

Chapter 10—Construction Effects

What is in this chapter?

The chapter describes how construction of the Preferred Alternative could affect transportation in the study area, particularly near the Montlake interchange. The results include information about traffic operations on local streets and freeways, construction truck volumes, transit connections and travel times, nonmotorized connections, and parking supply.

The results in this chapter are based on likely conditions during construction that could be related to the following activities:

- Changes to freeway access, intersections, and lanes that are needed during construction to build portions of the project while maintaining traffic flow
- Hauling construction materials and equipment on routes including arterial streets and freeways
- Temporary closure of the 24th Avenue East bridge over SR 520
- Presence of construction activities at parking areas
- Changes in access to pedestrian and bicycle facilities and transit stops due to construction activities

This chapter also describes the transportation effects of project construction activities. Additional information on construction activities and methods is provided in the Construction Techniques and Activities Discipline Report (WSDOT 2009e), which was revised as the Construction Techniques and Activities Discipline Report Addendum and Errata (WSDOT 2011b).

How were construction effects evaluated?

WSDOT used preliminary construction staging plans to evaluate how construction activities would potentially affect traffic on SR 520 and adjacent local streets. Preliminary construction staging plans were used to identify changes to local streets and roadways during construction.



Construction process assumptions were obtained from the Construction Techniques and Activities Discipline Report Addendum and Errata (WSDOT 2011b). The construction staging plans were further developed through coordination between traffic engineers and transportation planners.

After identifying construction sequencing for the Preferred Alternative, WSDOT assessed the potential effects that construction would have on traffic operations. Changes of access, temporary road closures, and modifications to lanes and intersections were identified. These changes would affect the way people travel through the project site during construction. WSDOT also estimated how traffic patterns would change based on the conditions during varying stages of construction and then revised the traffic volumes for use in operations analysis.

The potential effects of construction on local street and freeway traffic operations were assessed quantitatively for the peak traffic periods, which are the times of day when most commuting occurs during the typical work week (Monday through Friday). The peak periods are the most critical times of travel each day, when most people need to go from place to place. The analysis was performed using Synchro software, applying a method consistent with the local street operations results discussed in Chapter 6, in which results are reported in terms of level of service.

WSDOT evaluated traffic operations along SR 520 in the Montlake area using Highway Capacity Software (HCS). As with local operations, changes in freeway traffic volumes were estimated using existing peak-period volumes and redistributed to reflect changes in the roads and intersections during construction. Results for SR 520 are also reported in terms of level of service.

Truck trips were estimated using typical production rates for the estimated quantities of earthwork and concrete pours, as well as other construction activities. The estimated construction trucks were then distributed to the roadways on potential haul routes based on locations of access to work sites and directness of travel from freeways. The project volumes of construction trucks at multiple locations were compared to existing truck activity to quantify the project effects.

The construction parking analysis was based on the preliminary construction staging plans, including the parking supply and utilization information reported in Chapter 9. This information was used to



determine what effect construction staging and work activities would have on parking in the construction area.

Nonmotorized effects during construction were evaluated based on review of the preliminary construction plans in comparison to existing bicycle and pedestrian routes. The evaluation described closures and access changes that would require bicyclists and pedestrians to use an alternative route during construction.

The effects of construction on transit facilities were evaluated in a method similar to the nonmotorized evaluation. Changes to access and bus stops during construction were identified that would require riders to board or transfer at different stop locations. The effects of closing the Montlake Freeway Transit Station were evaluated in detail. Transit operations during construction would be affected by similar conditions to those reported for local street and freeway traffic operations. In addition to those results, the traffic engineers modeled traffic conditions in the Montlake interchange area to estimate likely changes to transit travel times during construction.

Construction Durations and Sequencing

The Preferred Alternative would be built in stages that give priority first to vulnerable structures and then to other elements of the project. The major project elements are listed in Exhibit 10-1 with their estimated construction durations. Detailed descriptions of these elements are provided in the Construction Techniques and Activities Discipline Report Addendum and Errata (WSDOT 2011b). These elements may be refined and modified as the project is further developed. However, the magnitude of effects on traffic and the relative differences between design options are not expected to change substantially unless the project description itself is changed.



Exhibit 10-1. Estimated Construction Durations for the Preferred Alternative

Element	Preferred Alternative
I-5/SR 520 Interchange	26 months
10th Avenue and Delmar Lid	26 months
Portage Bay Bridge (north half—4 lanes)	39 months
Portage Bay Bridge (south half—widen to 6 lanes, includes demolition of existing structure)	31 months
Montlake Interchange and Montlake Lid	56 months
New Bascule Bridge	29 months
West Approach (north half—4 lanes, includes work in Union Bay)	31 months
West Approach (south half—widen to 6 lanes, includes demolition of existing structure)	40 months
Floating Span of Evergreen Point Bridge and East Approach (includes towing, outfitting, and installing pontoons for a 6-lane bridge)	45 months
Bridge Maintenance Facility	24 months

Note:

Construction durations include testing of new systems and facilities, but do not include mobilization or closeout activities. Mobilization includes conducting material procurement, preparing construction staging areas, and moving equipment to the site. Closeout includes demobilization of staging areas and final roadside planting.

