This chapter describes how alternatives for the SR 520 Bridge Replacement and HOV Project were developed and evaluated, and what is included in the alternatives that this Draft EIS considers.

Chapter 3: Developing the Alternatives

The National and State Environmental Policy Acts (NEPA and SEPA) require—and good planning principles dictate—that agencies proposing a major project look at various ways the project's purposes might be accomplished. A range of reasonable alternatives is studied in detail in an EIS to ensure that information on environmental effects is developed to support good agency decision-making. This chapter describes how WSDOT developed the alternatives, the process used to evaluate them, and the features of each alternative.

What alternatives were considered for the Draft EIS?

How were the alternatives developed and selected?

In 1999, the 47-member Trans-Lake Washington Study Committee agreed on a set of possible ways to improve traffic flow across Lake Washington. As described in Chapter 1, this committee arrived at these solutions through an 18-month evaluation process. The Study Committee recommended that the following solutions be the starting point for further analysis under the formal NEPA/SEPA environmental review process:

- Add one HOV lane in each direction (6-Lane Alternative).
- Add one HOV lane in each direction and high-capacity transit.
- Add one HOV lane in each direction and one general-purpose lane in each direction (8-Lane Alternative).
- Include a minimum footprint (four lanes with minimum shoulders).
- Include a No Build Alternative.

The Study Committee also recommended that roadway shoulders and bicycle and pedestrian facilities be included. In addition, it recommended that "mitigation and enhancement must be integral to and inseparable from the proposed transportation improvements."[1] In other words, the

[1] Trans-Lake Washington Study Committee. 1999. Findings and Recommendations. July 16, 1999.

project design should include features such as sound walls, lids, stormwater treatment, and habitat improvements that would avoid or reduce effects on the surrounding communities, plants, and animals, or even provide enhancements over existing conditions.

These recommendations were the starting point for more review with the surrounding communities about their ideas for what should be studied. More than 100 ideas came out of this review, and were evaluated over the next 3 years. The process of engaging the communities in developing the alternatives included over 25 open houses, 12 community design workshops, and meetings with over 100 community groups. Additional information on how the public participated is presented in Appendix B, Agency Coordination and Public Involvement.

The project team analyzed all of the suggested alternatives through two screenings. The alternatives carried forward into this Draft EIS are the result of the second level of screening. Along the way, the project team prepared various reports to document the process, which are listed in Appendix A, Description of Alternatives and Construction Techniques.

First Screening Analysis (October 2000)

The goal of the first screening analysis was to eliminate alternatives that did not meet the purpose statement for the project or those that did not score as high as the alternatives recommended by the Trans-Lake Washington Study Committee. WSDOT asked the following three questions for each alternative during this screening.

- *Will the alternative be effective in improving mobility for people and goods?*

  The criteria used to answer this question were: (1) how much the alternative improved mobility, (2) whether the alternative increased or decreased reliability and safety, and (3) whether the alternative was compatible with other existing transportation system plans.

- *Can we reasonably avoid, minimize, or mitigate its environmental impacts?*

  To answer this question, the team assessed the project's effects on wetlands, habitat for threatened and endangered species, federally protected parks and historic properties, residential and commercial properties, and neighborhoods.

- *How much will it cost?*

  The project team developed a cost estimate for each major concept.

The first screening analysis examined 19 alternatives. These alternatives were categorized into four different solution categories or themes:

- Highway solutions
- Transit solutions
- Transportation demand management solutions
- Other solutions (such as ferries or arterial streets)

The alternatives were then compared to one another to identify a reasonable range of alternatives that represented a mix of transit, highways, transportation demand management, and other modes and strategies. The comparison was based on benefits to the transportation system, environmental considerations, and cost-effectiveness. Appendix A, Description of Alternatives and Construction Techniques, provides more detail on the results of the first screening.

Second Screening Analysis (April–June 2001)

The project team used the second screening analysis to determine how the highway and high-capacity transit (such as light rail and bus rapid transit) would work together. These modes of travel have interdependent effects within a regional transportation network. The purpose of the analysis, therefore, was to see which highway improvements and which high-capacity transit improvements worked best alone, and then combine the two modes to identify the blend that would best satisfy the project's goals.

The second screening analysis consisted of several steps and considered more factors, analyzed in more detail, than the first screening. The team separately compared different highway alternatives against one another and different high-capacity transit alternatives against one another. From the results of this comparison, the team created seven multimodal alternatives, each with both highway and high-capacity transit components. Ultimately, a regional decision was made that the initial high-capacity transit crossing of Lake Washington would be on I-90, but that SR 520 improvements would provide the ability to add high-capacity transit in the future. As Chapter 1 describes, Sound Transit has developed a candidate project for its ST2 long-range plan that proposes to evaluate high-capacity transit modes and routes on SR 520.

Finally, the project's Executive Committee recommended alternatives to be evaluated in the Draft EIS. As discussed later in this chapter, the recommended alternatives consist of the No Action Alternative, a 4-Lane Alternative, and a 6-Lane Alternative. In addition, a variety of options have been developed in association with the 6-Lane Alternative. These options are also described later in this chapter.

DEFINITION

Transportation Demand Management

Transportation demand management solutions include strategies and programs that focus on affecting travel behavior to reduce single-occupant vehicle trips in the peak period. These strategies and programs include marketing and public information programs to encourage:

- Carpooling
- Bus use
- Vanpooling/vanshare
- Employer-based programs such as work schedule options
- Incentives for employers affected by commute trip reduction laws.

What alternatives were considered, but not carried forward?

As described above, WSDOT considered many possible solutions for SR 520. Of these solutions, an 8-Lane Alternative and tunnel options were evaluated in more detail, but ultimately were not advanced for study in the Draft EIS. The reasons for not further studying the 8-Lane Alternative and tunnel options are in the following subsections.

8-Lane Alternative

In 2002, the project team's planning-level evaluation for the study committee's 8-Lane Alternative (which assumed no toll on SR 520) indicated that the volume of traffic from eight lanes on SR 520 would create additional backups on an already highly congested I-5. To alleviate these backups, the 8-Lane Alternative would require that one additional lane be built in each direction on the I-5 corridor through downtown Seattle, from SR 520 to potentially as far south as the Corson/Michigan interchange (approximately 6 miles south of the I-5/ SR 520 interchange). The team shared this information with the project committees. Because of the effects on I-5, the Executive Committee recommended dropping the 8-Lane Alternative.

In 2003, several key factors brought the 8-Lane Alternative back into consideration. The Washington State legislature provided funding for the SR 520 project, and, in conjunction, asked WSDOT to take a closer look at the 8-Lane Alternative to determine what modifications would be required on I-5 to alleviate congestion created by the additional SR 520 traffic. At the same time, the project was renamed the SR 520 Bridge Replacement and HOV Project, the project limits were redefined, and the decision was made to assume that tolls would be required for crossing the bridge.

As a result of these changes, the project team performed a second assessment of the 8-Lane Alternative's effects. Even with a toll assumed on the Evergreen Point Bridge, the assessment showed that additional capacity—up to one lane in each direction—would still be needed on I-5 from SR 520 to I-90, and possibly further. The project team developed three options for adding the two additional lanes on I-5: a tunnel option, an aerial option, and a frontage road option. Of those choices, the frontage road option appeared preferable to the others. However, even that option would involve extensive improvements to I-5 that would be extremely costly and might not be physically feasible. For example, the frontage road would require regrading of the entire hillside east of I-5 through Capitol Hill and downtown Seattle, which would displace a number of multifamily residential buildings. The other alternative would be to raise the grade of I-5 itself, which would disrupt traffic for years during construction. A seven-lane off-ramp at Madison Street would be another consequence of the improvements and would create severe traffic problems.

On the basis of these conclusions, the Executive Committee acknowledged the system constraints and recommended that I-5 capacity be examined as part of an I-5 corridor study for which the legislature allocated funding in 2004. Because the difficulties on I-5 were so severe, the team did not attempt to evaluate 8-lane improvements on the other side of the lake (I-405); however, it was clear that substantial additional capacity would be required at the SR 520/I-405 interchange to handle increased traffic flow.

See Appendix U, 8-Lane Alternative Report, for results of the transportation analysis for the 8-Lane Alternative.

In 2005, WSDOT's collaboration with project area communities to develop options for the 6-Lane Alternative stirred renewed interest in the 8-Lane Alternative. In response to this interest, WSDOT again evaluated an 8-Lane Alternative to see whether it could be combined with different design options to provide relief to I-5. For traffic forecasting purposes, the project team estimated an 8-Lane Alternative toll rate using the same method that was used for the other project alternatives. Interim findings from the traffic analysis indicated that, during the 2030 morning and afternoon peak periods, the 8-Lane Alternative would not operate at capacity across the Evergreen Point Bridge—in other words, WSDOT would be building space that would not be fully used. This would happen because congestion outside of the SR 520 Bridge Replacement and HOV Project limits would keep traffic from reaching the Evergreen Point Bridge. As a result, the demand for traffic with this alternative would not be enough to fill either the new general-purpose lane or the new HOV lane. The 8-Lane Alternative would carry about the same number of people as the 6-Lane Alternative, but many more of them would be in single-occupant vehicles, which is contrary to regional and local policies encouraging greater use of transit and HOVs.

The team's findings also illustrated that, with more cars crossing the lake, more local traffic would be introduced into the area around the University of Washington, where additional lane capacity would be required. Additional westbound traffic crossing the Evergreen Point Bridge would continue to be caught in congestion on SR 520 that originates from I-5. Furthermore, additional eastbound traffic destined for areas north or south on I-405 would add to the congestion already present on that corridor. Chapter 4 presents a summary of the traffic analysis results.

On the basis of these three analyses (2002, 2003, and 2005), the 8-Lane Alternative is not evaluated further in this EIS. WSDOT would prepare additional environmental documentation if an 8-Lane Alternative were selected for future detailed study.

Tunnel Options

Through the course of SR 520 planning, several stakeholders have suggested that placing the highway in a tunnel might be preferable to rebuilding it at ground level and/or on bridges. The Trans-Lake Study Committee reviewed options for tunnels and submerged tubes under Lake Washington early on in its development of solution sets. More recently, a group of citizens suggested a partial tunnel from I-5 to the western end of the floating bridge as a way of reducing effects on Seattle neighborhoods.

Although an underground highway would certainly have fewer visual and noise effects than an at-grade or above-ground highway, many physical

factors make the SR 520 corridor an especially difficult location for siting tunnels. The bed of Lake Washington is covered with a thick layer of peat deposits, which are too soft to be tunneled through. A tunnel in the solid layers under the peat, over 300 feet below the lake's surface, would be so deep that its west and east portals (the tunnel entrances) would be at I-5 and I-405, with no access in between. A tube submerged below the lake surface would not need to be as deep, but could interfere with navigation and fish passage, and would create extensive surface disturbance at each end where it entered the water. For these reasons, a tunnel or tube beneath Lake Washington was eliminated from consideration early in the analysis of potential alternatives.

At the request of a citizen group, WSDOT evaluated a partial tunnel through the Seattle portion of the project area in 2006. This approach would pose another set of challenges. Maintaining an interchange at Montlake and/or Lake Washington Boulevard would require either a complex and costly underground ramp design, or a "cut-and-cover" excavation that would severely disrupt nearby neighborhoods. At its east end, the tunnel would need to make the transition from below ground to above ground in the Arboretum area. This would mean substantial disruption to the ecosystems there, including complete excavation of Marsh Island and construction of a new soil island at the east tunnel portal. While mitigation is possible, it would take several decades for these fragile areas to recover. Resource agencies would be unlikely to issue permits for the necessary excavation and filling, since less disruptive alternatives exist.

Some of the challenges of tunnel construction could be overcome by technology, but the costs would be very high. For example, the cost of a partial tunnel through the Seattle project area was estimated at $8 billion—several times the cost of building the alternatives evaluated in this Draft EIS. Because of its high costs and the magnitude of environmental effects involved, a partial tunnel or tube for the Seattle area was also eliminated from further consideration.

What alternatives are studied in detail in this Draft EIS?

This Draft EIS evaluates the following alternatives and options:

- No Build Alternative
  - Continued Operation Scenario
  - Catastrophic Failure Scenario
- 4-Lane Alternative
  - Option with pontoons without capacity to carry future high-capacity transit
- 6-Lane Alternative
  - Pacific Street Interchange option

- No Montlake Freeway Transit Stop option
- Second Montlake Bridge option
- Bicycle/Pedestrian Path to the North option
- No Evergreen Point Freeway Transit Stop option
- South Kirkland Park-and-Ride Transit Access – 108th Avenue Northeast option
- South Kirkland Park-and-Ride Transit Access – Bellevue Way option

The remainder of this subsection describes each of these alternatives and options in detail. The final subsection in this chapter describes features that are similar in all the alternatives.

What is the No Build Alternative?

All EISs study an alternative that assesses what would happen to the environment in the future if the proposed project were not built. This alternative, called the No Action or No Build Alternative, assumes that the existing highway would remain exactly the same as it is today. The No Build Alternative provides a baseline against which project analysts can measure and compare the effects of all the build alternatives. However, this project is unusual, because, as described in Chapter 1, the existing SR 520 bridges may not remain intact through 2030, the project's design year. This means that the No Build Alternative has to consider the very real possibility that the bridges will fail if they are not replaced.

If nothing is done to replace the Portage Bay and Evergreen Point bridges, one or both structures could fail and become unusable before 2030. WSDOT cannot predict when or how these structures might fail, so there is no certainty about the consequences of doing nothing. To illustrate what could happen, the project team developed two scenarios to describe what might occur if the project were not built. These two No Build Alternative scenarios are continued operation of SR 520 and catastrophic failure of SR 520.

Under the ***Catastrophic Failure Scenario,*** both the Portage Bay and Evergreen Point bridges would be lost because of some kind of catastrophic event. Although in an actual catastrophic event one structure might fail while the other remained standing, this Draft EIS assumes the worst-case scenario—that both bridges would fail or would be so seriously damaged that they would be unavailable for use by the public for a length of time.

Under the ***Continued Operation Scenario,*** SR 520 would continue to operate as it does today—a 4-lane highway with nonstandard shoulders and without a bicycle/pedestrian path. No new facilities would be added and none would be removed, including the unused R.H. Thomson Expressway ramps near the Washington Park Arboretum. WSDOT would continue to manage traffic using its existing transportation demand management and intelligent transportation system strategies (see the *Flexible*

How will WSDOT maintain the Evergreen Point Bridge to prolong its life?

The Evergreen Point Bridge has had a number of safety and maintenance retrofits that have added weight to the structure. Because of the additional weight, the floating bridge sits 1 foot lower in the water than originally designed. Further major retrofits are not structurally feasible because they would add more weight than the bridge could safely support. However, as part of the No Build Alternative, WSDOT would undertake a number of other activities that would help keep the bridge open to traffic:

- Continuing the existing program of monthly and annual bridge inspections
- Replacing the anchor cables
- Adding new pavement overlay and rehabilitating or replacing the expansion joints
- Replacing the finger expansion joints located at the transition spans and the draw span
- Upgrading the illumination
- Replacing the programmable logic controller that runs the bridge control system
- Replacing the weather station
- Replacing the main power feeders and transformers
- Replacing the vertical guide roller assemblies, guide track, and rack gear
- Lowering the wind speed criteria for bridge closures

Transportation Plan discussion toward the end of this chapter for more detail). This scenario assumes that the Portage Bay and Evergreen Point bridges would remain standing and functional through 2030 and that no catastrophic events (such as earthquakes or extreme storms) would be severe enough to cause major damage to the bridges. This scenario provides the baseline to which the project team compared the other alternatives and is used throughout this Draft EIS as a basis for analysis.

What is the 4-Lane Alternative?

As described in Chapter 1, the 4-Lane Alternative was initially proposed during the Trans-Lake Washington Project as a "minimum footprint" alternative that would essentially duplicate the existing corridor with its narrow shoulders. This alternative was intended to enhance safety by replacing the two vulnerable bridges, but would have done nothing to increase SR 520's transportation value.

The 4-Lane Alternative has since been changed to include standard shoulders for greater safety and reliability. Adding the shoulders would improve traffic flow by allowing disabled vehicles to pull over without blocking an entire lane, as they do today. This would allow the full capacity of the roadway to be used for moving people and vehicles. However, the 4-Lane Alternative would not add new lane capacity, nor would it support the region's priorities for completing the HOV system.

The 4-Lane Alternative would meet two of the project's key goals—improving safety and reliability and protecting and enhancing neighborhood and environmental values. Its ability to meet the third goal of improving the movement of people and goods through the corridor would be marginal.

As its name suggests, the 4-Lane Alternative would have two 12-foot wide general-purpose lanes in each direction, the same number and type of lanes as today. SR 520 and its bridges would be rebuilt from I-5 to Bellevue Way. Roadway shoulders would meet current design standards, which for a 4-lane roadway require a 4-foot-wide inside shoulder and a 10-foot-wide outside shoulder. New facilities would collect and treat stormwater runoff from the roadway surface. WSDOT would build sound walls along much of SR 520 in Seattle and on the Eastside. These sound walls would substantially reduce the effects of traffic noise on areas near SR 520.

A bicycle/pedestrian path would follow the north side of SR 520 through Montlake and across the Evergreen Point Bridge, crossing to run along the south side of SR 520 through the Eastside to 96th Street Northeast. The bicycle/pedestrian path is discussed in more detail later in this chapter. The 4-Lane Alternative would also provide a new bridge operations facility for SR 520 beneath the east approach structure on the east shore of Lake Washington. Other features of the 4-Lane Alternative would include electronically collected tolls and a flexible transportation plan.

Tolls would be collected using data from transponders carried in vehicles. This alternative would be designed to be compatible with the future addition of high-capacity transit in the SR 520 corridor. (As noted earlier in this chapter, there is also an option to build the bridge with smaller pontoons that would not allow future high-capacity transit, although this would be inconsistent with regional transportation planning goals.)

The features of the 4-Lane Alternative in Seattle, Lake Washington, and the Eastside are described briefly below. Appendix A, Description of Alternatives and Construction Techniques, contains a more complete description of the improvements.

4-Lane Alternative: Seattle

Exhibits 3-1a and *3-1b* show the key features of the 4-Lane Alternative in Seattle. SR 520 would connect to I-5 in almost the same way as it does today, with a few exceptions. From westbound SR 520, one lane would still exit to either East Roanoke Street or northbound I-5. Two lanes would connect to I-5 southbound using the existing structure across I-5. A new HOV-only ramp would connect SR 520 westbound to the I-5 southbound express lanes; this ramp would operate only during the morning. Connecting to SR 520 eastbound would also be similar to today. From I-5 southbound, the existing tunnel would remain. From I-5 northbound, a wider two-lane on-ramp would connect to SR 520.

