The staging scenario presented here would work whether the station is constructed before, after, or in conjunction with the intersection work. Coordination with Sound Transit would be necessary to minimize conflict and unnecessary reconstruction. Several challenges have been identified between the light rail station and the proposed intersection improvements. These challenges include the south and north entrances, the north station vent shaft, and the tunnel boring machine retrieval pit. Coordination and adjustments between

the two projects would be necessary to resolve design conflicts and to allow for the possibility of simultaneous construction.

During construction of the Pacific Street/Montlake Boulevard intersection, the Pacific Place entrance would serve as the main access to the University of Washington's E-12 parking area near Husky Stadium. Additional construction access could be provided off of Montlake Boulevard, either near the Montlake Bridge or from the Pacific Street intersection. Temporary access would be provided to allow pedestrians to cross from the parking area to the west side.

Temporary lanes would be constructed on the west side of the existing Montlake Boulevard, near the Triangle Parking Garage for continued access to the University of Washington Hospital. At this point in the design process, the temporary lanes do not encroach onto the top of the parking structure. However, an access stairway and a vent shaft would require relocation. Left-turning traffic onto northbound Montlake Boulevard and right-turning traffic onto eastbound Pacific Street would be detoured through Pacific Place during Stage 3. **Exhibit 18** shows these stages.

Stage 1 - Retaining Wall and Utilities

- Remove or relocate conflicting utilities (by others). Major utilities that would be affected include a 54-inch water line.
- Construct the retaining wall using top-down construction methods (soldier pile or slurry walls).
- Construct a temporary detour for southbound traffic.
- Widen the Pacific Place roadway.
- Perform any temporary signal work at Pacific Place and Pacific Street.

Stage 2 - Easterly Half of the Pacific Street/Montlake Boulevard Intersection

- Shift southbound traffic to the temporary detour.
- Construct the easterly half of the depressed intersection.

Stage 3 – Westerly Half of the Pacific Street/Montlake Boulevard Intersection

- Shift northbound and southbound traffic to the newly constructed easterly half of the intersection. Construct the transitions during night closure.
- Construct the westerly half of the depressed intersection, including the Pacific Street leg.

Stage 4 – Site Restoration and Pedestrian Bridges

- Shift traffic to its final configuration.
- Restore roadside features.
- Construct the pedestrian bridges.

Montlake Boulevard

Construction of Montlake Boulevard would occur as follows:

- Construct retaining walls on the west side of Montlake Boulevard.
- Construct new pedestrian bridges.
- Widen roadway and construct new sidewalks.

Second Montlake Bridge Option

The Second Montlake Bridge option would not alter the construction sequence described for the original 6-Lane Alternative. Construction of the second Montlake bridge could take place independently of the rest of the SR 520 construction, as follows:

Stage 1 – Second Bascule Bridge Construction

- Construct the bascule piers and foundations from land.
- Erect the bascule girders and leaves from a crane barge.

During construction of the new bridge, half of the navigational channel would be blocked for approximately 4 weeks, with intermittent complete blockages.

Stage 2 – Transition Section Construction

- Construct the transition section.
- Shift traffic to the proposed configuration.

South Kirkland Park-and-Ride Transit Access – 108th Avenue Northeast Option

The South Kirkland Park-and-Ride Transit Access – 108th Avenue Northeast option would not alter the construction sequence described for the original 6-Lane Alternative. In conjunction with the original Bellevue Way staging concept, the 108th Avenue Northeast interchange could be staged as follows:

Stage 1 – Westbound Mainline and Ramps

- On the north side, construct westbound temporary ramps for widening and westbound mainline structure.
- Shift ramp traffic to the temporary ramps.
- Complete westbound ramps and mainline widening.
- Shift traffic to the proposed configuration.

Stage 2 – Eastbound Mainline

- West of 108th Avenue Northeast, construct the eastbound mainline widening to the south, matching the mainline widening from Bellevue Way.
- Construct the new eastbound-to-northbound Bellevue Way off-ramp.
- Shift traffic to the proposed configuration.

Stage 3 – Direct Access Ramps

- Construct the direct access ramps.
- Open the interchange in its final configuration

References

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Exhibits