Exhibit 10-2 shows how the project elements could be sequenced for construction during the 7- year project timeline. WSDOT evaluated the effects of construction based on this sequencing plan for the Preferred Alternative. The plan was divided into five stages according to key changes in construction conditions that would potentially affect the movement of traffic in the study area. Each stage was analyzed for construction traffic effects. The variation of effects among the stages is shown by year of construction in the results sections below. Exhibit 10-3 shows the concurrent construction activities in the project vicinity.

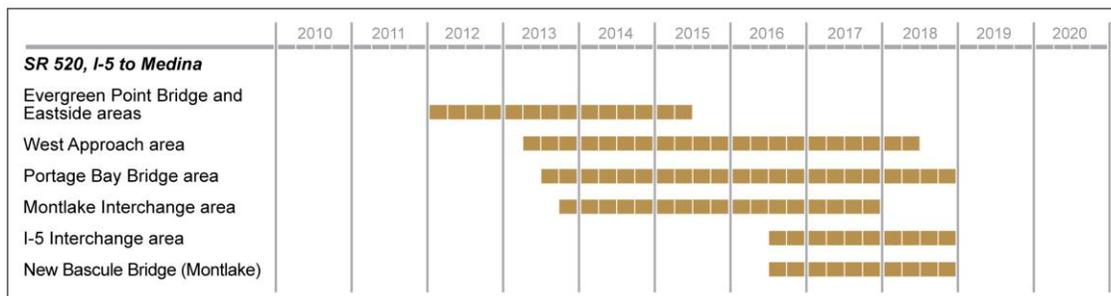


Exhibit 10-2. Potential Construction Sequencing: Preferred Alternative



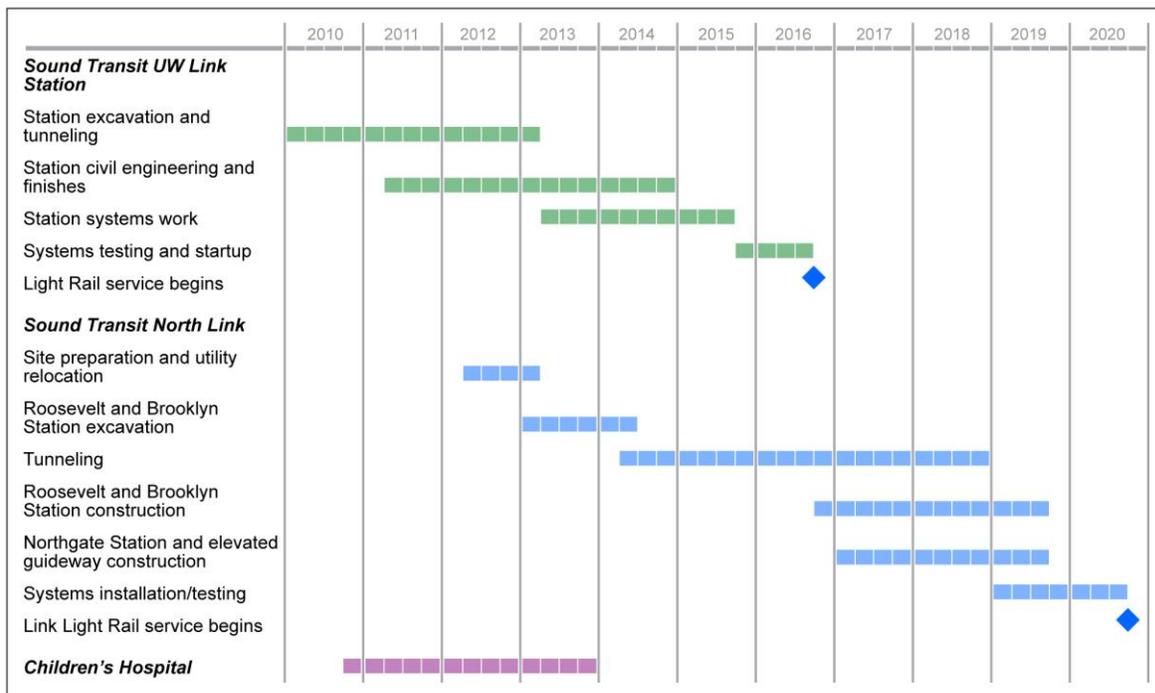


Exhibit 10-3. Concurrent Construction Activities in the Project Vicinity

Concurrent Construction Activities

Sound Transit is constructing the University Link light rail station near Husky Stadium, just east of the intersection of Montlake Boulevard NE and NE Pacific Street. Based on current construction schedules, the station is scheduled to have excavation and tunneling completed in 2013, and major construction elements, including pile driving, completed by the end of 2014. Haul traffic for the station construction is expected to be completed before the end of 2015. The SR 520, I-5 to Medina project does not currently identify any active haul routes north of the SR 520/Montlake Boulevard interchange until 2016, although some station construction may be ongoing at the time the Lake Washington Boulevard ramps are closed. In addition, some Sound Transit construction traffic is expected through the interchange. The current construction schedules for the two projects show that there would not be substantial concurrent haul route traffic on Montlake Boulevard NE between the SR 520 interchange and areas to the north. Coordination between WSDOT and Sound Transit has been initiated to minimize project conflicts and concurrent construction effects, and would continue throughout project construction.