WSDOT would rebuild four bridges over SR 520 to provide room to widen the highway: 10th Avenue East, Delmar Drive East, Montlake Boulevard, and 24th Avenue East. All except for the Montlake Boulevard bridge would have the same width and lane configuration as the existing structures. The Montlake Boulevard bridge would be slightly wider and reconfigured to improve the operation of the interchange.

The Portage Bay Bridge would be widened to the north. The slope of the bridge would be more gradual than it is today, with parts of the bridge 20 feet higher than the existing bridge. Columns supporting the structure would generally be spaced 250 feet apart, compared to the current 100-foot column spacing. At its widest point (the east abutment), the bridge would have seven lanes—four general-purpose lanes, a lane in each direction to allow buses to accelerate out of or decelerate into the Montlake Freeway Station, and a westbound auxiliary lane from Montlake to I-5 northbound. This auxiliary lane is required because the distance between the Montlake and I-5 interchanges is less than current standards, and would otherwise create dangerous weaving patterns as vehicles merge into traffic. The new Montlake interchange would be similar to today's interchange.

The project would remove the existing Lake Washington Boulevard ramps and the ramps from the never-completed R.H. Thomson Expressway. A new westbound off-ramp to Lake Washington Boulevard and a new eastbound on-ramp from Lake Washington Boulevard would pass over the WSDOT-

Exhibit 3-1a. **4-Lane and 6-Lane Alternatives from I-5 to Portage Bay**

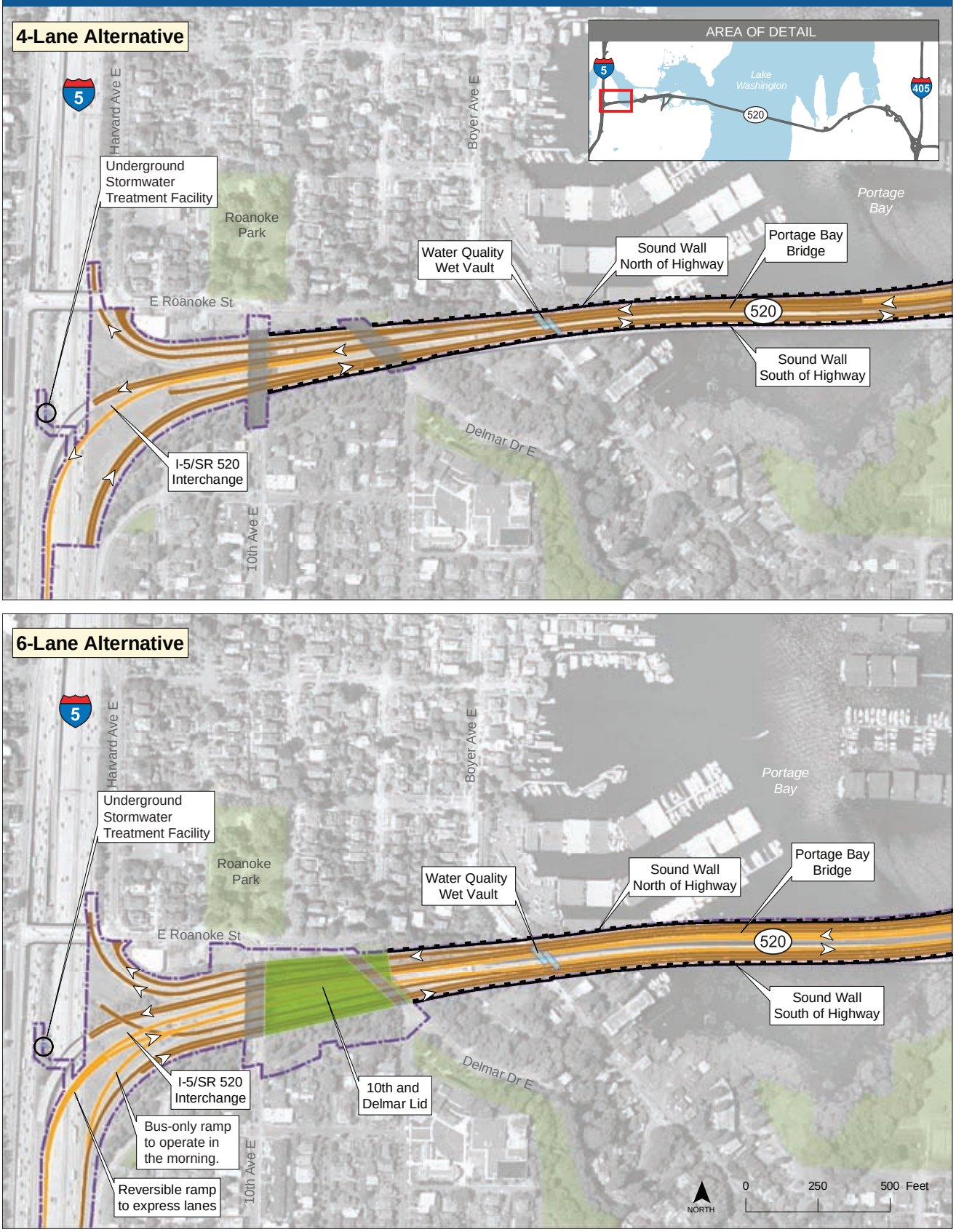
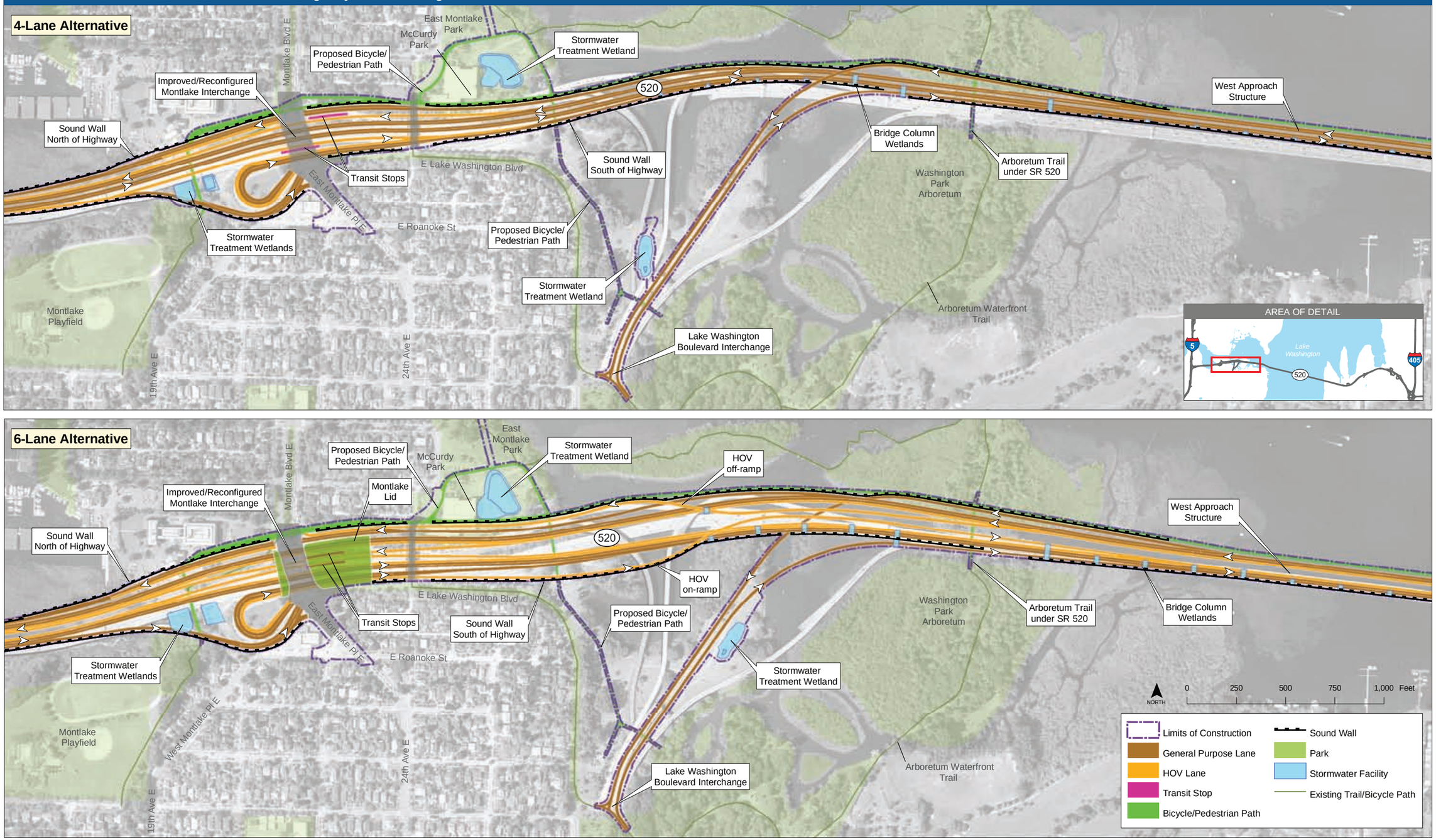


Exhibit 3-1b. **4-Lane and 6-Lane Alternatives from Portage Bay to Lake Washington**



This page intentionally left blank

owned peninsula west of the Arboretum, instead of crossing over water as the existing ramps do. These two ramps would be adjacent to one another on the peninsula. They would intersect with Lake Washington Boulevard in the same place that they do today, but would rise higher; the SR 520 westbound off-ramp would be approximately 90 feet above the water level when crossing SR 520. Beginning at the Lake Washington Boulevard ramps, the SR 520 mainline would shift north compared to the existing mainline, continuing through to the floating portion of the bridge.

WSDOT would build sound walls along both sides of SR 520 throughout most of the project corridor. *Exhibits 3-1a* and *3-1b* show the locations of the proposed sound walls in Seattle. In locations where a retaining wall is needed, the sound wall would be placed on top of the retaining wall, thereby lowering the height requirement of the sound wall. Sound walls in Seattle would total about 5.6 miles in length, with heights ranging from 6 to 22 feet above the roadway surface.

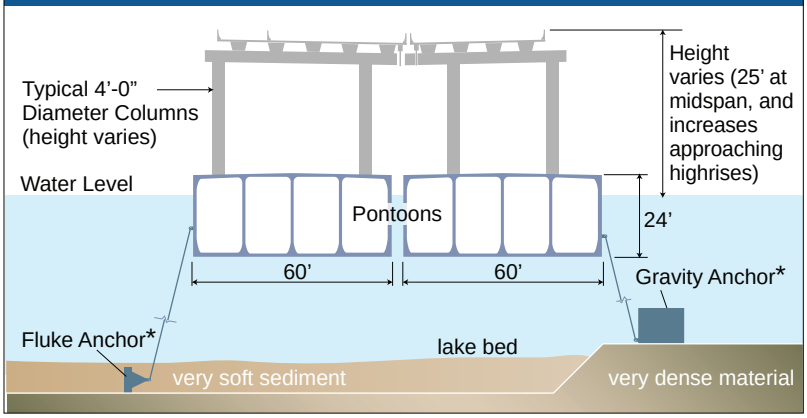
4-Lane Alternative: Lake Washington

The new west approach of the Evergreen Point Bridge would be higher and less steep than the current west approach. The SR 520 mainline would begin to rise at Union Bay, gradually attaining a maximum elevation of approximately 56 feet above the water just east of Foster Island. The west approach structure would provide a clearance of 25 feet for navigation, which is 19 feet less than the existing highrise. Boats taller than this would need to go beneath the bridge below the east highrise, which would provide a minimum of 70 feet of vertical clearance. For more details, see the discussion of changes in navigational channels later in this chapter.

The floating portion of the Evergreen Point Bridge would lie up to 200 feet north of the existing bridge at the western end. The bridge would have two 12-foot-wide general-purpose lanes in each direction, 4-foot-wide inside shoulders, and 10-foot-wide outside shoulders. A 14-foot-wide bicycle/pedestrian path would be located on the north side of the bridge. The path would have five scenic vantage points, with pull-outs along the north side of the path, and would be illuminated with recessed lighting in the traffic barrier.

The pontoons that support the floating bridge would be sized to carry future high-capacity transit, which would be built in the center of the roadway (the vehicle travel lanes would be widened to the outside to accommodate the high-capacity transit right-of-way). As shown in *Exhibit 3-2,* two parallel rows of 60-foot-wide pontoons would support the structure and rows of four concrete columns spaced 15 to 20 feet apart would carry the roadway. The rows would be spaced about 75 feet apart. Because of these columns, the roadway would be approximately 20 feet higher than the existing roadway. Unlike the existing Evergreen Point Bridge, the new bridge would not have a draw span to provide a navigation channel in the floating section.

Exhibit 3-2. **4-Lane Alternative Cross Section of the Evergreen Point Bridge**



* Anchors shown only to illustrate proposed anchor types, not their placement. Drawing not to scale.

The 4-Lane Alternative without expanded pontoons would be exactly the same as the 4-Lane Alternative, except the pontoons for the floating portion of the Evergreen Point Bridge would be shallower. These shallower pontoons would have 1 to 2 feet less draft (depth), which would eliminate the future possibility of high-capacity transit on the bridge. Because the structural difference between this option and the 4-Lane Alternative is so small, it has few discernible differences in environmental effect. Therefore, it is not discussed further in this EIS, except where its effects differ from those of the 4-Lane Alternative.

The bicycle/pedestrian path on the bridge structure would be illuminated by recessed lighting in the bridge barrier. Other than lighting for the path, there is currently no plan for additional lighting (such as overhead lighting) on the floating portion of the bridge.

Under the 4-Lane Alternative, the SR 520 east highrise would connect to land approximately 100 feet north of its current location. The east structure would provide a clearance of 70 feet for navigation, 13 feet more than the existing highrise. The structure would meet the existing highway elevation as it approaches Evergreen Point Road.

4-Lane Alternative: Eastside

Exhibits 3-3a through *3-3d* shows the key features of the 4-Lane Alternative on the Eastside. WSDOT would rebuild the Evergreen Point Road bridge over SR 520 to provide room to widen the highway; it would have the same width and lane configuration as the existing structure. Eastbound and westbound freeway stations would be located on the outside of the highway just east of Evergreen Point Road. Along with the four existing general-purpose lanes, the existing westbound HOV lane would be rebuilt from the vicinity of I-405 to just east of the Evergreen

Point Bridge. The HOV lane would not be carried across the bridge, so its western end would continue to create a bottleneck for westbound traffic as it does today.

The 84th Avenue Northeast bridge over SR 520 would also be rebuilt with an interchange configured similarly to the interchange that exists today. A one-lane ramp would exit from SR 520 eastbound to become two lanes at the intersection. The loop on-ramp to SR 520 westbound would have one general-purpose lane and one HOV bypass lane. WSDOT is continuing to examine ways to design the interchange to improve operations and reduce environmental effects.

The 92nd Avenue Northeast interchange would also be similar to the existing interchange. WSDOT would rebuild the 92nd Avenue Northeast bridge over SR 520 to allow room to widen the highway. The SR 520 eastbound on-ramp would have one general-purpose lane and one HOV bypass lane. The westbound off-ramp would have one general-purpose lane, but no HOV bypass lane. Freeway stations would be located on the outside of the SR 520 eastbound and westbound lanes, just east and west of the interchange.

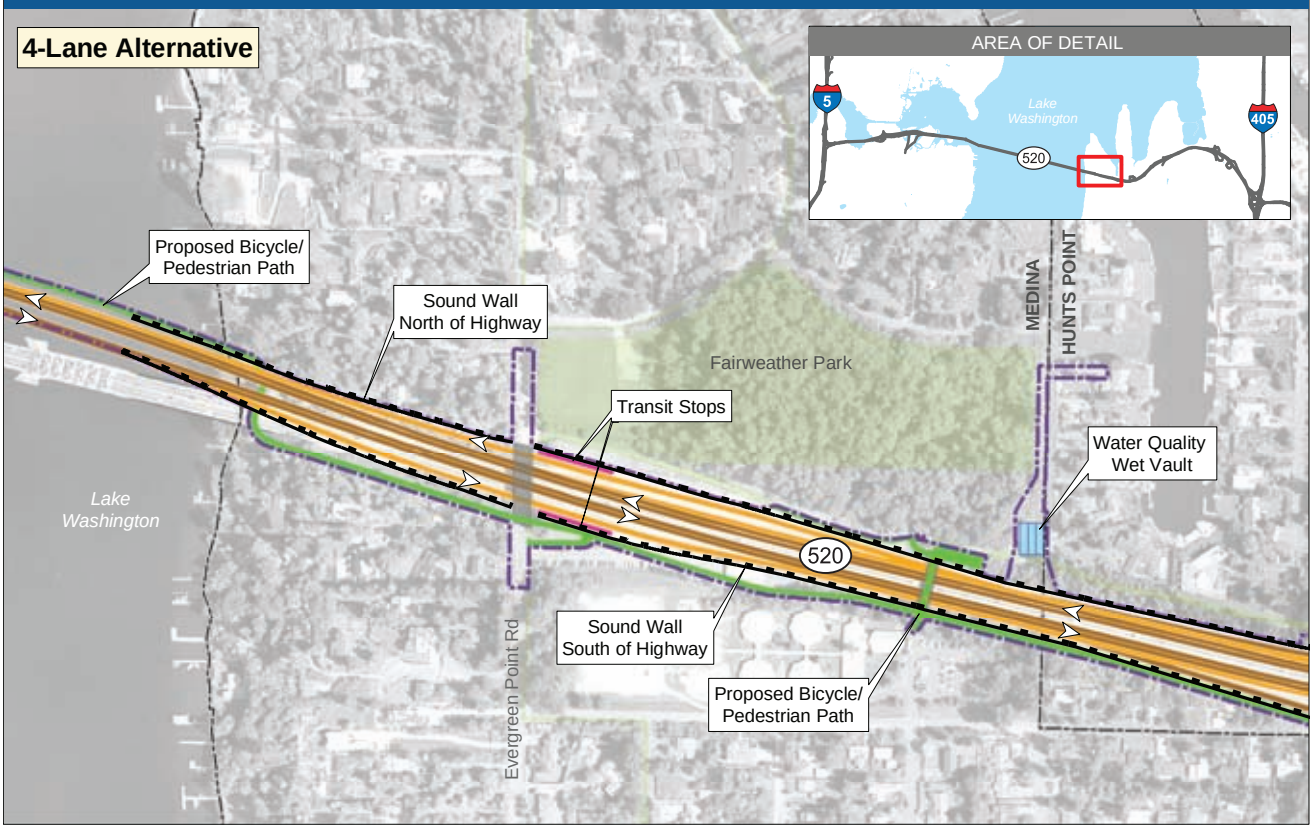
Only minor changes would be made to the Bellevue Way interchange. The SR 520 westbound on-ramp from Lake Washington Boulevard Northeast would have one general-purpose lane and one HOV bypass lane. A new lane would be added to Lake Washington Boulevard Northeast between Northup Way and the westbound on-ramp. The SR 520 eastbound off-ramp to Bellevue Way Northeast would be rebuilt as a single general-purpose lane ramp.