How would construction affect traffic operations?

Construction of the project, including demolition of structures and use of some areas for contractor staging, would require adjustments to the existing lanes and intersections on roadways. Construction equipment and activities would occupy a portion of the transportation right-of-way and construction truck traffic would be present on the roadways. These scenarios could affect the capacity of the roadway and pose distractions to drivers.

The conditions that are expected to affect traffic operations the most are changes in the configuration of roadway lanes and intersections that would be required in the Montlake interchange area as construction progresses. When the Lake Washington Boulevard ramps are closed, more traffic would go through the Montlake interchange, resulting in some changes in local street traffic operations. Temporary roadway improvements during construction would allow traffic conditions to remain similar to existing conditions throughout most of the construction period. However, increased traffic from Lake Washington Boulevard, in combination with construction activities along Montlake Boulevard, is expected to increase delay at three locations along Montlake Boulevard during different periods of construction. The increases would be moderate – from LOS B to LOS C at two locations: Montlake Boulevard East/SR 520 westbound off-ramp, and Montlake Boulevard East/East Shelby Street. These effects would occur at these locations for 2 years and 1 year, respectively. A more substantial increase – from LOS E to F – is expected during the AM peak period at Montlake Boulevard East/Lake Washington Boulevard, lasting for up to 1 year. The increased delay at these locations would occur during different periods of construction. These effects are described in more detail below.

Traffic conditions on the freeways would remain similar to existing conditions during the most congested times of the day. Intermittent delays can be expected due to isolated construction events, but activities that close lanes on the highway would not be allowed during the daytime. When the Lake Washington Boulevard ramps are closed and other ramps are shifted temporarily, the locations of existing congestion on SR 520 would change, while overall delay would remain much as it is today.



Throughout construction of the Preferred Alternative, there would be intermittent short-term lane closures along ramps, local streets, and the highway. These closures would be limited to nights and weekends when traffic volumes are lowest. Lane closures are not expected to substantially affect traffic operations during off-peak travel times. However, travelers can expect intermittent delays, and during isolated construction activities, some would need to use alternative routes to reach their destination. WSDOT will notify the public of the times when travel through the study area could be disrupted.

Roadway Access During Construction

The Lake Washington Boulevard ramps to and from SR 520 would be closed permanently during construction. Also, there would be one long-term, temporary roadway closure at the 24th Avenue East bridge over SR 520. Short-term, temporary lane closures would occur to accommodate work on the roadways throughout the construction period. Closures and detour routes on local streets would be coordinated with and approved by the City of Seattle. In addition, WSDOT would work with Metro and Sound Transit to discuss and finalize any detours used during construction.

Two long-term, temporary road closures that were previously evaluated in the SDEIS would not be required for construction of the Preferred Alternative. First, the Delmar Drive East bridge over SR 520 would remain open during construction and traffic would be temporarily shifted onto a portion of the new 10th and Delmar lid while the existing bridge is demolished and rebuilt. Second, NE Pacific Street would remain open throughout construction because its intersection with Montlake Boulevard NE would not be substantially affected by the Preferred Alternative.

Lake Washington Boulevard Ramps

The first roadway closure that would affect traffic operations is the closure of the westbound Lake Washington Boulevard off-ramp. Construction on the north side of the west approach would require the use of temporary work bridges. The westbound off-ramp to Lake Washington Boulevard must be closed and removed to accommodate the work bridges and construction activities.

The second closure to affect traffic operations would be the eastbound Lake Washington Boulevard on-ramp. After the north side of the west approach is completed, construction activities would move to the south side of the west approach. The eastbound on-ramp would be