Sound walls would line SR 520 on the Eastside from west of the eastern shoreline of Lake Washington to just west of Bellevue Way *(Exhibits 3-3a through 3-3d).* These walls would be virtually continuous through the entire area, except for breaks at Evergreen Point Road, 84th Avenue Northeast, and 92nd Avenue Northeast. Sound walls on the Eastside would total approximately 4 miles in length, with heights ranging from 8 to 20 feet above the roadway surface.

What is the 6-Lane Alternative?

The 6-Lane Alternative would complete the regional HOV connection across SR 520. In addition to two general-purpose lanes in each direction, it would also include one inside HOV lane in each direction. SR 520 and its bridges would be rebuilt from I-5 to 108th Avenue Northeast in Bellevue, with an auxiliary lane added on SR 520 eastbound from east of I-405 to 124th Avenue Northeast. Roadway shoulders would meet the current design standards for a 6-lane roadway, with 10-foot-wide inside shoulders and 10-foot-wide outside shoulders. New facilities would collect and treat stormwater runoff from the roadway surface.

Exhibit 3-3a. **4-Lane and 6-Lane Alternatives from Lake Washington to Hunts Point**



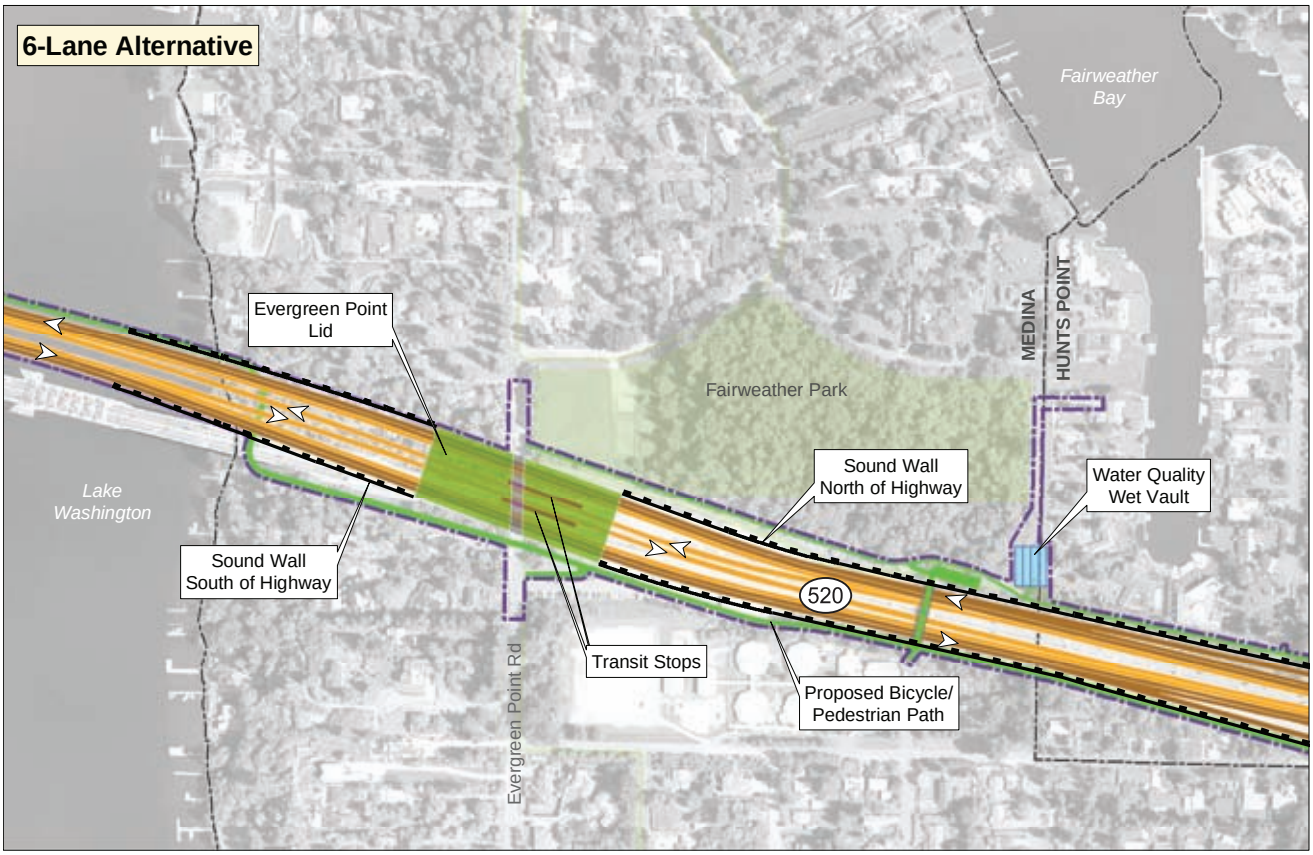


Exhibit 3-3b. **4-Lane and 6-Lane Alternatives from Hunts Point to Yarrow Point and Clyde Hill**

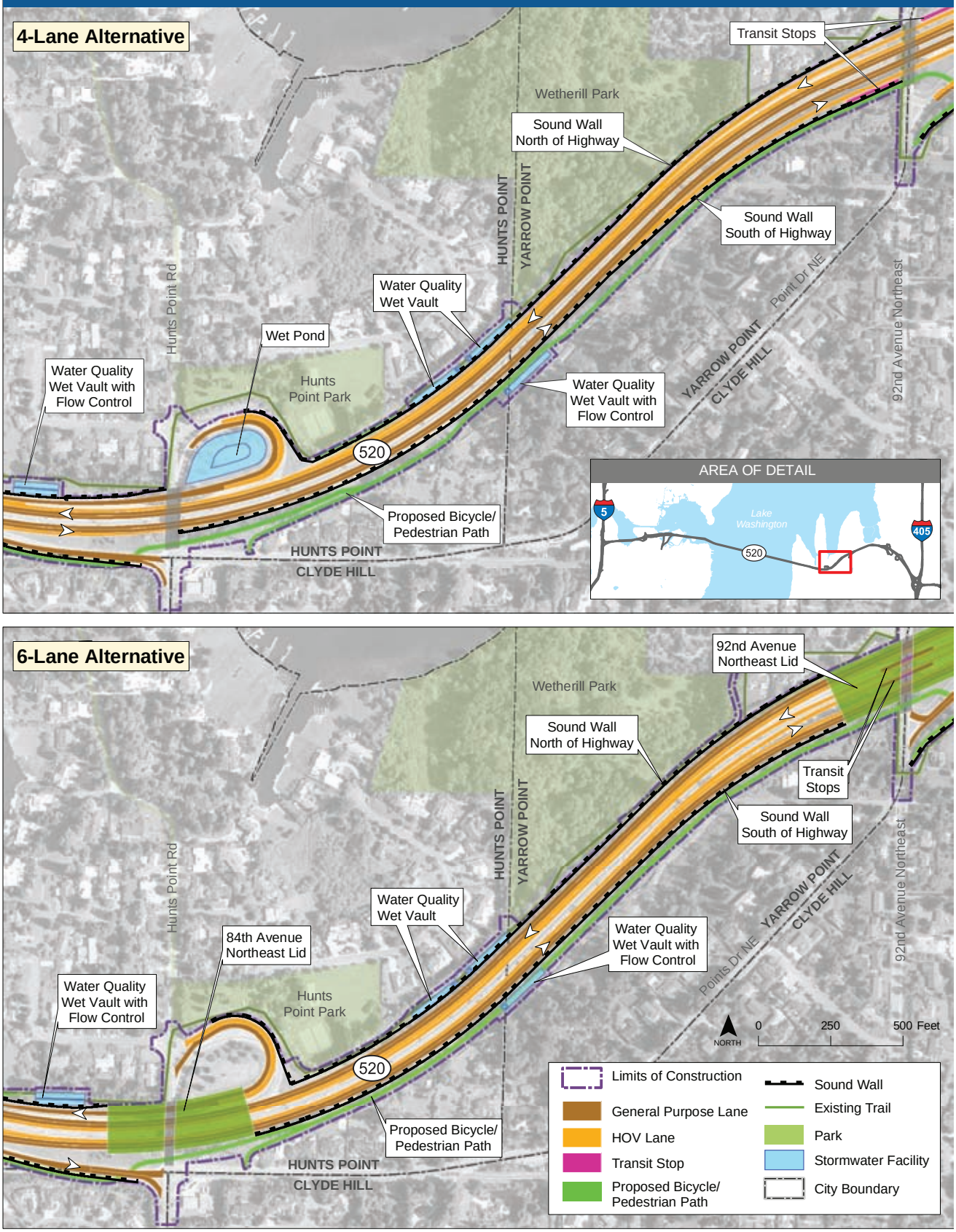


Exhibit 3-3c. **4-Lane and 6-Lane Alternatives from Yarrow Point to Bellevue**

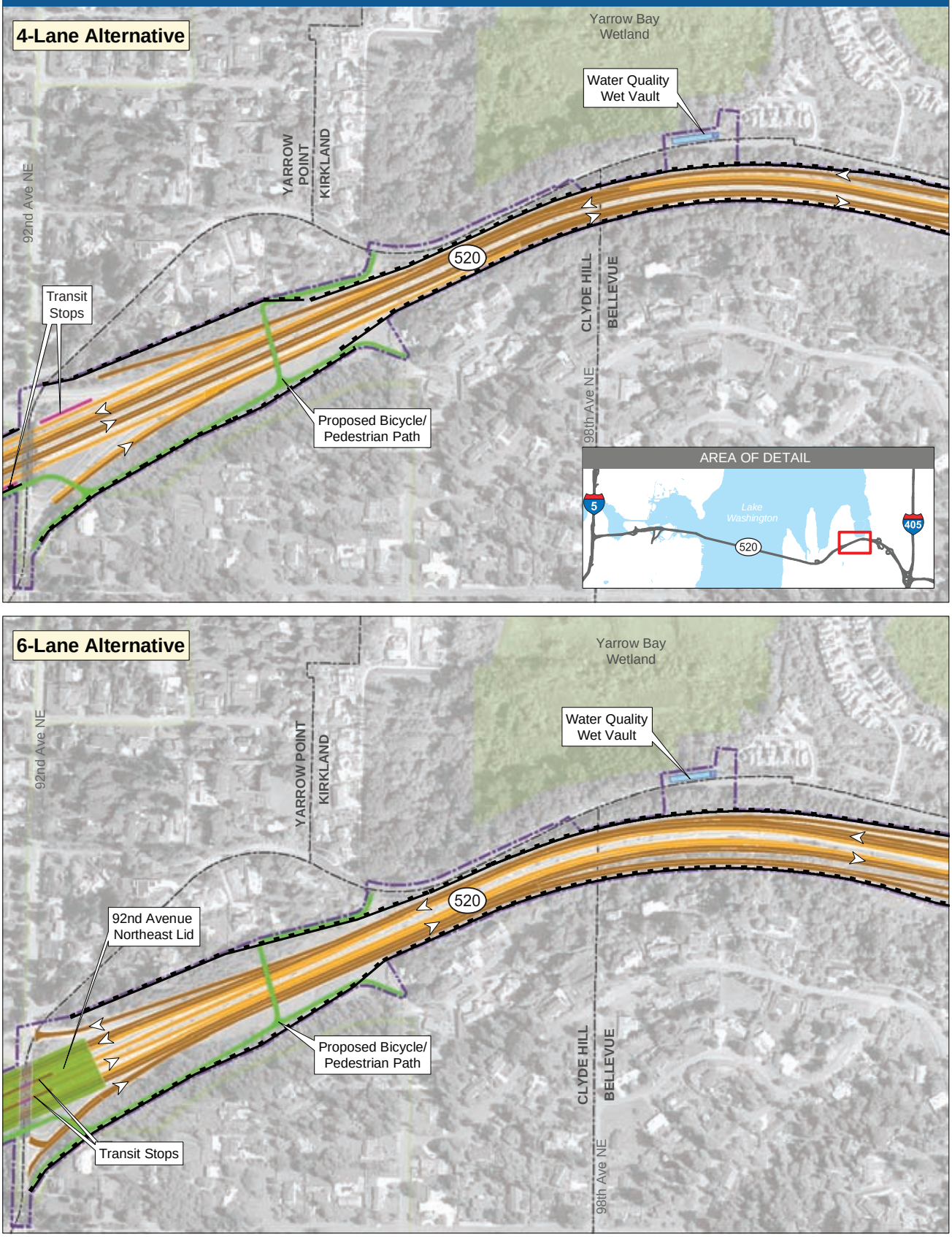
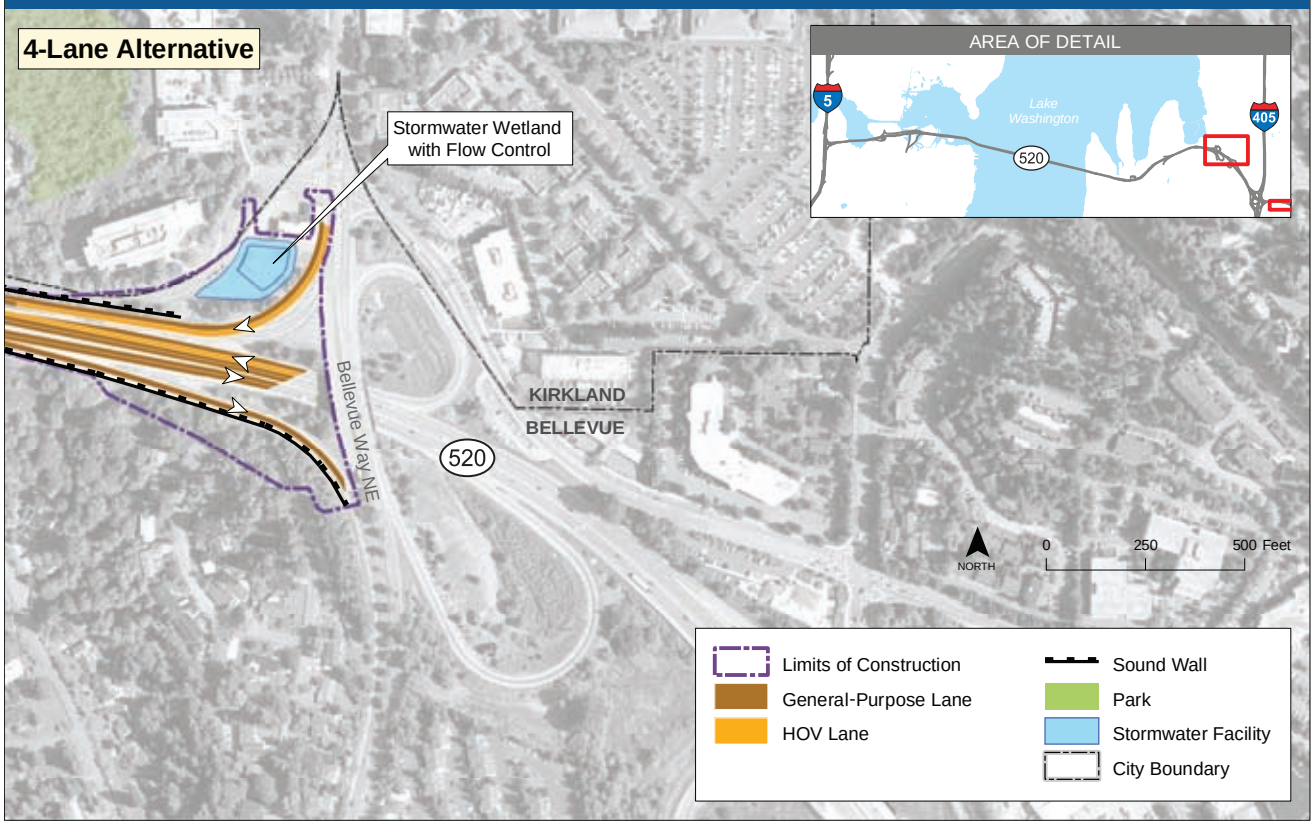
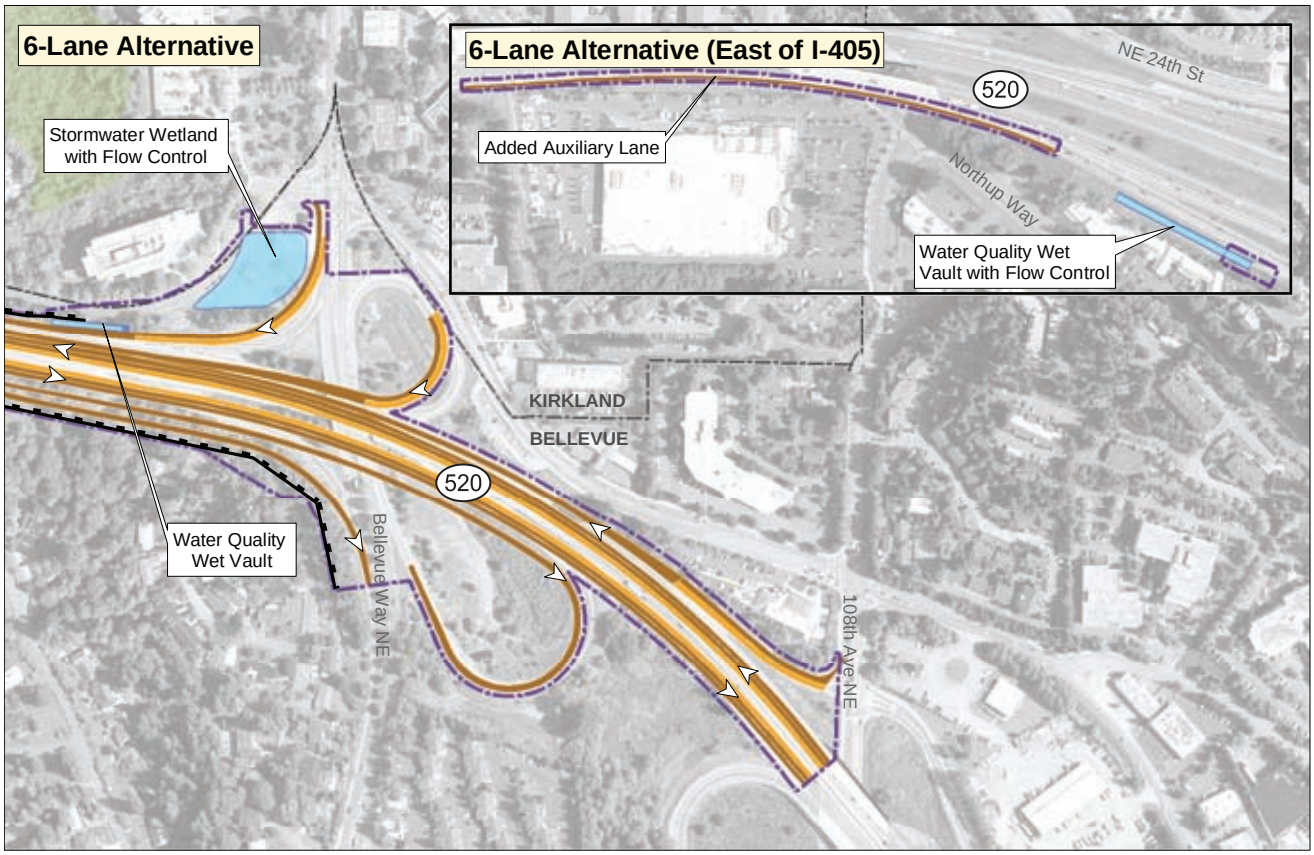


Exhibit 3-3d. **4-Lane and 6-Lane Alternatives in Kirkland and Bellevue**





As with the 4-Lane Alternative, WSDOT would build sound walls along much of SR 520 in Seattle and the Eastside. A 14-foot-wide bicycle/pedestrian path would follow the north side of SR 520 through Montlake and across the Evergreen Point Bridge, and run along the south side of SR 520 through the Eastside. A new bridge operations facility would be built into the east approach structure abutment on the eastern shore of Lake Washington. Like the 4-Lane Alternative, the 6-Lane Alternative would include an electronic toll collection system. The floating section of the Evergreen Point Bridge would be designed to accommodate the future addition of high-capacity transit in the SR 520 corridor.