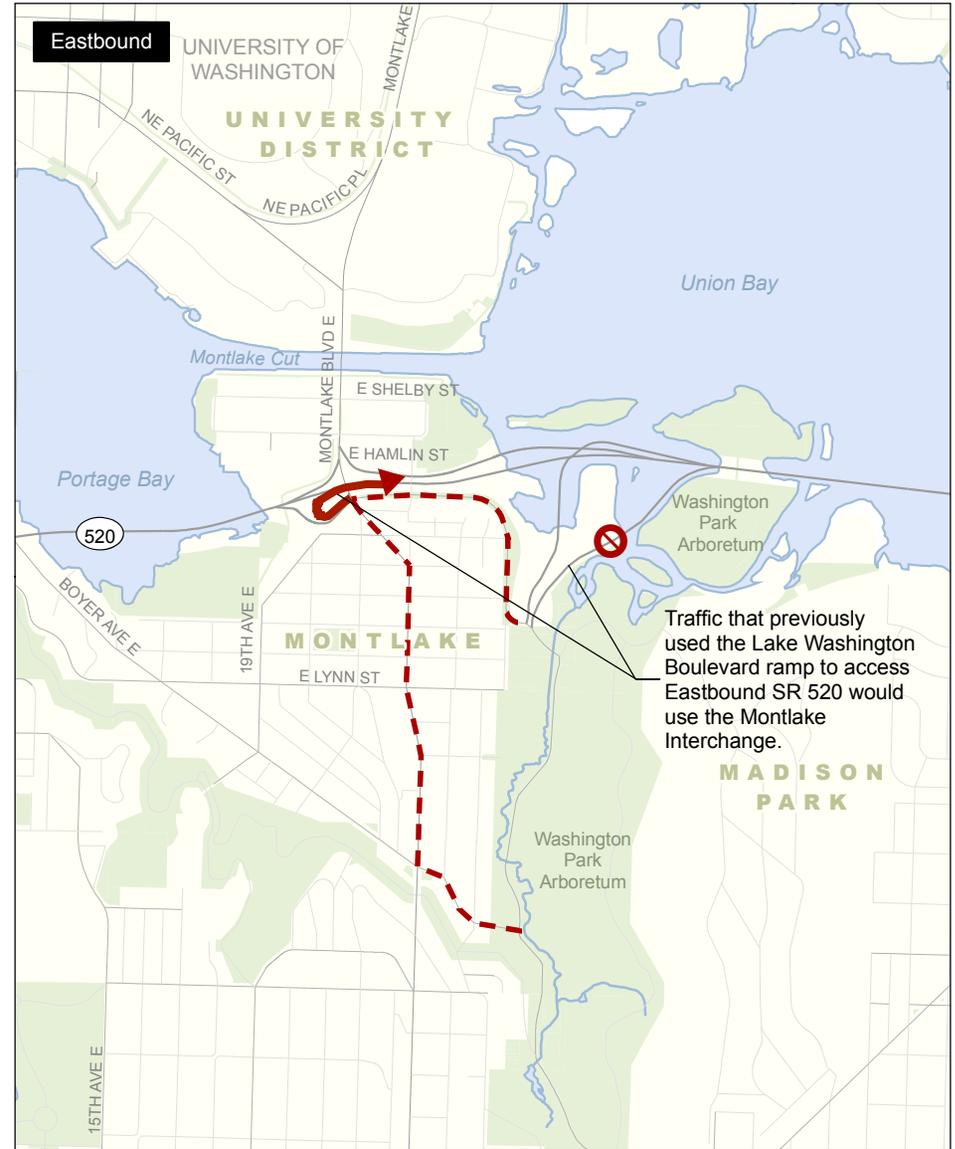
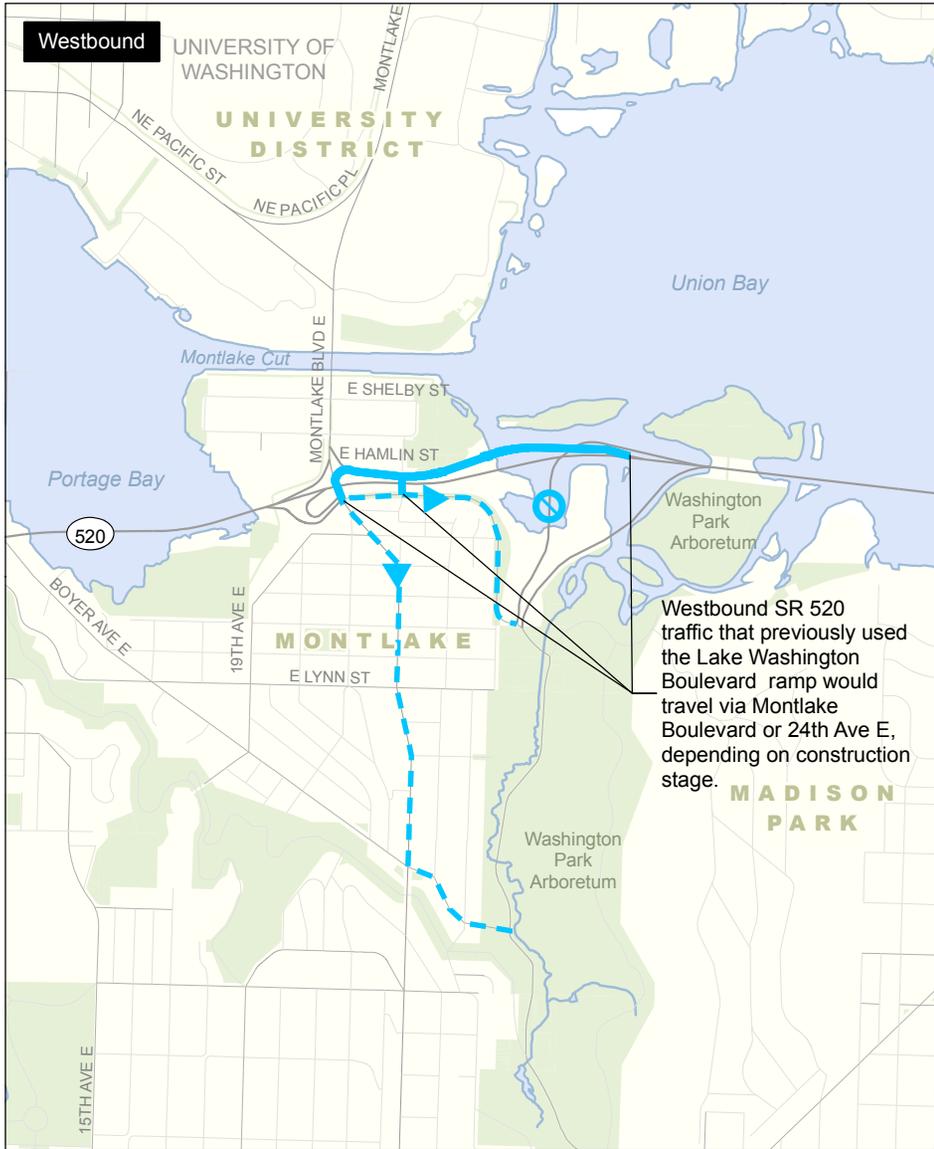


closed to accommodate the work bridges and construction activities, similar to the process described for the north side of the west approach.

When the Lake Washington Boulevard ramps are closed, traffic that currently uses them would transition to using the Montlake interchange. The Montlake interchange would be the permanent location for access to and from SR 520 in the Montlake vicinity when the Preferred Alternative is completed. However, the configurations of intersections, on-ramps, and off-ramps would change several times during construction before the final roadway configuration is in place. These changes would be necessary due to the right-of-way needed for construction activities.

During construction, drivers who currently use the Lake Washington Boulevard ramps would travel to and from the Montlake interchange on Lake Washington Boulevard or 24th Avenue East. During most of the construction period, traffic that previously used the eastbound Lake Washington Boulevard on-ramp would use the eastbound SR 520 loop ramp from the intersection of Montlake Boulevard East and Lake Washington Boulevard. When the loop ramp and its connection to mainline SR 520 are reconstructed, traffic would access eastbound SR 520 on a temporary ramp in the location of the future HOV direct access ramp. Traffic that previously used the westbound Lake Washington Boulevard off-ramp would use the westbound Montlake Boulevard off-ramp. During early stages of construction, these drivers would travel south on Montlake Boulevard and then choose to reach their destination along Lake Washington Boulevard or 24th Avenue East. Later, when the 24th Avenue East bridge over SR 520 is completed, drivers would be able to access Lake Washington Boulevard from the westbound off-ramp without traveling on Montlake Boulevard. The construction access locations for drivers who currently use the Lake Washington Boulevard ramps are depicted in Exhibit 10-4.





- - - Westbound traffic re-route when Lake Washington Boulevard ramps are closed
- Access from Westbound SR 520
- - - Eastbound traffic re-route when Lake Washington Boulevard ramps are closed
- Lake Washington Boulevard Access to Eastbound SR 520



Source: King County (2005) GIS Data (Streams and Streets), King County (2007) GIS Data (Water Bodies), CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.



Exhibit 10-4. Lake Washington Boulevard Access During Construction

SR 520, I-5 to Medina: Bridge Replacement and HOV Project

24th Avenue East Bridge

The 24th Avenue East bridge across SR 520, north of Lake Washington Boulevard, would be closed to all traffic for approximately 1 year while the bridge is demolished and reconstructed. The 24th Avenue East bridge provides access to MOHAI, East Montlake Park, and McCurdy Park. The MOHAI facility would be moved prior to demolition of the bridge. A potential alternative access to parking at East Montlake Park could be provided. When the new bridge is completed in conjunction with the new westbound off-ramp, the lanes and intersections on 24th Avenue East between Lake Washington Boulevard and the westbound off-ramp would be in temporary configurations until the project is completed. This strategy would improve traffic operations on Montlake Boulevard East by providing an additional route for traffic from the westbound SR 520 off-ramp. Drivers exiting from westbound SR 520 will be able to turn left on 24th Avenue East to access Lake Washington Boulevard or East Montlake Place East and travel south, without going through the Montlake interchange.

Montlake Boulevard East

Several roadway capacity improvements would be made to the intersections and ramps along Montlake Boulevard to accommodate the additional traffic due to the Lake Washington Boulevard ramp closures and to maintain traffic flow while construction activities occupy the existing right-of-way. These improvements would minimize substantial delays that otherwise would occur on Montlake Boulevard at the SR 520 interchange. The following changes are proposed along Montlake Boulevard:

- Two left-turn lanes and two right-turn lanes from the westbound SR 520 off-ramp to Montlake Boulevard would be constructed. A traffic signal would be added at this intersection to allow left turns.
- One additional lane would be added on southbound Montlake Boulevard between the westbound SR 520 off-ramp and East Roanoke Street. This would accommodate the increased traffic from the westbound off-ramp to southbound Montlake Boulevard during construction.
- Two northbound left-turn lanes to the SR 520 eastbound on-ramp and two southbound left-turn lanes to Lake Washington Boulevard would be provided on Montlake Boulevard.



- An additional general-purpose lane would be constructed on the SR 520 eastbound on-ramp from Montlake Boulevard.
- An additional westbound lane would be constructed on Lake Washington Boulevard at the intersection with Montlake Boulevard.

SR 520

Four lanes on SR 520 (two eastbound and two westbound) would remain open during peak periods and for most of the construction period. All ramp connections on SR 520 at the I-5 interchange and at Montlake Boulevard would also remain open during these times. The only substantial change of access affecting SR 520 would be the Lake Washington Boulevard ramp closures described above. The locations where ramps connect to the freeway would be modified several times as construction progresses. The location of the freeway lanes would also be shifted several times. These changes in lane configurations would allow traffic flow to be maintained as work sites are moved to new locations.