An additional feature of the 6-Lane Alternative that is not included in the 4-Lane Alternative would be five 500-foot-long lids across SR 520. These lids would help to reconnect communities that were separated when SR 520 was built in the 1960s. The lids would also provide new landscaped open spaces for use by the adjoining communities. The lids were included in the 6-Lane Alternative to help mitigate the widening of the footprint required for the two additional lanes (as opposed to the 4-Lane Alternative, which would only replace the lanes that already exist). Two of the lids would be in Seattle: one connecting Roanoke Park with North Capitol Hill, and the other connecting the Montlake neighborhood across SR 520. The first lid would carry 10th Avenue East and Delmar Drive East; the second would carry Montlake Boulevard over SR 520. On the Eastside, there would be lids at Evergreen Point Road, 84th Avenue Northeast, and 92nd Avenue Northeast. If the 6-Lane Alternative is selected as the preferred alternative, WSDOT will work with the affected cities and neighborhoods to complete the lid designs.

The 6-Lane Alternative meets all three of the SR 520 project's goals. It would improve safety and reliability by providing new Portage Bay and Evergreen Point bridges; increase mobility for people and goods by adding continuous HOV lanes throughout the corridor; and enhance community and environmental values in the project area. Completion of the HOV system would also support many regional and local policies encouraging transit and carpooling.

As discussed earlier in this chapter, the 6-Lane Alternative includes seven design options, three in Seattle and four on the Eastside. The following subsection describes the development of these options.

What are the 6-Lane Alternative options, and how did they come about?

After developing the 6-Lane Alternative, WSDOT identified several optional design improvements that would reduce its effects and/or enhance its benefits. Many of these improvements originated during the course of WSDOT's continuing discussions with communities in the project area. Neighborhoods adjacent to the highway expressed concern that the

proposed 6-Lane Alternative was too wide through the corridor. WSDOT also received a request from the Montlake community to study the option of building an elevated, distinctively designed bridge (such as a suspension bridge or cable-stayed bridge) that would pass above Montlake, with an interchange at Pacific Street. In addition, WSDOT held workshops with representatives from Sound Transit, Metro Transit, Kirkland, and Bellevue to look at developing better connections between SR 520 and the South Kirkland Park-and-Ride. WSDOT's work with the communities identified the following 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
- Provide a more reliable transit connection to the proposed Sound Transit University Link light rail station at Husky Stadium

WSDOT convened two workshops to consider a list of possible design options that could reduce the width of the 6-Lane Alternative, provide better transit opportunities in the corridor, and address community issues. The options identified in these workshops were evaluated through two screening processes: one for the Seattle options and another for the Eastside options. The screening yielded eight potential options to the 6-Lane Alternative—four in Seattle and four on the Eastside—that were carried forward for further evaluation. These options could be added to the 6-Lane Alternative either individually or in a variety of combinations. The eight options were evaluated in a report completed in July 2005, which is provided in Appendix V, 6-Lane Alternative Options Report, of this Draft EIS.

One of the eight options (High 6 Lanes with Pacific Street Interchange) had its basis in a suggestion from the Montlake community that WSDOT consider a distinctive bridge in this area. Suspension and cable-stayed bridges were ruled out because of engineering design issues and because their large scale would have been out of character with their surroundings. Instead the High 6 Lanes with Pacific Street Interchange option included bridges that were similar to those in the 6-Lane Alternative, but higher. Through further work, WSDOT and the community determined that a lower version of the Pacific Street Interchange design would have a virtually identical footprint and provide the same transportation benefits, but would have fewer visual effects because of its lower height. Thus, the High 6 Lanes with Pacific Street Interchange option was dropped from further consideration.

The following subsections describe the 6-Lane Alternative and the 6-Lane Alternative options for the Seattle, Lake Washington, and Eastside project areas, respectively.

6-Lane Alternative: Seattle

6-Lane Alternative

Exhibits 3-1a and *3-1b* show key features of the 6-Lane Alternative in the Seattle project area. The connection of SR 520 westbound to I-5 would be similar to the 4-Lane Alternative, but would include a new ramp over I-5 with a reversible HOV lane to connect the SR 520 HOV lanes to the I-5 express lanes. This reversible lane would be used for the westbound-to-southbound connection in the mornings, and the northbound-to-eastbound connection in the afternoons. The I-5 express lanes would be modified to include the new ramp over I-5, reconstruction of the shoulders, and restriping to reduce the number of express lanes from four to three in the vicinity of the SR 520 interchange.

The connection of I-5 to SR 520 eastbound would also be similar to the 4-Lane Alternative, with a few exceptions. From southbound I-5, the eastern portion of the existing tunnel would be rebuilt to include a wider 15-foot lane and an 8-foot outside shoulder. From northbound I-5, a wider two-lane on-ramp would connect to SR 520. From the two-lane on-ramp, there would be a bus-only ramp that would operate only in the morning and connect to the SR 520 eastbound HOV lane.

Four bridges over SR 520 would be rebuilt to provide room to widen the highway—10th Avenue East, Delmar Drive East, Montlake Boulevard, and 24th Avenue East. The first three of these would cross SR 520 on the two 500-foot-wide lids described at the beginning of this section. *Exhibit 3-4* shows several ideas presented by local residents about how these lids might look.

The Portage Bay Bridge would be similar in height, location, and column spacing to the 4-Lane Alternative, but it would be nine lanes wide (four general-purpose lanes, two HOV lanes, two auxiliary lanes coming into and out of the Montlake Boulevard interchange and the I-5/SR 520 interchange, and a westbound acceleration lane from the Montlake Freeway Station). The two HOV lanes would connect to the I-5 express lanes and the I-5 mainline. The westbound HOV lane that connects to the I-5 mainline would only be used westbound in the mornings.

The new Montlake interchange would be similar to the 4-Lane Alternative, but would have new HOV direct access ramps and different freeway station locations. A westbound HOV direct access off-ramp would begin at Foster Island, weave over SR 520 to the north side of the highway, and exit to northbound Montlake Boulevard adjacent to the mainline exit. The eastbound SR 520 on-ramp would be a loop ramp (as it is today) with

two general-purpose lanes and one HOV bypass lane. The HOV bypass lane on the eastbound ramp would weave north over SR 520 to connect directly to the inside HOV lane at Foster Island. The Montlake Freeway Station would be located in the center of SR 520 to allow buses using the inside HOV lanes to directly access the stop. Pedestrians would use stairs and elevators to access the freeway stations from the Montlake lid.

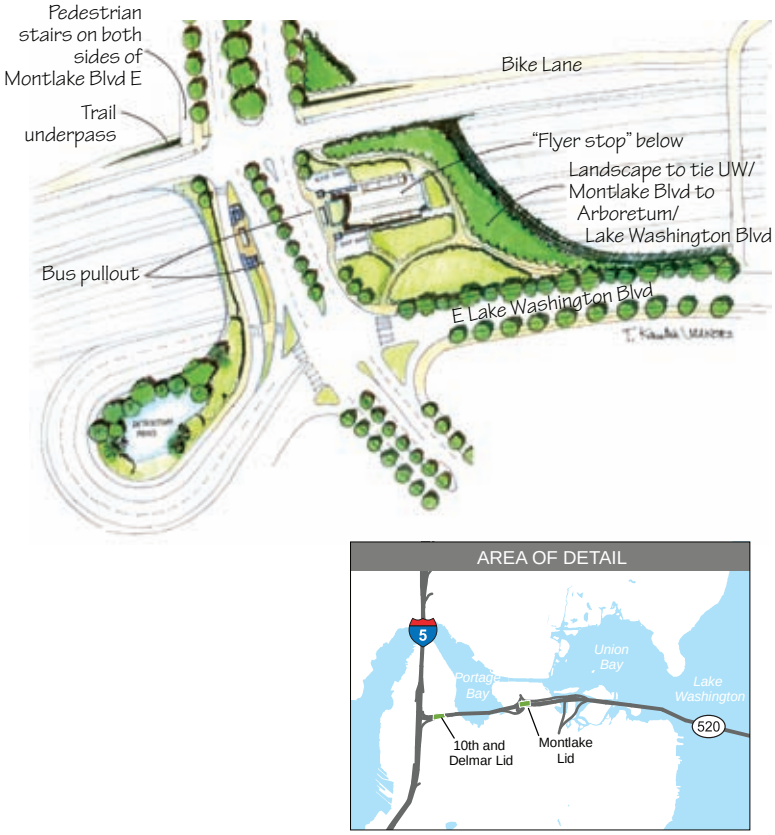
The new Montlake Boulevard would cross over SR 520 on the 500-foot-long lid; it would carry three lanes in each direction, plus left turn lanes. Montlake Place East and East Roanoke Street would be realigned just south of the SR 520 interchange. East of the interchange, the 6-Lane Alternative would (like the 4-Lane Alternative) include reconstruction of the Lake Washington Boulevard interchange, removal of the R.H. Thomson Expressway ramps, and a northward shift of the roadway from its existing location. It would differ from the 4-Lane Alternative by including braided HOV ramps and reconstruction of the 24th Avenue East bridge.

The sound walls for the 6-Lane Alternative would be similar to those for the 4-Lane Alternative. These walls would run along both sides of SR 520 for most of the project corridor. Major differences would occur near the lids, and in some locations the wall heights would differ because of roadway geometry. *Exhibits 3-1a* and *3-1b* show the locations of the proposed sound walls in Seattle. Sound walls in Seattle would total

Exhibit 3-4. **Community Ideas for the Design of the Seattle Lids**

10th and Delmar Lid Idea

Montlake Lid Idea



about 5 miles in length, with heights ranging from 8 to 18 feet above the roadway surface.

6-Lane Alternative Options in Seattle

Three potential options for the 6-Lane Alternative in Seattle, as shown in *Exhibits 3-5a* and *3-5b,* would change the proposed design of the 6-Lane Alternative in specific locations:

- Pacific Street Interchange option
- No Montlake Freeway Transit Stop option
- Second Montlake Bridge option

The Pacific Street Interchange option would eliminate the existing Montlake interchange, replacing it with a new connection between SR 520, Lake Washington Boulevard, and the intersection of Montlake Boulevard and Pacific Street near the University of Washington campus. From a new interchange located about 2,000 feet east of the Montlake interchange, a new bridge would cross Union Bay and the Ship Canal and pass south of Husky Stadium *(Exhibit 3-5a).* Much of the new interchange would be located over the WSDOT-owned peninsula near the Washington Park Arboretum, and some of it would be within the Arboretum over parts of Foster and Marsh Islands. The bridge over Union Bay would be four lanes wide and include a 14-foot-wide bicycle path. It would not include HOV lanes because the bridge and intersections would operate with low

Madison Park Bicycle/Pedestrian Connection

The City of Seattle, with WSDOT support, is studying the potential for a bicycle/pedestrian connection between SR 520 and Madison Park. This connection was suggested by community groups as a way to improve access between the Madison Park neighborhood and the University of Washington. The following two routes have been identified.

The 37th Avenue East connection would connect from SR 520 to a city-owned site at the end of 37th Avenue East via a 750-foot-long pedestrian/bicycle bridge.

The 43rd Avenue East connection would connect from SR 520 to public right-of-way at the end of 43rd Avenue East via an approximately 1,000-foot-long pedestrian/bicycle bridge.

The project team evaluated the potential effects of these two options. The most notable effects that would occur with either option are in regard to ecosystems, visual changes, navigation, and benefits to pedestrian and bicycle transportation, as follows:

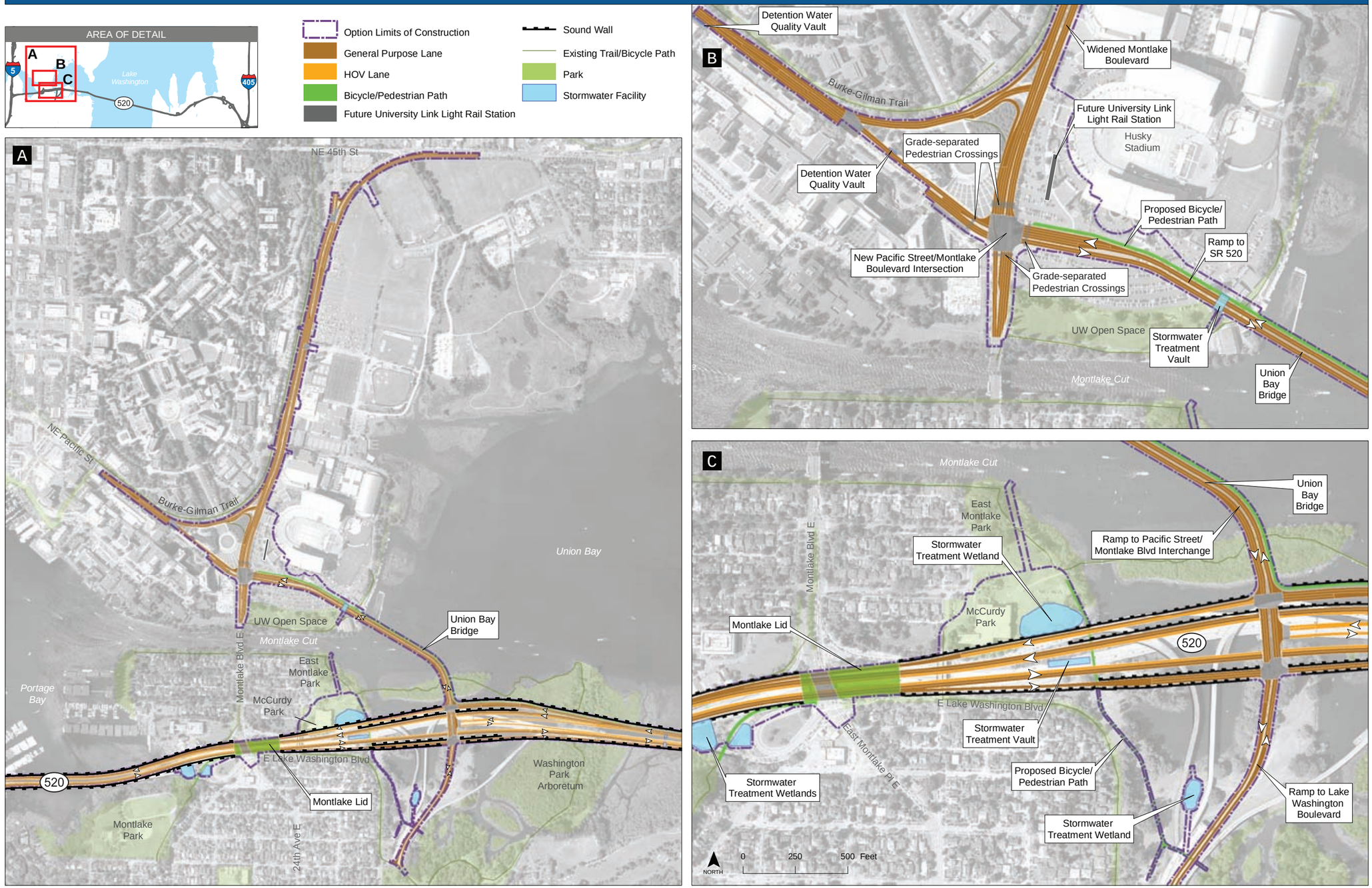
The 37th Avenue East connection would be constructed over shallow open water and wetlands within a generally undeveloped area that provides habitat for a variety of wildlife uncommon in urban environments. In comparison, the 43rd Avenue East connection would not affect wetlands but would cross over open water at the edge of Union Bay in an area where young salmonids migrating from the southern end of Lake Washington are likely to pass.

The new bridge and supporting columns with either option would be highly visible to adjacent homes. Generally, the 43rd Avenue East connection would have greater effects because it would be longer, in a more visible location, and closer to more residences.

The 37th Avenue East connection would not affect recreational or commercial vessel navigation because the section of Lake Washington that would be spanned is limited to boats such as kayaks and canoes, which could easily pass under this bridge. The 43rd Avenue East connection, however, would restrict the sailboats with fixed masts that moor at the north Madison Park docks from passing under the bridge. Additionally, it would restrict the Seattle Fire Department fireboat Chief Seattle from passing under the bridge. Consequently, there would be an extended response time if it were necessary for another boat, the fast attack boat, to access this area.