Intermittent lane closures are expected on SR 520 and its ramps throughout the project duration. Traffic would continue to pass through the area, but could be required to merge into one lane to go around the closed portion of roadway. Lane closures would be short term and limited to nights and weekends when roadway volumes are typically lower than during peak travel periods. The closure hours and dates would be restricted based on special events and coordinated with closures on other freeways.

Limited full closures are expected for major construction activities that would require work on the full width of the roadway. When full closure of SR 520 is required, the SR 520, I-5 to Medina project would use the closure plan that WSDOT developed for the annual maintenance and inspection for the Evergreen Point Bridge. This plan closes SR 520 from Montlake Boulevard on the west side of Lake Washington to 92nd Avenue on the east side of the lake. The designated detour route during closure of SR 520 is the I-90 Bridge. These closures would occur on weekends, as they do for bridge maintenance and inspection.

Traffic Volumes during Construction

Because of the temporary roadway changes that would be needed, traffic patterns would change periodically as the stages of construction progress, particularly on local streets in the Montlake interchange area.



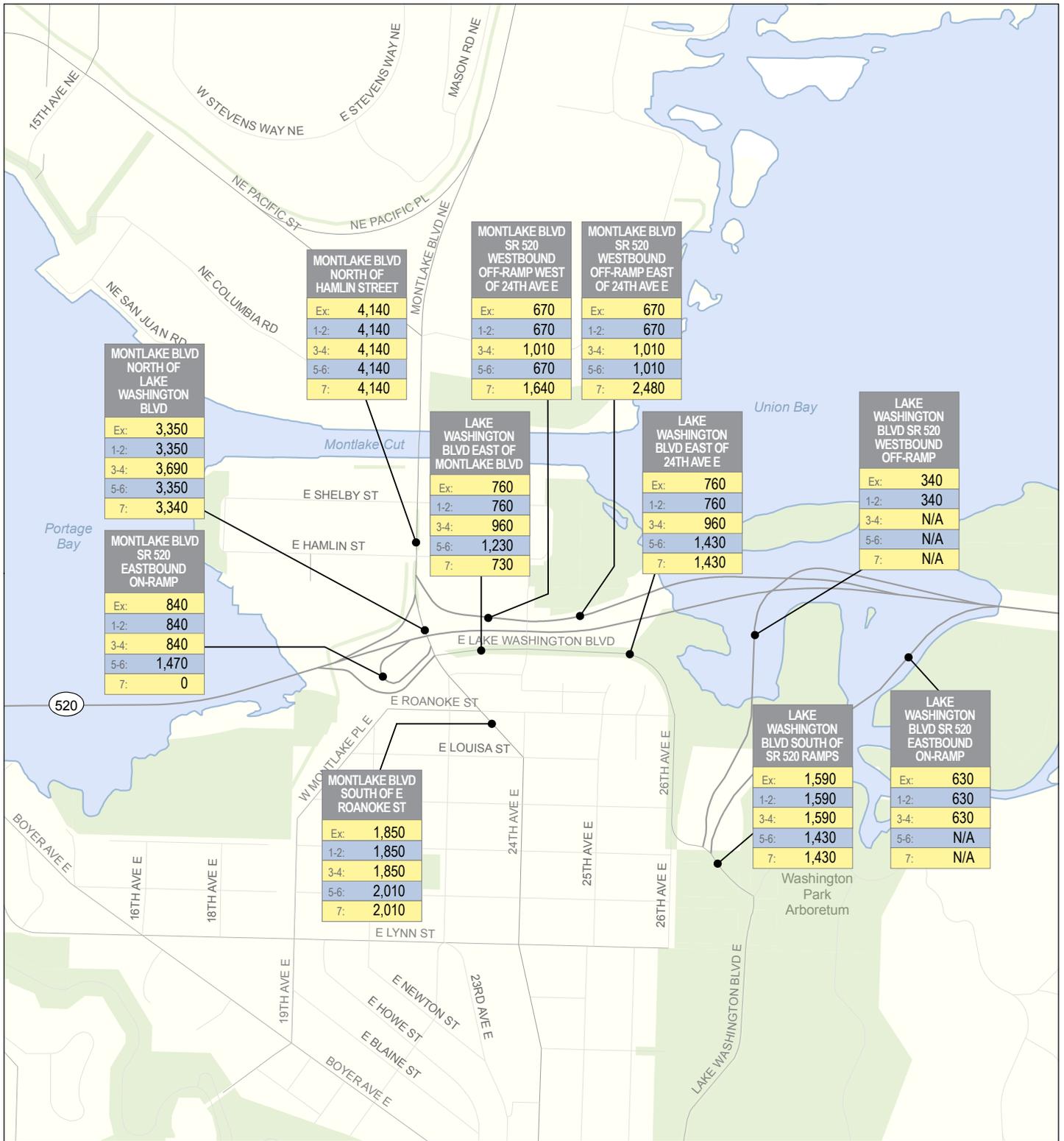
Other locations in the project vicinity would not be substantially affected. The major stages of construction would last for approximately 1 to 2 years each, which would result in major project elements being completed in designated areas. After each stage, construction activities would move to new areas. The configurations of some roadways, ramps, and intersections would be adjusted before each stage to allow space for workers and equipment. These adjustments would result in increases of traffic volumes on some roadway segments and decreases on others. The estimated traffic volumes during construction at locations throughout the Montlake interchange area are shown in Exhibits 10-5 and 10-6. The results are grouped by the approximate years of construction that would have similar traffic volume patterns.