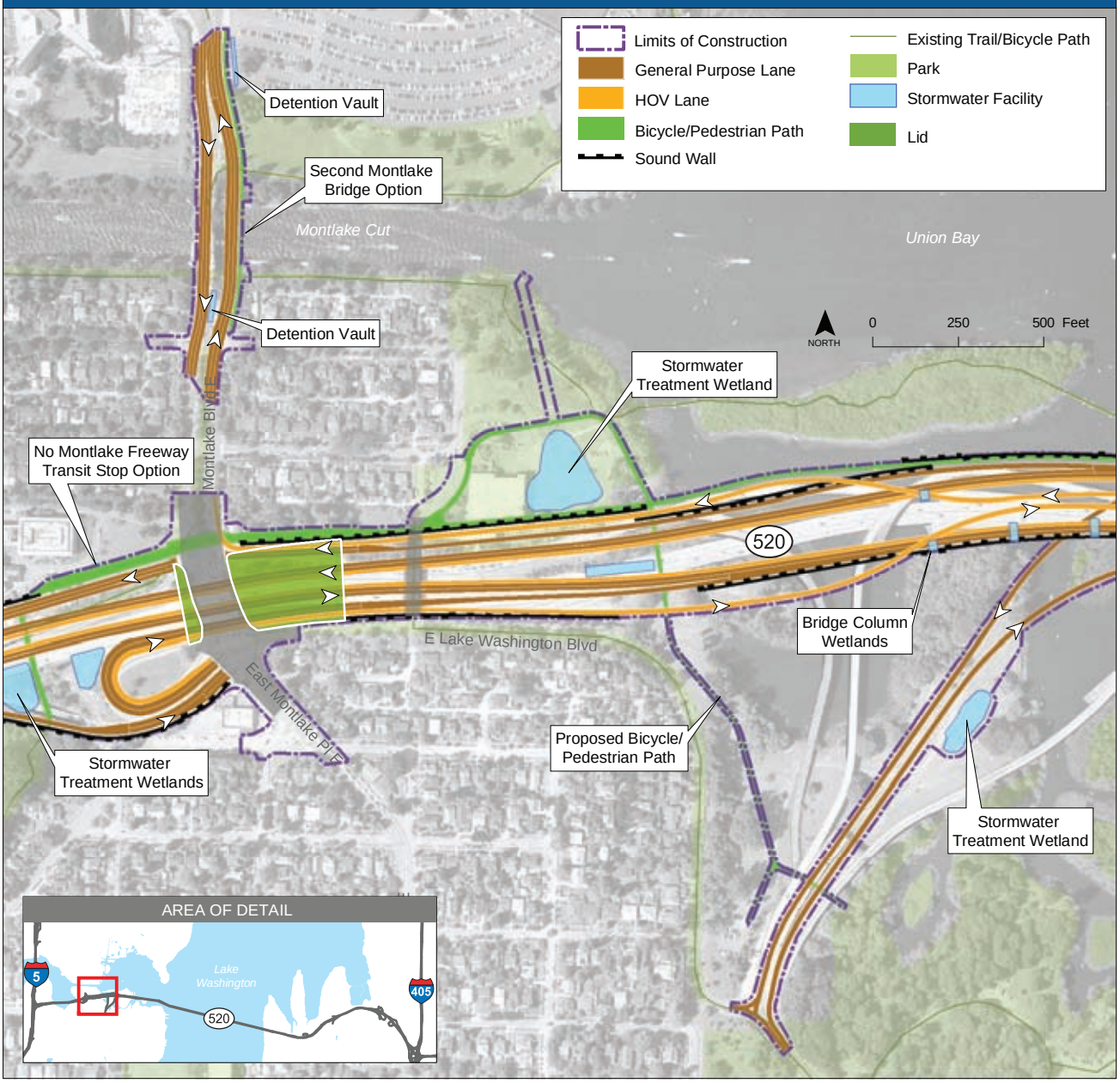
Both of the options would be consistent with the Seattle Department of Transportation's Bicycle Program and would provide recreational benefits. Either option would increase bicycle and pedestrian circulation and access to parks and neighborhoods.

Exhibit 3-5a. **Pacific Street Interchange Option**



This page intentionally left blank

Exhibit 3-5b. **Second Montlake Bridge and No Montlake Freeway Transit Stop Options**



NOTE: The Second Montlake Bridge Option assumes a pairing with the No Montlake Freeway Transit Stop Option.

or moderate congestion, and there would be no travel time advantage gained by adding separate lanes for HOVs. To ensure adequate clearance for large ships, the bridge would provide a minimum of 110 feet of vertical clearance above the Ship Canal water surface.

The Pacific Street extension would pass through a part of what is now the Husky Stadium parking lot, then join the existing intersection of Pacific Street and Montlake Boulevard. The intersection would be lowered by 8 to 10 feet and bridged to provide pedestrian access across Montlake Boulevard and Pacific Street. North of the intersection, the option would widen Montlake Boulevard by one northbound lane to just east of the Northeast 45th Street viaduct and by one southbound lane between Pacific Street and 25th Avenue Northeast.

This option would give SR 520 a smaller "footprint" across Portage Bay. From Montlake to I-5, SR 520 would be six lanes wide (three in either direction), compared to nine lanes for the 6-Lane Alternative. The two auxiliary lanes and the westbound acceleration lane from the Montlake Freeway Station would not be needed because the station would be removed and the new interchange would be located farther east. This would increase the distance between the interchange and I-5 to a more optimal spacing for traffic operations, allowing vehicles to safely get up to speed when merging onto SR 520 and safely decrease speed when exiting SR 520.

This option would improve access to and from northeast Seattle, and alleviate existing congestion in the Montlake interchange area. It would also provide a more reliable transit connection to the Sound Transit University Link light rail station at Husky Stadium than the 6-Lane Alternative because buses coming from SR 520 to the Pacific Street bus stops would not be affected by congestion on Montlake Boulevard. This alternative would require some major changes in transit service to address the elimination of the freeway transit station, including additional transit service; these changes are described in Chapters 4 and 5. WSDOT is working with Sound Transit and Metro Transit to determine how transit riders could be served with rerouted or additional service.

WSDOT considered several potential locations for the Pacific Street interchange. The analysis that went into the location evaluated in this Draft EIS is described in the box on the next page. More information on the analysis is in Appendix X, Pacific Street Interchange Option Location Analysis.

The No Montlake Freeway Transit Stop option (see *Exhibit 3-5b)* would eliminate the Montlake Freeway Station. This would narrow the footprint of the 6-Lane Alternative through Montlake by as much as 40 feet, and also would reduce the width of the Portage Bay Bridge to eight lanes (one less than the 6-Lane Alternative). Depending on their destination, bus riders who currently use this stop would instead board buses or use Link light rail service via the Pacific Street transfer point or in downtown Seattle.

The Second Montlake Bridge option would narrow SR 520 through the Montlake neighborhood while continuing to provide transit access from SR 520 to the University of Washington *(see Exhibit 3-5b).* This option could improve traffic operations through the corridor by increasing capacity across the Montlake Cut. It would be the same as the No Montlake Freeway Transit Stop option (discussed above), except that it would also include a second drawbridge across the Montlake Cut, parallel to the existing Montlake Bridge. The new bridge would carry three lanes of north-

Evaluating the Pacific Street Interchange Option

At the eastern edge of the Seattle project area, SR 520 passes through a wealth of cultural and natural resources: the historic Montlake neighborhood; Washington Park Arboretum's trails and wetlands; Lake Washington Boulevard; shoreline areas of East Montlake and McCurdy parks; and the open water of Union Bay. The existing roadway affects all of these resources, as would each of the alternatives. To balance resource protection with the key project goals of safety and mobility, WSDOT developed two locations for the Pacific Street interchange—south of Marsh Island and east of Foster Island. These locations were evaluated in a screening process using the same transportation and environmental criteria used to screen the alternatives considered for the SR 520 project. At the request of resource agencies, WSDOT developed and screened a third potential location along the shoreline, just east of the existing Montlake interchange.

Each possible location of the interchange represents tradeoffs among several factors. One critical factor is the safety of motorists on SR 520. Ensuring safety requires that curves and slopes be gradual and smooth, and that adequate distance be provided for motorists to change lanes as they enter and leave the highway. A particular concern is the distance between the interchange and I-5; under existing conditions, the limited distance between the Montlake interchange and the I-5 ramps creates dangerous weaving movements as westbound drivers try to change lanes within a short distance on an uphill grade. The more room that drivers have to change lanes, the safer the highway will be.

Another key factor in interchange location is minimizing the negative effects on the neighborhoods and parks that SR 520 passes through. These effects include the need to acquire right-of-way as well as the noise and visual intrusion that a large highway can create. Equally important is WSDOT's desire to minimize filling and shading of the wetland, aquatic, and shoreline habitats in the Arboretum and Union Bay. These areas support endangered salmon; eagles; and many other species of fish, birds, and wildlife. Every alternative and option being considered for this project affects each of these factors to some degree; WSDOT's objective is to gain the greatest possible transportation benefit with the least possible environmental effect.

The results of the screening evaluation showed the following:

- An interchange east of Foster Island would require WSDOT to build a 4,000-foot-long bridge over Union Bay, affecting much more aquatic habitat than any other option. It would not be feasible to build ramps to and from Lake Washington Boulevard, so this option would create additional traffic congestion in Montlake and at the south end of the University of Washington. (A location over Foster Island was ruled out because, in addition to being a park, this area has a long history of Native American use and is very likely to contain archaeological sites.)
- A shoreline location just east of the Montlake interchange could still challenge drivers trying to merge safely. To solve this problem, WSDOT would need to add an auxiliary lane in each direction, which would increase the width of the Portage Bay Bridge and place additional columns in the water. This interchange location would eliminate McCurdy Park and permanently occupy approximately 3 acres of East Montlake Park, including the entire shoreline. The new bridge over the Montlake Cut would require a maximum 70-foot vertical clearance for vessels going to and from the lake (a higher vertical clearance would result in unacceptably steep grades). This roadway would be prominent in the foreground from the University of Washington's Rainier Vista.
- An interchange south of Marsh Island (Pacific Street Interchange option) would span Union Bay with a new roadway that would touch down south of Husky Stadium. This interchange would be at a far enough distance from I-5 that drivers would have ample room to merge. As such, no auxiliary lanes would be required, resulting in a narrower bridge width across Portage Bay. The new bridge over Union Bay could provide a maximum of 110 feet of vertical clearance for vessels going to and from the lake, while still maintaining acceptable grades for driver safety. The interchange would place several additional columns in Union Bay, but would result in comparatively lower effects on park areas and adjacent neighborhoods than the interchange location along the East Montlake shoreline. The bridge would be comparatively less prominent from the Rainier Vista.

WSDOT weighed the advantages and disadvantages of the three interchange locations and determined that the interchange south of Marsh Island was the best. It would provide a greater level of safety to drivers, minimize effects on parks and neighborhoods, and have only slightly greater net effects on aquatic habitat compared to the 6-Lane Alternative or the interchange location along the East Montlake shoreline. As a result, WSDOT decided to move forward with the Pacific Street interchange location south of Marsh Island. Refer to Appendix X, Pacific Street Interchange Option Location Analysis, for more detailed discussion of the screening evaluation

bound traffic, and the existing bridge would carry three lanes of southbound traffic. Eliminating the Montlake Freeway Station would reduce the width of the Portage Bay Bridge to eight lanes with this option, compared to nine lanes with the 6-Lane Alternative.

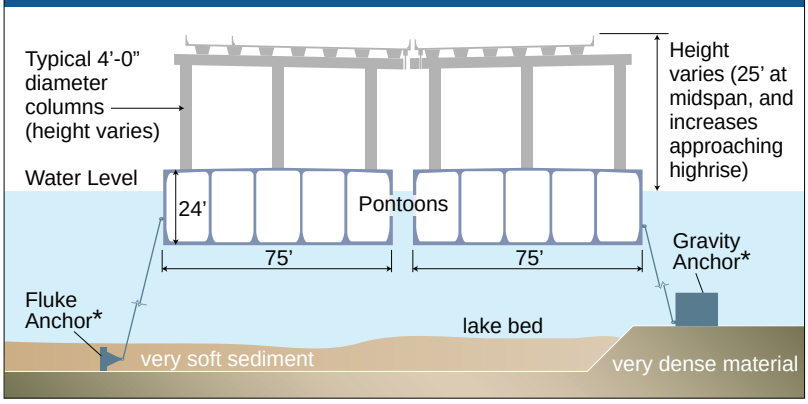
6-Lane Alternative: Lake Washington

Under the 6-Lane Alternative, the west approach to the Evergreen Point Bridge would begin farther west and would be higher and less steep than the current highrise. The SR 520 mainline would begin to rise at Union Bay, gradually attaining a maximum elevation of approximately 60 feet above water (water level to bottom of bridge) just east of Foster Island.

Similar to the 4-Lane Alternative, the floating portion of the Evergreen Point Bridge would lie approximately 200 feet north of the existing floating bridge at its westerly end. As shown in *Exhibit 3-6,* two parallel rows of 75-foot-wide pontoons would support the structure, and six concrete columns would carry the roadway at a height of approximately 25 feet above water level. The bridge would have two general-purpose lanes in each direction, one inside HOV lane in each direction, 10-foot-wide inside shoulders, 10-foot-wide outside shoulders, and a 14-foot-wide bicycle/pedestrian path located on the north side of the bridge. The bicycle/pedestrian path would feature five scenic vantage points with pull-outs and would be illuminated by recessed lighting in the traffic barrier.

Like the 4-Lane Alternative, the 6-Lane Alternative would have pontoons wide enough to accommodate future development of high-capacity transit, which would be built in the center of the roadway. The vehicle travel lanes would be widened to the outside to accommodate the high-capacity transit right-of-way.

Exhibit 3-6. **6-Lane Alternative Cross Section of the Evergreen Point Bridge**



* Anchors shown only to illustrate proposed anchor types, not their placement

Drawing not to scale.

6-Lane Alternative: Eastside

6-Lane Alternative

Exhibits 3-3a through *3-3d* shows key features of the 6-Lane Alternative in the Eastside project area. Except for its width (40 feet wider than the 4-Lane Alternative), the east highrise for the 6-Lane Alternative would be identical to the 4-Lane Alternative, connecting to land approximately 100 feet north of its existing location measured from the north edge of the existing bridge to the north edge of the new bridge. Under the 6-Lane Alternative, Evergreen Point Road would cross over SR 520 on a 500-foot-wide lid reconnecting Medina residents north and south of SR 520. Freeway stations would be located in the center of SR 520, east of the Evergreen Point Road bridge.

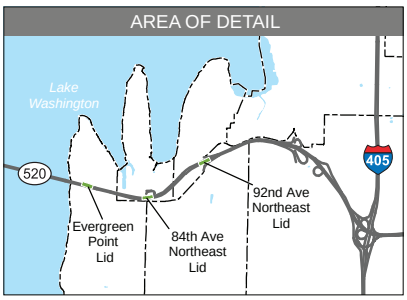
The 84th Avenue Northeast interchange would be rebuilt and configured similarly to the 4-Lane Alternative. One lane would exit from SR 520 eastbound, becoming two lanes at the 84th Avenue Northeast intersection. The loop on-ramp to SR 520 westbound would be rebuilt with one general-purpose lane and one HOV bypass lane. This interchange also would have an approximately 500-foot-wide lid, which would carry 84th Avenue Northeast over SR 520 and provide new open space to help reconnect the Medina and Hunts Point communities. *Exhibit 3-7* shows some sketches created by Eastside residents of how the lids might look.

The 92nd Avenue Northeast interchange would be similar to the 4-Lane Alternative, but would have a lid approximately 500 feet wide that would help reconnect the Clyde Hill and Yarrow Point communities. Freeway stations for eastbound and westbound buses would be located in the center of SR 520 underneath the 92nd Avenue Northeast lid.

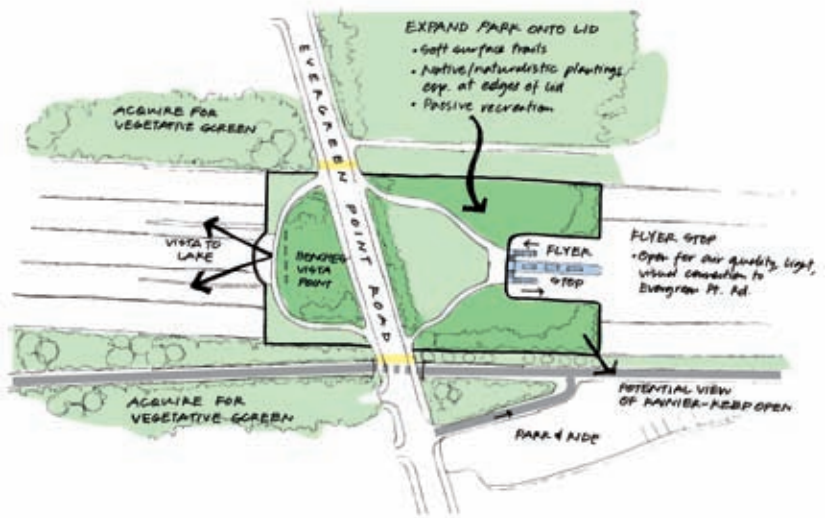
The Bellevue Way interchange would be similar to the interchange that exists today. The Bellevue Way bridge over SR 520 would be rebuilt to allow more room for the widened highway. The SR 520 westbound on-ramp from Lake Washington Boulevard Northeast would begin approximately 150 feet farther north on Lake Washington Boulevard. WSDOT would rebuild the SR 520 eastbound off-ramp to Bellevue Way Northeast as a single general-purpose lane ramp, and the SR 520 eastbound off-ramp to Lake Washington Boulevard Northeast would be rebuilt as a single-lane loop ramp. A portion of the SR 520 westbound on-ramp from Bellevue Way would be rebuilt in a tighter loop, with one general-purpose lane and one HOV bypass lane. The SR 520 westbound on-ramp from 108th Avenue Northeast would be redesigned to connect with the widened highway.

East of I-405, an eastbound auxiliary lane would be added between the I-405 interchange and the 124th Avenue Northeast exit. The SR 520 bridge that crosses over Northup Way would be widened to accommodate the new lane. SR 520's westbound lanes east of I-405 would not change,

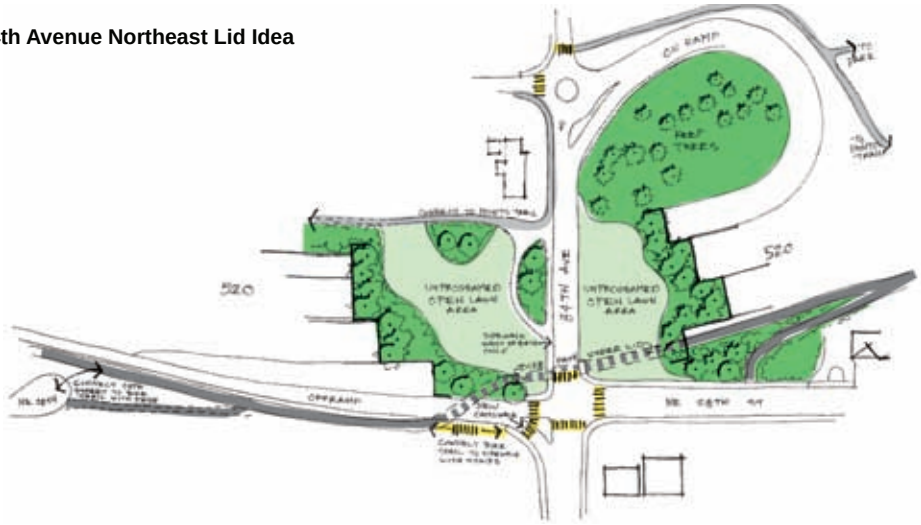
Exhibit 3-7. **Community Ideas for the Design of the Eastside Lids**



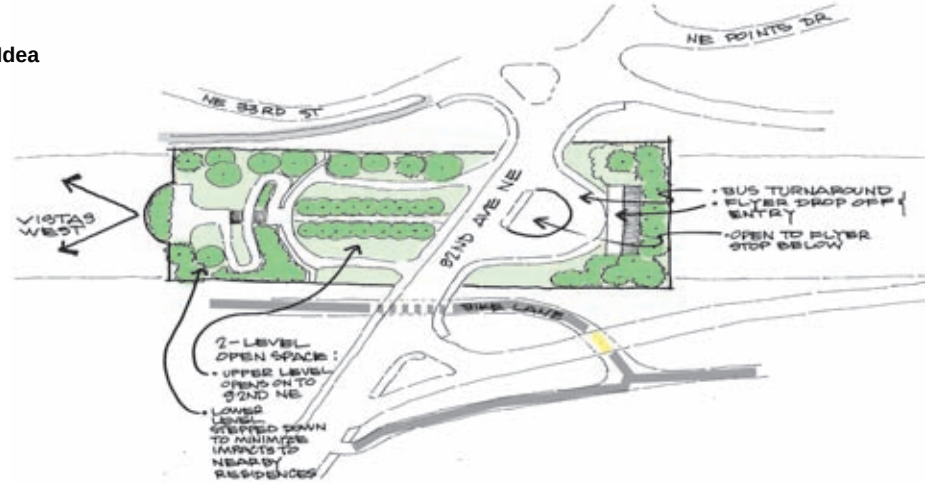
Evergreen Point Lid Idea



84th Avenue Northeast Lid Idea



92nd Avenue Northeast Lid Idea



except for potential restriping of the HOV lanes to be compatible with the center HOV lanes proposed for this alternative.

The 6-Lane Alternative includes sound walls for the Eastside from just west of the eastern shoreline of Lake Washington to just west of Bellevue Way *(Exhibits 3-3a through 3-3d).* The sound walls would be continuous throughout the entire area, except for breaks at Evergreen Point Road, 84th Avenue Northeast, and 92nd Avenue Northeast, where the sound walls would be integrated with the lids. The project would add about 3.7 miles of sound walls on the Eastside, with heights ranging from 8 to 20 feet above the roadway surface. The highest sound walls would be placed in areas where residents are located uphill from the project corridor.

6-Lane Alternative Options on the Eastside

WSDOT evaluated four options for the 6-Lane Alternative on the Eastside:

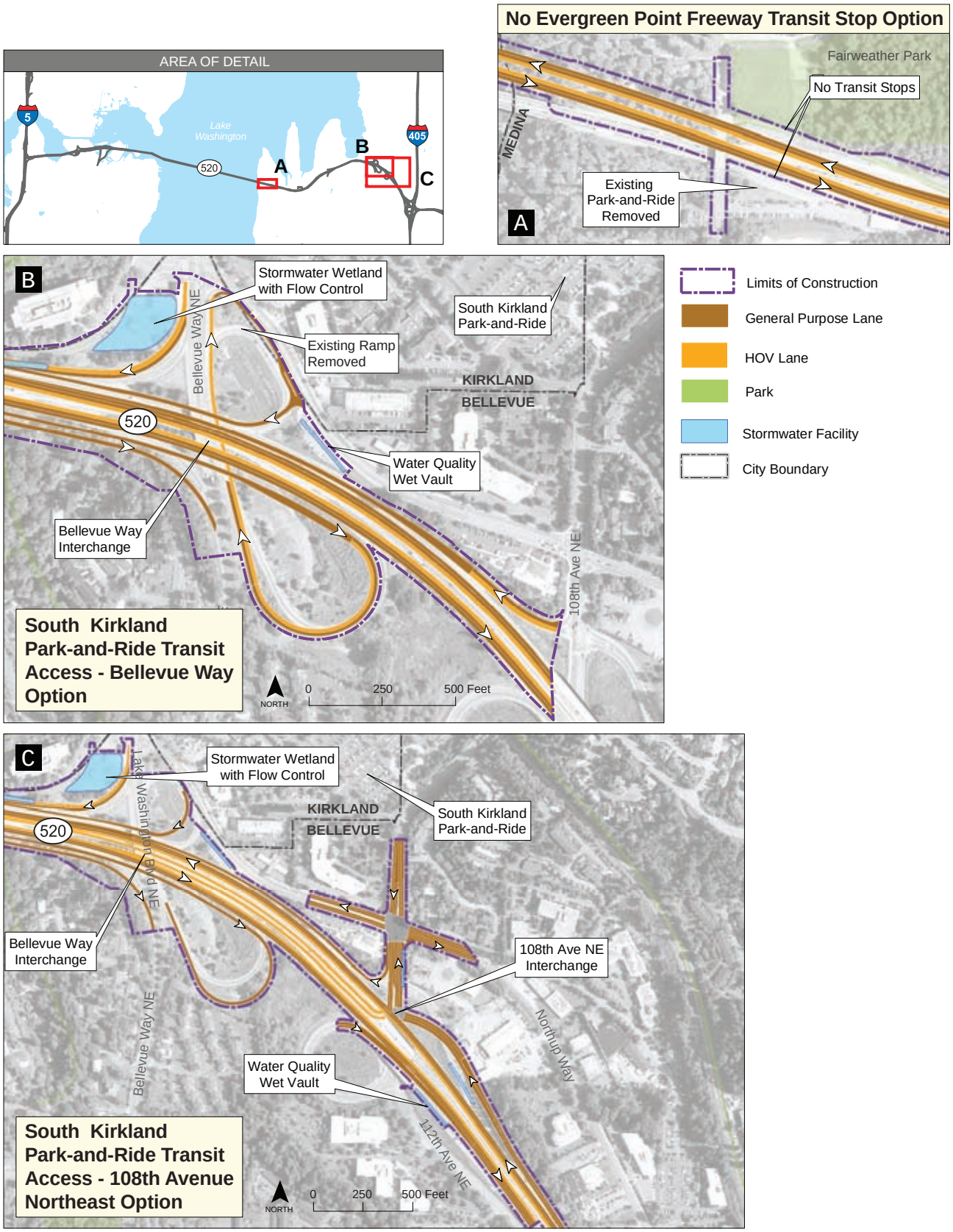
- Bicycle/Pedestrian Path to the North
- No Evergreen Point Freeway Transit Stop
- South Kirkland Park-and-Ride Transit Access – Bellevue Way
- South Kirkland Park-and-Ride Transit Access – 108th Avenue Northeast

Three of the options are depicted in *Exhibit 3-8.* The Bicycle/Pedestrian Path to the North option is not shown because it would differ from the 6-Lane Alternative only in the location of the bicycle/pedestrian path on the north side of SR 520.

The Bicycle/Pedestrian Path to the North option would eliminate the hard turns and crossings of the proposed SR 520 bicycle/pedestrian path as it extends east from Lake Washington, and would reduce the path's steep grade at Points Drive. The route of the SR 520 path would parallel that of the local Points Loop Trail, while providing a physical separation between the two paths. In this option, the 14-foot-wide bicycle/pedestrian path would stay on the north side of SR 520 as it leaves the east highrise, meeting up with the realigned Points Loop Trail as it moves eastward along the north edge of the freeway. The path and the trail would be separated by 4 feet and a physical barrier. The bicycle/pedestrian path would extend about 1,500 feet farther to the east than the 6-Lane Alternative along the alignment of Points Drive.

The No Evergreen Point Freeway Transit Stop option would be the same as the Bicycle/Pedestrian Path to the North option, except that it would also eliminate the freeway station at Evergreen Point Road. The Yarrow Point Freeway Station would serve people and buses now using the Evergreen Point Freeway Station, and would not require any additional physical changes beyond what is proposed in the 6-Lane Alternative. This option would narrow the 6-Lane Alternative footprint by approximately 60 feet through Medina.

Exhibit 3-8. **6-Lane Alternative Options in the Eastside Project Area**



The South Kirkland Park-and-Ride Transit Access – 108th Avenue Northeast option would allow buses better access from eastbound SR 520 to the South Kirkland Park-and-Ride and from the park-and-ride to westbound SR 520. It would add two new ramps for transit and HOVs from SR 520 to 108th Avenue Northeast—one eastbound off-ramp and one westbound on-ramp—at the 108th Avenue Northeast interchange. The footprint of SR 520 east of Bellevue Way Northeast would be widened slightly to accommodate the new ramps. Both 108th Avenue Northeast and Northup Way would be widened and improved under this option.

The South Kirkland Park-and-Ride Transit Access – Bellevue Way option would provide the same improved bus access as the 108th Avenue Northeast option, but would use a different approach. It would add a new HOV/transit lane to the eastbound Lake Washington Boulevard off-ramp and relocate the northbound-to-westbound Bellevue Way on-ramp to Northup Way.

What features are similar between the 4-Lane and 6-Lane Alternatives?

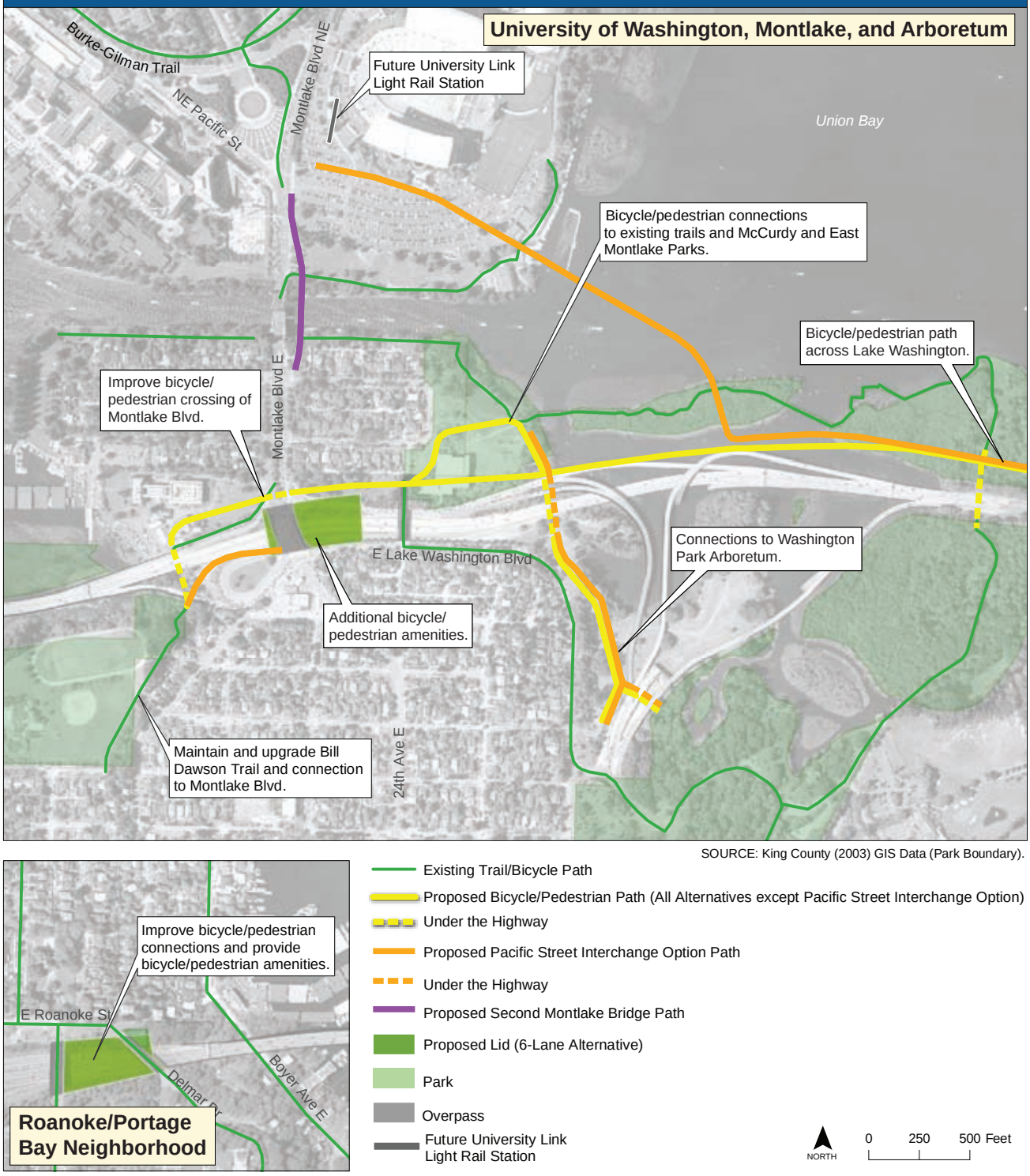
Both the 4-Lane and 6-Lane Alternatives would include a continuous bicycle/pedestrian path, stormwater treatment, and a bridge operations facility. Both would also make changes in existing navigational channels, impose tolls on bridge users, and implement a flexible transportation plan to enhance management of traffic flow. Although some details of these features would differ among the alternatives and options, they are generally similar and are described together in this section. More detail is available in Appendix A, Description of Alternatives and Construction Techniques.

Bicycle/Pedestrian Connections

The 4-Lane and 6-Lane Alternatives would provide a new, continuous bicycle/pedestrian path across the Evergreen Point Bridge, where there currently is no path today. This path would function as part of the regional transportation system, providing a nonmotorized route across Lake Washington. *Exhibits 3-9* and *3-10* show the route of the new path and where it would connect with existing bicycle/pedestrian trails.

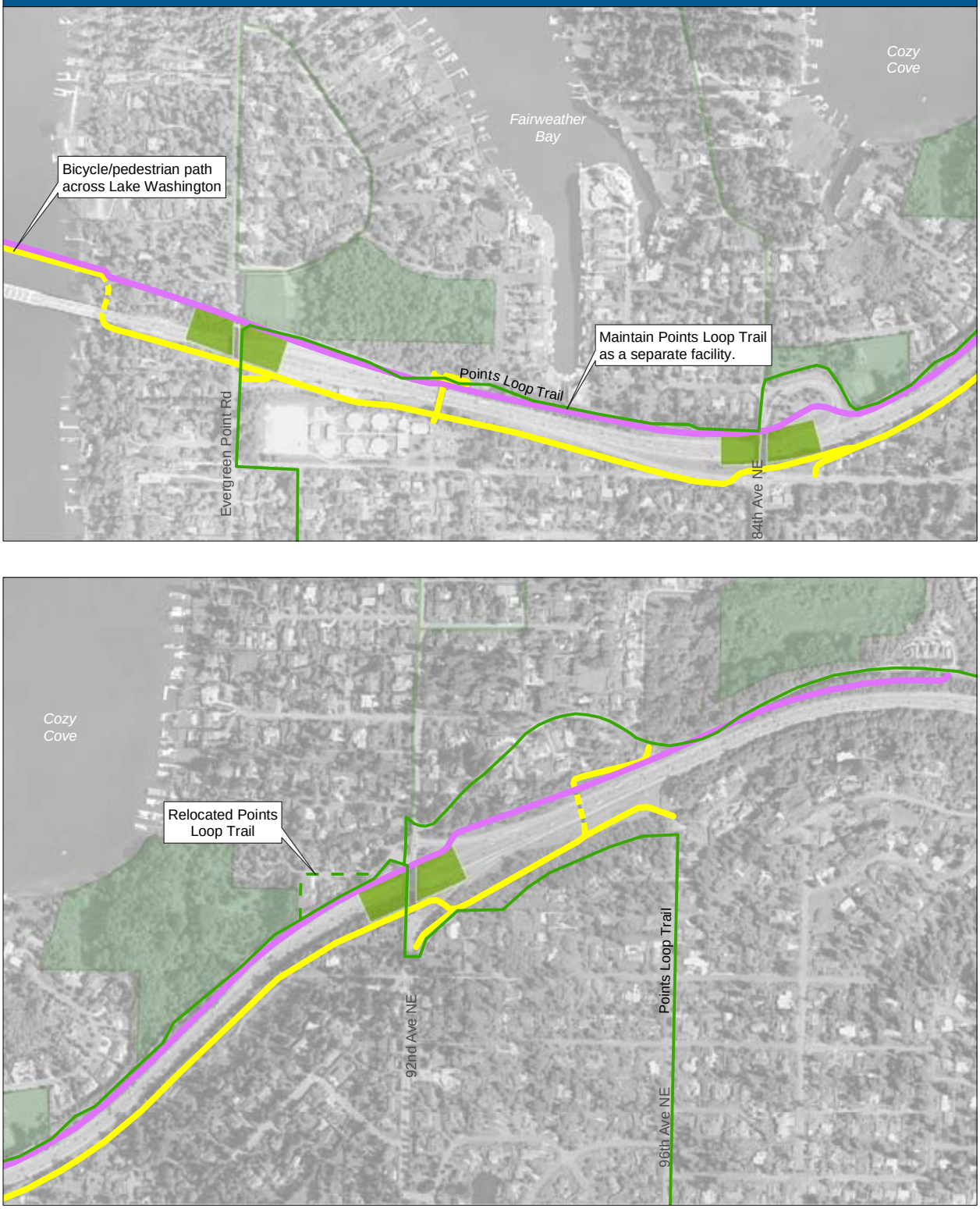
In Seattle, the bicycle/pedestrian path would begin just south of the SR 520 eastbound Montlake off-ramp, connecting to the existing Bill Dawson Trail near the Montlake Playfield and extending north underneath the off-ramp and SR 520. The path would then turn east and follow the northern edge of SR 520, just outside of the sound wall, in two paths—one connecting to Montlake Boulevard and the other continuing along SR 520 under Montlake Boulevard. The path would continue east along the north side of the Evergreen Point Bridge.

Exhibit 3-9. **Proposed Bicycle and Pedestrian Path Improvements in the Seattle Project Area**



SOURCE: King County (2003) GIS Data (Park Boundary).

Exhibit 3-10. **Proposed Bicycle and Pedestrian Path Improvements in the Eastside Project Area**



SOURCE: King County (2003) GIS Data (Park Boundary).

- Existing Points Loop Trail
- Proposed Relocated Points Loop Trail
- Proposed Bicycle/Pedestrian Path(All Alternatives except Bicycle/Pedestrian Path to the North Option)
- Under the Highway
- Proposed Bicycle/Pedestrian Path to the North Option
- Proposed Lid (6-Lane Alternative)
- Park
- Overpass

NORTH 0 250 500 Feet

Another bicycle/pedestrian path beginning in East Montlake Park would extend south under SR 520 and connect to a proposed new trail in the Arboretum, creating a loop trail through the Arboretum. No bicycle/pedestrian path is currently planned along SR 520 west of Montlake Boulevard because of the steep grades up the Portage Bay Bridge.