Local Arterial Effects during Construction

While traffic volumes would vary at several locations, traffic operations on local streets are expected to remain similar to existing conditions during most of the construction period. The temporary improvements along Montlake Boulevard would accommodate traffic volume changes and prevent substantial increases in congestion. Drivers could expect the same level of congestion that currently occurs during the morning and afternoon peak hours. However, some additional travel delays are expected at three intersections during specific periods of construction. Under the Preferred Alternative, the transportation construction effects would be experienced primarily at the Montlake Boulevard/SR 520 interchange, but could result in delays that extend to NE Pacific Street and Montlake Boulevard NE, north of NE Pacific Street. These effects would be due to temporary increases in traffic volumes and right-of-way constraints where construction is taking place.

WSDOT evaluated the local street traffic conditions that would result from the expected changes in volumes and roadway configurations during construction. The results of the traffic operations analysis for affected intersections are shown in Exhibit 10-7 in terms of level of service. Similar to the traffic volumes indicated in Exhibit 10-6, the results are grouped by years of construction when traffic operations are expected to be consistent. The analysis results for years 5 and 6 are reported separately, although the volume estimates are the same for those years. The difference in traffic operations is due to roadway changes that would be needed for reconstruction of the Montlake Boulevard bridge over SR 520. As with all major projects, the conditions associated with construction could change.





LOCATION	Ex: Volume	1-2: Volume	3-4: Volume	5-6: Volume	7: Volume
Existing	Volume				
Year of Construction	1-2: Volume				
	3-4: Volume				
	5-6: Volume				
	7: Volume				