At the east end of the Evergreen Point Bridge, the bicycle/pedestrian path would turn south and continue under SR 520, then proceed east along the south side of the highway, south of the proposed sound wall. The path would be constructed to cross under local streets to provide a continuous, nonstop route with connections to Evergreen Point Road, 84th Avenue Northeast, and 92nd Avenue Northeast.

Just east of Evergreen Point Road, the existing bicycle/pedestrian overpass would be rebuilt to accommodate the wider highway. Past this point, the path would branch southward to connect to Northeast 25th Place in Clyde Hill and northward to connect to Northeast Points Drive in Kirkland via a bicycle/pedestrian-only bridge over SR 520. The existing Points Loop Trail would remain on the north side of SR 520 for local use only; several sections of the Points Loop Trail would be rebuilt to the north of their existing location to accommodate the widening of the highway.

Stormwater Treatment

New stormwater treatment facilities in the SR 520 corridor would improve water quality by removing roadway pollutants from stormwater before discharging it to surface water. Depending on location, some of these facilities would also detain stormwater flows in order to release them into streams at a controlled rate. Generally, stormwater treatment facilities would be in approximately the same locations for both the 4-Lane and 6-Lane Alternatives, although the 6-Lane Alternative facilities would be larger. Some of the 6-Lane Alternative options would require different or additional detention and treatment facilities because of changes in roadway location and/or increases in impervious surface. Project engineers have identified the facilities that fit the constraints of the project area. These facilities are discussed briefly below. Appendix T, Water Resources Discipline Report, contains a more detailed description and figures of all the project's stormwater treatment facilities.

Seattle

Exhibits 3-1a and *3-1b* show the locations of proposed stormwater facilities in Seattle. In the Lake Union basin, stormwater runoff from SR 520 would be directed to an underground facility alongside I-5 near East Louisa Street. This facility would treat stormwater from the portion of the SR 520 mainline west of 10th Avenue East and the I-5 ramp that would be added by the project. The specific treatment methods would be chosen at the time of final design and would comply with the Department of Ecology's stormwater requirements.

How do WSDOT projects comply with stormwater management regulations?

The Water Pollution Control Act, better known as the Clean Water Act (33 USC 1251 et seq.), provides the comprehensive federal regulation of all sources of water pollution. It prohibits the discharge of pollutants without a permit. In Washington, authority to administer the Clean Water Act is delegated primarily to the U.S. Army Corps of Engineers and the Washington State Department of Ecology (Ecology).

Ecology regulates how development projects across the state must manage and treat their stormwater. WSDOT and Ecology work collaboratively to develop stormwater management methods for highway projects. These methods are updated regularly. One of the key features of WSDOT's and Ecology's stormwater management approach is the use of best management practices. Best management practices for stormwater are actions or structures that reduce or prevent pollutants from entering stormwater and degrading water quality.

There are many different types of best management practices. Some are treatment technologies, such as stormwater treatment ponds. Others are typical measures that can be implemented as part of a project, such as sweeping streets to eliminate debris. Some best management practices are permanent features of a project, and others can be temporary measures used during construction. The SR 520 project uses a variety of best management practices that are adopted to the types of pollutants to be treated and the available space.

In the Portage Bay basin, the project would construct a water quality wet vault under the Portage Bay Bridge between East Boyer and the shoreline. The vault would discharge treated stormwater into the bay via an existing outfall under the bridge. A stormwater treatment wetland—one of several such wetlands proposed for the project—would be constructed between SR 520, the Montlake Boulevard eastbound off-ramp, and the shoreline of Portage Bay. These wetlands would be designed to resemble natural wetlands, so they would blend into the surrounding landscape. Stormwater treatment wetlands are considered an enhanced treatment best management practice because they remove some of the dissolved metals from stormwater, in addition to removing total suspended solids. *Exhibit 3-11* shows how these wetlands would work.

In the Union Bay basin, stormwater would be treated at a number of treatment wetlands. Runoff from SR 520 between Montlake Boulevard and the WSDOT-owned peninsula would travel through new storm drains to a treatment wetland in McCurdy and East Montlake Parks (where the MOHAI parking lot is currently located). Treated stormwater from the wetland would flow north to a new outfall or an existing city outfall in the Montlake Cut. Another stormwater treatment wetland would be located in the existing WSDOT right-of-way on the WSDOT-owned peninsula just west of the Arboretum near the new Lake Washington Boulevard ramps. The wetland would treat stormwater from these ramps.

Also in the Union Bay basin, up to 15 small treatment wetlands would be integrated into the design and construction of the bridge columns. This innovative approach, which is "over and above" current stormwater treatment requirements, would provide the same components and functions as a typical stormwater treatment wetland, but in a nontraditional location. The bridge column wetlands would be built inside cofferdams that are used during construction to keep water out of the area around the column footings. Rather than removing these cofferdams when construction is complete, WSDOT would create the stormwater treatment wetlands inside of them. Chambers under the roadway would remove sediments, then the water would flow through the wetland vegetation at the base of the columns to remove additional pollutants. Finally, treated stormwater would flow from submerged outfalls at each column into Lake Washington. *Exhibit 3-12* illustrates how these bridge column wetlands would function. In addition to this treatment, periodic cleanings of the bridge approach with a high-efficiency vacuum sweeper would collect pollutants from the roadway before they get into the stormwater.

Stormwater facilities for some of the 6-Lane Alternative options would differ somewhat from those for the 6-Lane Alternative. The Pacific Street Interchange option would extend the footprint of the project north of the Ship Canal. Stormwater from this area would flow to Portage Bay through University of Washington storm drainage pipes, to a King County combined

Stormwater Treatment

Two types of stormwater treatment facilities proposed for the SR 520 project are wet vaults and stormwater treatment wetlands. Which one is chosen depends upon where the stormwater flows will be discharged and how much space is available.

Wet Vaults: Stormwater picks up sediment as it flows across the surface of the highway. Many pollutants bind to these sediments, so removing the sediments can reduce the level of pollutants contained in stormwater. Wet vaults collect sediments on the bottom of a vault or pond, where maintenance workers can clean them out on a regular basis. When it's necessary to protect receiving waters, the wet vault can be sized to slow down the discharge and store the excess stormwater for release over a longer period of time.

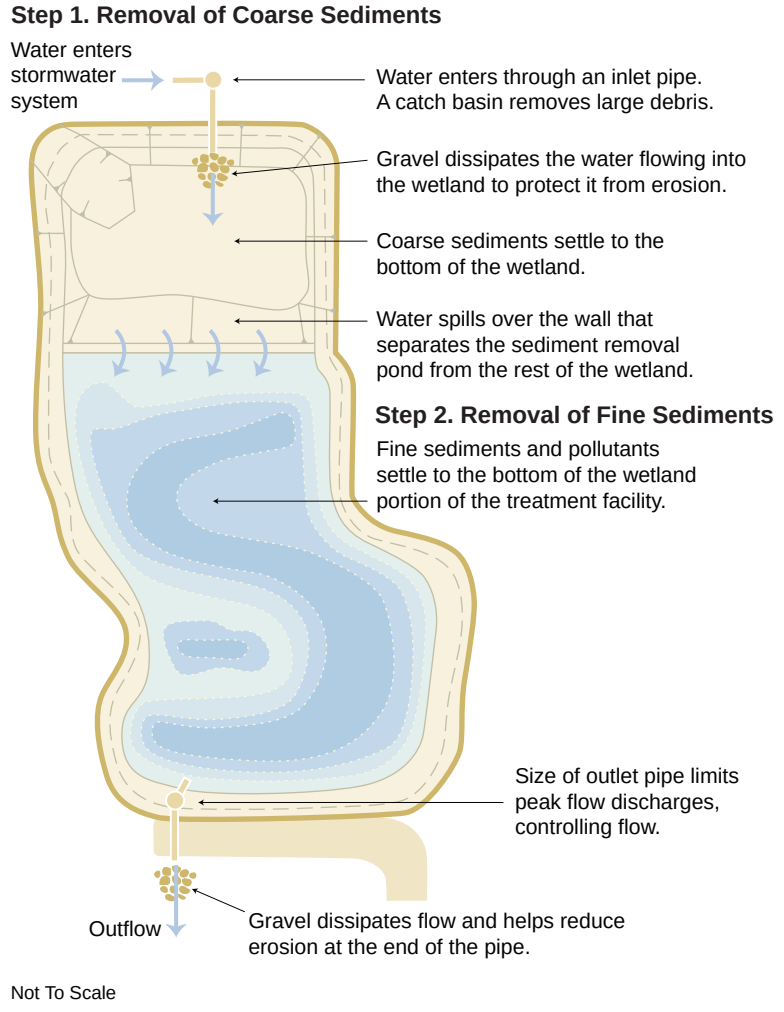
Stormwater Treatment Wetlands: Stormwater treatment wetlands are considered an enhanced treatment best management practice because, along with sediments, they remove some of the dissolved metals from stormwater. They provide this enhanced treatment by using a two-step process *(see Exhibit 3-11)*. The first step collects sediment and pollutants at the bottom of the pond like a wet vault does. During the second step, water flows into the wetland, where wetland vegetation filters and breaks down pollutants through the combined biological action of plants and bacteria. WSDOT is also including innovative wetland treatment systems in the bridge columns, as described later in this section.

DEFINITION

Enhanced Treatment

Enhanced water quality treatment is the use of best management practices to capture dissolved metals such as copper, which are especially harmful to aquatic life.

Exhibit 3-11. **Diagram of a Stormwater Treatment Wetland Facility**

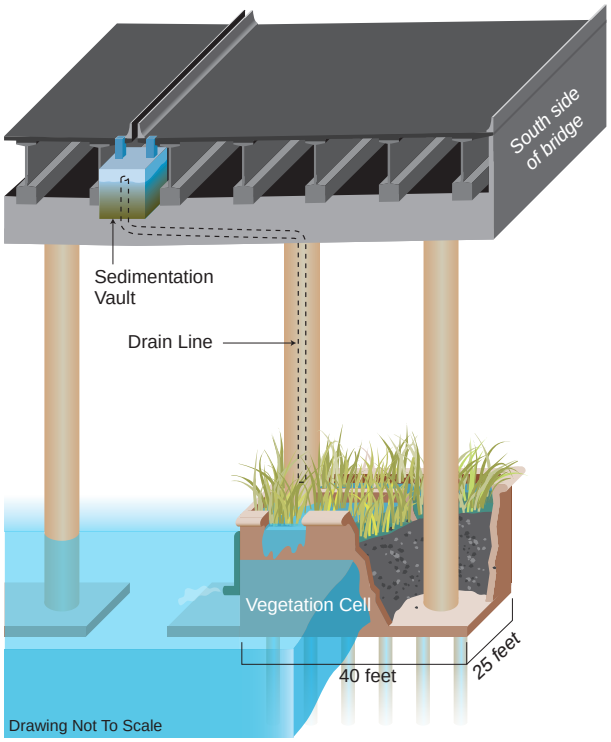


sewer overflow near the University of Washington Medical Center, or to Seattle combined sewer system pipes that eventually convey flows to the West Point Treatment Plant in Magnolia. New stormwater treatment wetlands and wet vaults located within the right-of-way would detain and treat stormwater from the new roadway and ramps. The bridge column wetlands proposed to be constructed between the WSDOT-owned peninsula and Foster Island under the 6-Lane Alternative would be eliminated. Instead, the bridge column wetlands would be limited to areas east of Foster Island because of the separated roadways and columns in this area.

Example of a stormwater treatment wetland

Stormwater facilities for the Second Montlake Bridge option would also differ from those for the 6-Lane Alternative. The existing Montlake Bridge has grated decking, so precipitation falls directly off the bridge into the Montlake Cut. The second bridge would be built with an impervious deck surface that would convey stormwater off the bridge. This option would

Exhibit 3-12. **Stormwater Treatment Wetland at Bridge Column**



include two detention facilities, one on the north and one on the south end of the bridge. These facilities would collect and discharge stormwater to Seattle's combined sewer system, which flows into a King County sewer trunk line that conveys the discharge to the West Point Treatment Plant.

Lake Washington

Standard stormwater treatment strategies are difficult to construct on floating bridges. Conventional strategies would add weight to the floating bridge. Turbulence during storms would also limit the stormwater facilities' ability to settle out sediments. The proposed treatment strategy is a series of treatments, including, in order:

1. High-efficiency vacuum sweeping of the bridge deck
2. Modified catch basins with oil traps to collect sediment and oil
3. Spill lagoons located in the enclosed spaces between the pontoons

The initial strategy used to treat stormwater on the floating bridge would include the use of high-efficiency vacuum sweeping. The bridge surfaces would be swept on a regular basis, thereby reducing the amount of pollutants collecting on the road surface to be carried off by stormwater. In the next strategy, stormwater would flow across the road surface on the bridge

to the inside gutter, then move down the gutter and through grated inlets into modified catch basins with oil traps. Stormwater would ultimately discharge to the spill control lagoons. The 4-Lane Alternative would have a 3-foot-wide lagoon; the 6-Lane would have a 6-foot-wide lagoon. These lagoons would serve two purposes:

- Contain any spills of oil and other petroleum products so that they could be properly disposed of at an approved disposal facility.
- Mix and diffuse water-soluble pollutants, such as metals, in the stormwater. Lake currents would continue to mix and dilute pollutants as they enter the lake through the discharge pipes.

Eastside

Exhibits 3-3a through *3-3d* show the locations and types of stormwater management facilities proposed for the Eastside. Up to three facilities would be constructed in the Fairweather Creek basin (Medina and Hunts Point—see *Exhibits 3-3a* and *3-3b).* The first facility would be the same for the 4-Lane and the 6-Lane Alternatives—a wet vault between the roadway slope and the 80th Avenue Northeast cul-de-sac. This wet vault would treat flows from the west portion of the basin and discharge to a storm drain that flows into Fairweather Bay. The other facilities would differ between the 4-Lane and 6-Lane Alternatives. With the 4-Lane Alternative, a wet pond would be built inside the loop ramp at the 84th Avenue Northeast westbound on-ramp. Treated stormwater would flow to the west and be discharged into Fairweather Creek. In addition, an underground wet vault would be built under the trail just east of Fairweather Creek. With the 6-Lane Alternative, the lid would make the wet pond inside the loop ramp impractical, so this facility would not be constructed; instead, enhanced treatment and flow control would be provided in a wet vault near the outfall to the creek. Treated and detained flows would discharge to an upgraded outfall at Fairweather Creek.

In the Cozy Cove basin (Hunts Point and Yarrow Point—see *Exhibit 3-3b),* wet vaults with flow control and enhanced treatment would be located under the existing Points Loop Trail and the proposed bicycle/pedestrian path. Treated and detained stormwater from this wet vault would then flow to Cozy Cove Creek.

Example of a stormwater wet vault

In the Yarrow Creek basin (Kirkland and Bellevue—see *Exhibits 3-3c* and *3-3d),* new and existing storm drains would convey runoff to several stormwater treatment facilities. With both alternatives, a wet vault with an enhanced treatment best management practice would be located on the shoulder of Northeast Points Drive; it would treat flows and discharge them into the Yarrow Bay wetland via an upgraded outfall. Construction of this wet vault would reduce or eliminate stormwater flows to an existing 36-inch-diameter culvert, helping to alleviate existing downstream erosion. For the 6-Lane Alternative only, another wet vault with enhanced treat-

ment is proposed under the enforcement area on the westbound on-ramp from Lake Washington Boulevard. Treated stormwater would flow into the east tributary of Yarrow Creek.

For both alternatives, a stormwater treatment wetland with flow control would be built in the Yarrow Creek basin between SR 520, Lake Washington Boulevard, and Northeast Points Drive. This site is currently occupied by two commercial buildings and an espresso stand. Stormwater from this treatment wetland would discharge to both the east tributary and the mainstem of Yarrow Creek.

Because the 6-Lane Alternative would extend farther east than the 4-Lane Alternative, an additional stormwater facility would be needed in the West Kelsey Creek basin in Bellevue (see the inset in *Exhibit 3-3d).* To provide this, an existing water quality and detention vault under the eastbound 124th Avenue Northeast off-ramp shoulder would be expanded.

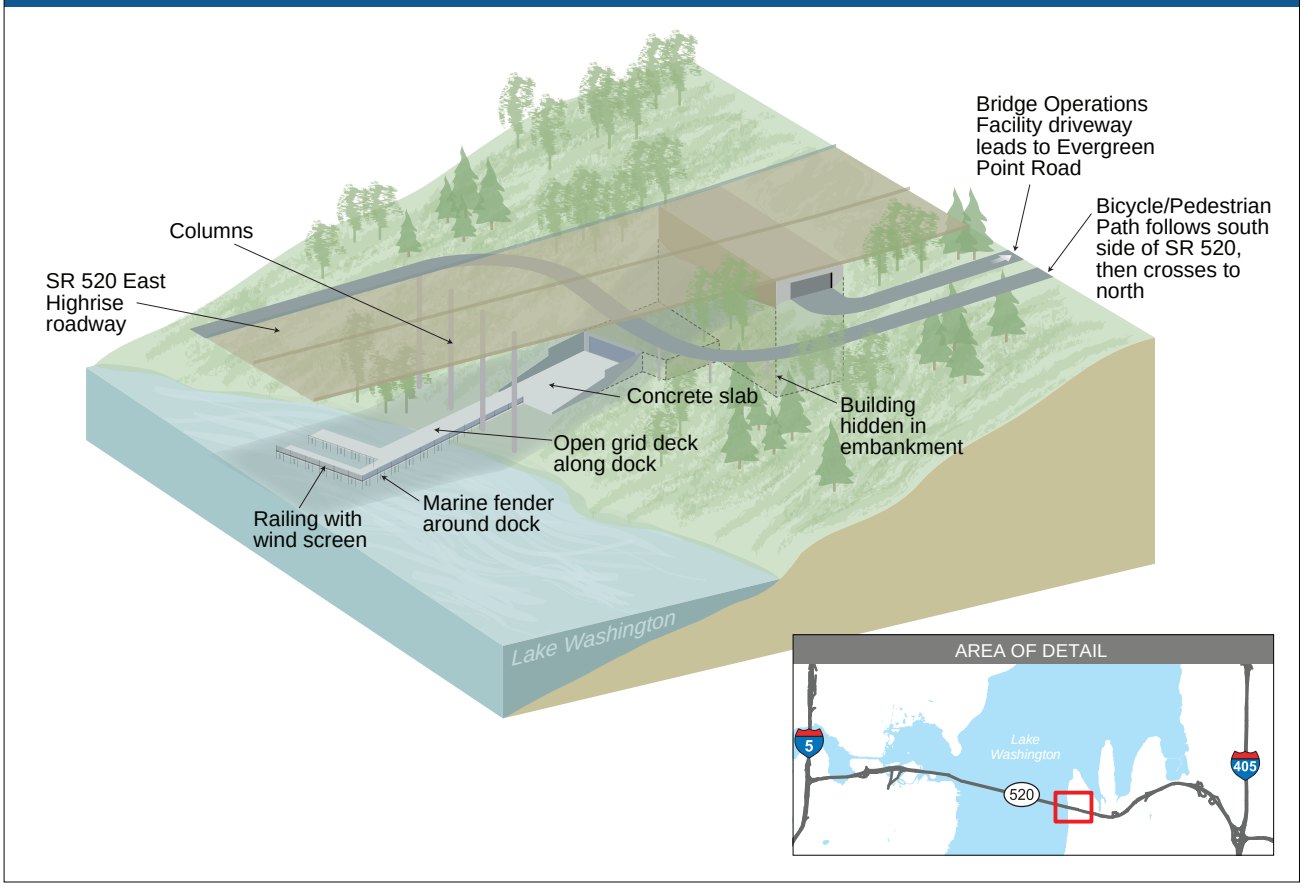
The locations of stormwater treatment facilities in the Yarrow Creek basin would differ between the 6-Lane Alternative and the South Kirkland Park-and-Ride Transit Access – 108th Avenue Northeast option. WSDOT would replace the existing stormwater system in this area with an improved biofiltration swale and additional detention and treatment facilities to control and treat stormwater flows to Yarrow Creek. An existing detention pond north of SR 520 and east of 108th Avenue Northeast would not be substantially altered and could probably remain in its current location. Widening of the SR 520 mainline west of 108th Avenue Northeast to accommodate new ramps would require the construction of three new detention and treatment facilities in this area.

Bridge Operations Facility

WSDOT would build a new bridge operations facility between the east shore of Lake Washington and Evergreen Point Road, just north of the existing bridge. The facility would house a maintenance crew duty station and provide shop space for minor bridge repair work, staging for maintenance materials, and moorage for two work boats. The existing Northup maintenance facility in Bellevue would continue to be used for larger repair work and as an administrative office.

The new facility would be a three-story structure built into the abutment under the new bridge. Most of the facility would be buried in the bank slope. *Exhibit 3-13* is a conceptualization of how the facility would fit into the abutment. The maintenance crew would access the facility using a driveway off Evergreen Point Road, just south of SR 520. The 10- to 20-foot-wide dock would extend 70 feet into the water, where two slips would provide moorage for two boats. The facility would also have a crane for loading maintenance materials and equipment onto the boats and specialty equipment to help WSDOT employees provide emergency response to spills.

Exhibit 3-13. **Conceptual Sketch of the Structure of the Bridge Operations Facility**



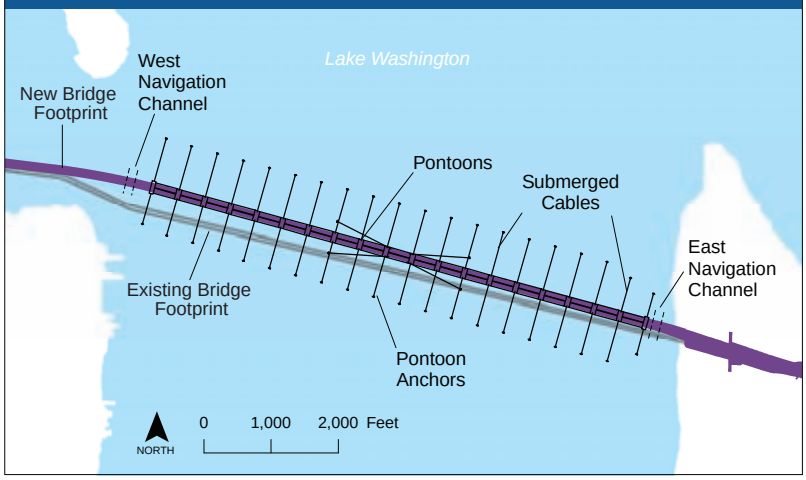
Pontoon Anchors

Like the existing floating bridge, both the 4-Lane and 6-Lane Alternatives would anchor the floating pontoons to the lake bottom to hold the bridge in place. *Exhibit 3-14* shows the general locations of the pontoons and anchors. The anchors would connect to the floating pontoons with steel cables ranging in size from 1½ to 3 inches in diameter. Approximately 22 anchors would be installed along each side of the new bridge structure, for a total of 44 anchors. The existing anchors would likely be left in place when the old bridge structure is removed. Two main types of anchors would be used for the new bridge:

- Gravity anchors would be used in the dense, harder lakebed materials of Lake Washington. These anchors would consist of large concrete blocks or boxes stacked on top of one another.
- Fluke anchors would be used in the soft bottom sediments of the lake. These anchors would be installed below the mud line.

Additional information on the pontoon anchors and their installation can be found in Appendix H, Geology and Soils Discipline Report.

Exhibit 3-14. **Locations of New Pontoons and Anchors**



Changes in Navigation Channels

The Evergreen Point Bridge currently provides three navigation channels through which boat traffic can pass: one under the west highrise, one at the midspan drawbridge, and one under the east highrise. The new bridge would keep the east and west navigation channels in approximately the same locations as the current channels *(Exhibit 3-15),* but the midspan drawbridge would not be replaced.

The new west navigation channel would have a maximum vertical clearance of 25 feet above high water, a horizontal clearance of 165 feet, and a maximum depth of 30 feet. This would be 19 feet less vertical clearance and 46 feet less horizontal clearance than today. The new east navigation channel would have a maximum vertical clearance of 70 feet above high water, 200 feet of horizontal clearance, and a maximum depth of 30 feet. This would be 13 feet more vertical clearance and 7 feet less horizontal clearance than today. The existing drawbridge would not be replaced, permanently prohibiting passage of any vessel with a mast taller than the 70-foot clearance at the new east highrise.

The Pacific Street Interchange option would construct a new Union Bay Bridge, which would cross the navigational channel east of the Montlake Cut with a vertical clearance of 110 feet. This clearance was selected because there are no vessels taller than 110 feet that travel in this part of the lake. However, to reduce the roadway slopes that this height would necessitate, WSDOT may request that the Coast Guard establish a new governing clearance of 70 feet for this area. (See sidebar about the two vessels with a vertical clearance higher than 70 feet that are known to travel in this part of the lake.) Before making this change, the Coast Guard would consider whether vessels requiring a higher clearance have an essential use in north Lake Washington. With either a 110-foot or a 70-foot clearance, columns would be placed just outside the navigational channel to avoid blocking boat traffic.

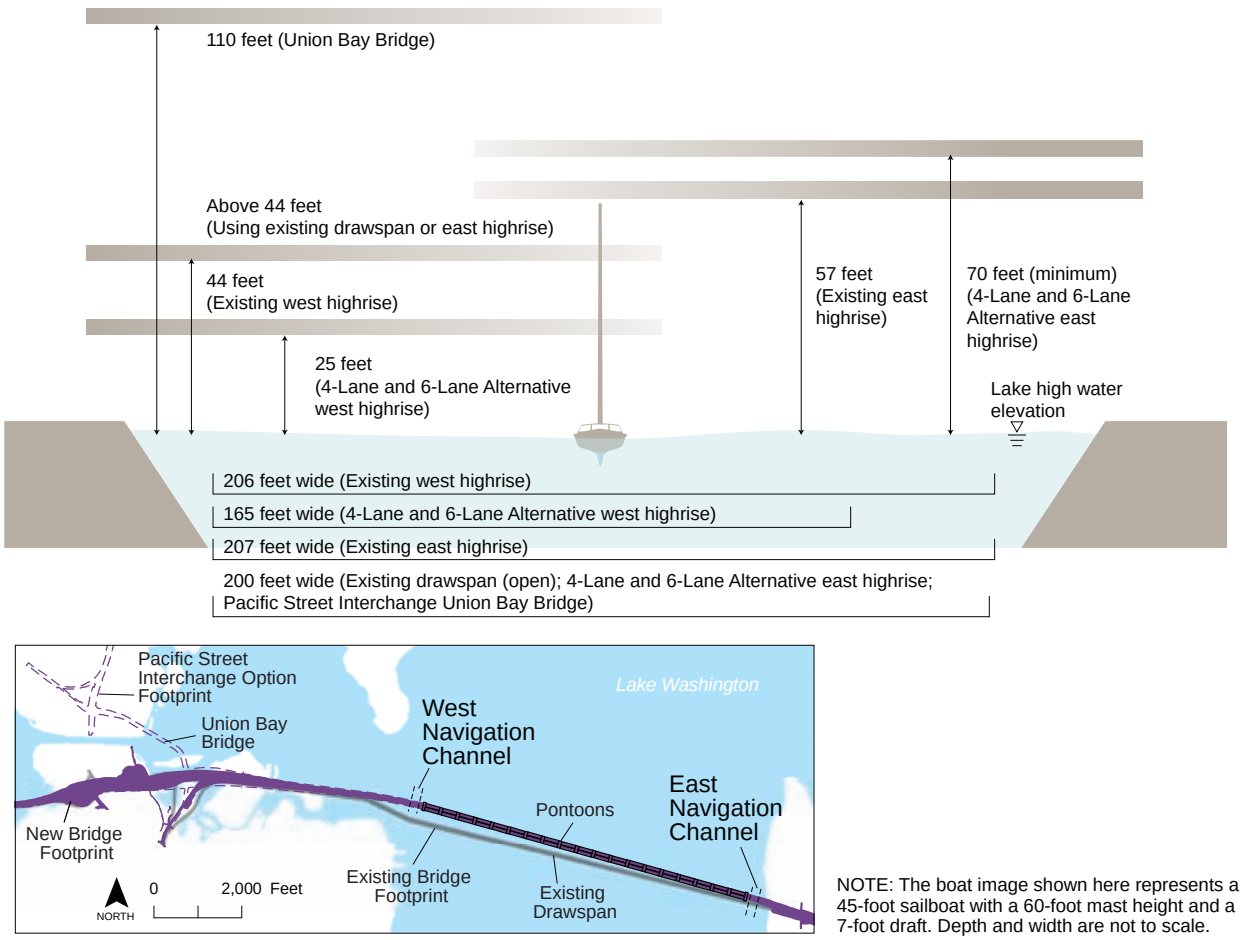
Large Ships in Lake Washington

Two government research vessels—the U.S. Navy's R/V Thomas G. Thompson (operated by the University of Washington) and the National Oceanic and Atmospheric Administration's (NOAA's) R/V Ronald H. Brown—regularly pass through the Ship Canal and into the north Lake Washington area. The use of these vessels could be affected by any change in vertical clearance over the Ship Canal. The R/V Thomas G. Thompson, which has an air draft (height from waterline to masthead) of 105 feet, does sea trials in Lake Washington. The R/V Ronald H. Brown, which has an air draft of 102 feet, regularly passes through the Ship Canal to the north end of Lake Washington to reach NOAA's Sand Point facility.

The Evergreen Point Bridge Draw Span – Useful but Vulnerable

The original draw span on the floating bridge was opened using chains, pulleys, and counterweights. This system presented several maintenance difficulties and was eventually replaced by the system in use today—hydraulic cylinders. Today, the draw span is the part of the bridge that maintenance engineers consider most prone to storm damage. The new floating bridge will not have a draw span. We are removing the draw span because it causes traffic congestion when open and it is structurally deficient. Boat traffic will cross under the highrises on the east and west ends of the bridge.

Exhibit 3-15. **Navigational Restrictions in Union Bay and Lake Washington**



NOTE: The boat image shown here represents a 45-foot sailboat with a 60-foot mast height and a 7-foot draft. Depth and width are not to scale.

Tolls

To help fund the SR 520 improvements, WSDOT would collect tolls from vehicles crossing the Evergreen Point Bridge. Both the 4-Lane and 6-Lane Alternatives would be tolled. This analysis assumed that tolls would not be paid by transit vehicles, registered vanpools, carpools with three or more people, or vehicles that use SR 520 without crossing the bridge; however, WSDOT policy on tolling may change in the future. Tolls would be collected in each direction. The amount of the toll would vary depending on whether the driver made the trip during peak or off-peak periods.

Exhibit 3-16 shows the estimated toll rates that would apply to vehicles crossing the Evergreen Point Bridge in 2030. The exhibit shows the rates both in current dollars and in 2030 dollars, which are higher because of the effects of inflation. These rates are not final, and could be more or less than the amount shown if the rate of inflation is different than expected.

KEY POINTS

The existing bridge allows navigation under the east and west highrises and at the draw span. The new bridge would raise the height at the east highrise, lower the height at the west highrise, and eliminate the draw span. A new Union Bay bridge would have a vertical clearance of up to 110 feet.

However, the rates used for the analysis were determined to be an accurate estimate at the time of Draft EIS preparation.

Exhibit 3-16. **Estimated Toll Rates for Evergreen Point Bridge for 2030**

	Toll Rate (one way)	
Toll Category	**Current Dollars[a]**	**2030 Dollars**
Afternoon peak-period toll rate	$3.35	$6.50
Off-peak toll rate	$1.80	$3.50

Source: Parsons Brinckerhoff. 2003. Proposed 2030 PM Peak and Off-Peak Toll Rates for the SR 520 Bridge Replacement and HOV Project Modeling Technical Memorandum. September 24, 2003.

[a]Based on year-end 2002 dollars.

Electronic Toll Collection

Tolling has gone high-tech. The number of toll facilities using electronic technology has increased from 49 in 1995 to about 161 in 2003. Where electronic toll collection is applied, as a vehicle passes through the toll lane, an electronic reader overhead reads a transponder located on the vehicle's windshield. The correct toll amount is automatically deducted from the driver's pre-paid account. Using this form of high-tech tolling avoids the queues at toll booths and the resulting traffic congestion and air quality problems.

Tolls would be collected using an electronic toll collection system, rather than manual collection at a toll plaza. This would allow traffic to flow freely across the bridge instead of stopping to pay at the beginning or end. The electronic toll collection system would consist of an overhanging fixture beside the roadway, similar to a lighting fixture, that would monitor vehicles as they cross the bridge. This system would either recognize the vehicles as having pre-paid for the toll or would bill the vehicle's owner for the toll. WSDOT would develop policies to address how tolls would be paid by occasional users of the bridge (such as nonlocal drivers) and how to prevent attempts to avoid the tolls.

Removal of Aurora Borealis Sculptures

The Aurora Borealis sculptures east of Foster Island in Union Bay would be removed to accommodate the new highway. These sculptures, donated by a private individual, were placed in their current location in 2002. The sculptures would not be reinstalled because they would no longer be visible from SR 520. WSDOT plans to return them to the original donor.

Flexible Transportation Plan

A flexible transportation plan complements the physical improvements proposed for the SR 520 Bridge Replacement and HOV Project. It is a collection of strategies that WSDOT and other agencies would implement to enhance management of traffic flow in the SR 520 corridor and to provide alternatives to driving alone. Detailed information on the content and costs of a flexible transportation plan can be found in Appendix A, Description of Alternatives and Construction Techniques. The following major strategies have been identified for the flexible transportation plan:

DEFINITION

Flexible Transportation Plan

A flexible transportation plan is a group of strategies intended to enhance how traffic flows in a highway corridor and to provide alternatives to driving alone. It is designed to complement physical improvements proposed to the corridor with programs that will reduce demand and make the whole corridor work more efficiently.

- Incident Response Program—A program dedicated to motorist and incident scene safety through safe, quick responses and incident clearance.
- Transportation Demand Management—Strategies and programs that focus on affecting people's travel habits to reduce single-occupancy vehicle trips.
- Intelligent Transportation Systems—Various methods to enhance the transportation system and provide traveler information through advanced technology such as ramp metering, video camera monitoring, and signal control on arterial streets near highway interchanges.
- Transit Service Enhancements—Potential service increases by local transit agencies to address estimated shortfalls in peak-period transit capacity along the project corridor.
- Bicycle and Pedestrian Improvements—Improvements are included in the project design.

The flexible transportation plan contains specific goals associated with implementing an incident response program and intelligent transportation systems, including elements that would require cooperation among a number of agencies and jurisdictions. WSDOT would facilitate a collaborative effort with these local jurisdictions, transit agencies, and other appropriate parties to establish an effective SR 520 corridor flexible transportation plan program. WSDOT would also facilitate efforts to find funding for elements of the flexible transportation plan that the agency cannot fund itself, such as funding for additional transit service.

What incident response program strategies would be funded as part of the project construction?

Incident response program strategies would focus on traffic clearing techniques and tools of modern traffic incident response that can be practiced on the corridor. Response Team personnel currently respond to major incidents 24-hours a day, 7 days a week to provide traffic control, traffic rerouting, mobile communications, and assistance in incident clearance and cleanup. Additional incidence response service will be included in the flexible transportation plan and will be linked with the overall intelligent transportation systems described on the next page.

What transportation demand management strategies would be funded as part of the project construction?

Transportation demand management elements funded as part of the project construction would focus on maintaining traffic flow during construction, including public education and outreach on HOV and a vanpooling program. These programs would start 1 year before construction and continue throughout the entire construction period. Traffic maintenance strategies for the 4-Lane and 6-Lane Alternatives would be implemented over the 7- to 8-year construction period. The traffic maintenance implementation plan would be developed in partnership with public and private

sector agencies involved in implementing transportation demand management in the SR 520 corridor.

What intelligent transportation system strategies would be funded as part of the project construction?

Currently, WSDOT uses a variety of intelligent transportation system strategies to manage traffic along the SR 520 corridor, including closed-circuit television, ramp meters, highway advisory radio, variable message signs, and the existing Transportation System Management Center. WSDOT would enhance and expand these intelligent transportation systems to address traffic management during construction. WSDOT would also add additional support to the Transportation System Management Center. WSDOT would purchase and install equipment for intelligent transportation system expansion, such as variable message signs, ramp metering, and closed-circuit television.

What are the goals for the flexible transportation plan after construction?

The transportation demand management and intelligent transportation system elements previously described are identified in the cost estimates for the SR 520 Bridge Replacement and HOV Project, and would be implemented during construction of the project. However, after the new roadway is opened to traffic, a longer-term flexible transportation plan would be implemented. The long-term goals that would guide implementation of the flexible transportation plan are:

- Goal 1: Provide alternatives to single occupant vehicle travel.
- Goal 2: Provide incentives to reduce trips and/or use non-single-occupant vehicle modes.
- Goal 3: Manage traffic to reduce congestion and delay.

These goals and suggested strategies for achieving them are discussed in greater detail in Appendix A, Description of Alternatives and Construction Techniques. WSDOT would work with local jurisdictions, transit operators, federal agencies, and others to implement and fund the long-term goals of the flexible transportation plan.