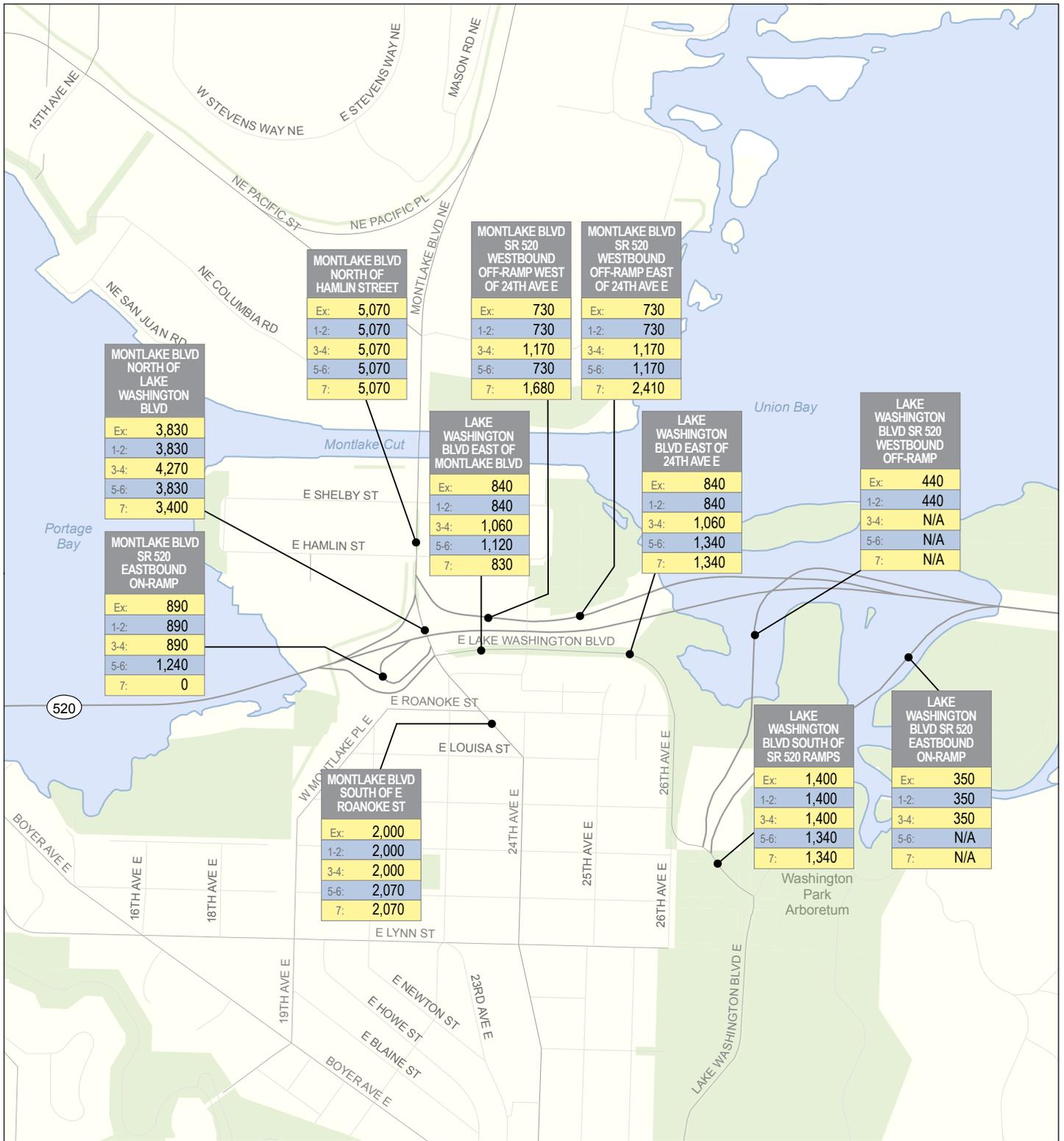
Volumes are totals for both directions



Source: King County (2008) GIS Data (Streams, Streets, Water Bodies), CH2M HILL (2008) GIS Data (Park). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 10-5. SR 520/Montlake Boulevard Interchange Area – AM Peak Hour Vehicle Volumes During Construction

SR 520, I-5 to Medina: Bridge Replacement and HOV Project



LOCATION	Ex: Volume	1-2: Volume	3-4: Volume	5-6: Volume	7: Volume
Existing	Ex: Volume				
Year of Construction	1-2: Volume				
	3-4: Volume				
	5-6: Volume				
	7: Volume				
	7: Volume				

Volumes are totals for both directions



Source: King County (2008) GIS Data (Streams, Streets, Water Bodies), CH2M HILL (2008) GIS Data (Park). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 10-6. SR 520/Montlake Boulevard Interchange Area – PM Peak Hour Vehicle Volumes During Construction

SR 520, I-5 to Medina: Bridge Replacement and HOV Project



Year of Construction

	Existing	Ex	1-2	3-4	5	6	7
AM Peak Hour	B	B	B	B	B	B	C
PM Peak Hour	D	D	D	D	D	D	D

○ Unsignalized Intersection
● Signalized Intersection
◐ Signalized Intersection with Project

LEVEL OF SERVICE

- A-C No/Little Congestion
- D Moderate Congestion
- E Heavy Congestion
- F Severe Congestion/Over Capacity

Exhibit 10-7. SR 520/Montlake Boulevard Interchange Area – AM and PM Peak Hour LOS During Construction
 SR 520, I-5 to Medina: Bridge Replacement and HOV Project

This could result in a different timing of effects, but the magnitude and duration of effects at specific locations should not change substantially. The following sections discuss traffic operations at several locations in more detail.

The construction activities affecting local street operations are planned to begin in the third year of construction, so traffic operations during the first 2 years of construction would be the same as existing conditions. The results indicated in Exhibit 10-7 show that most intersections would function similarly to existing conditions throughout construction, and better in some cases due to the temporary roadway improvements that would be built. Delay would increase at three locations during a portion of the construction timeline:

- SR 520 westbound ramps/Montlake Boulevard East, during years 3 and 4 in the AM and PM peak hours
- Lake Washington Boulevard/eastbound SR 520 ramps/Montlake Boulevard East, during year 6 in the AM peak hour
- East Shelby Street/Montlake Boulevard East, during year 7 in the AM peak hour

Prior to year 3 of construction, the westbound Lake Washington Boulevard off-ramp would be closed and traffic would be diverted to the westbound Montlake Boulevard off-ramp. Traffic volumes through the intersection of the westbound off-ramp and Montlake Boulevard would increase by about 340 vehicles per hour in the AM peak period and 440 vehicles per hour in the PM peak period. Delay would increase at the westbound ramp intersection and traffic operations would change from LOS B to LOS C during the AM and PM peak hours. This change is due to the addition of westbound left turns at the intersection. At all other locations, traffic operations would be very similar to existing conditions. These conditions would continue through years 3 and 4 of construction.

Prior to year 5 of construction, the eastbound Lake Washington Boulevard on-ramp would be closed and traffic would begin using the eastbound SR 520 on-ramp at Montlake Boulevard. Traffic volumes entering the eastbound on-ramp at Montlake Boulevard would increase by about 630 vehicles per hour in the AM peak period and 350 vehicles per hour in the PM peak period. Traffic operations during year 5 in the Montlake area would remain similar to existing conditions, although some intersections would improve due to the temporary capacity improvements on Montlake Boulevard. By year 5, construction of the



24th Avenue East bridge would be completed, and would provide an alternative route for some drivers who use the westbound SR 520 off-ramp. This would improve traffic operations on Montlake Boulevard at the westbound off-ramp intersection. It would also prevent increased congestion at the eastbound on-ramp and Lake Washington Boulevard intersection that would otherwise occur due to additional traffic from Lake Washington Boulevard.

During year 6 of construction, the Montlake Boulevard bridge over SR 520 would be demolished and reconstructed. While this work takes place on the existing Montlake Boulevard right-of-way, traffic would be shifted east onto a portion of the new Montlake lid. Because of the area occupied by construction, temporary capacity improvements on Montlake Boulevard would be limited. The traffic destined for the eastbound on-ramp from northbound Montlake Place East and from Lake Washington Boulevard would require through traffic on Montlake Boulevard to stop for a longer time than they currently do, resulting in an overall increase in delay at this intersection during year 6. Traffic operations would degrade from LOS E to LOS F at the eastbound on-ramp and Lake Washington Boulevard intersection. Traffic operations at other locations would be similar to existing conditions.

By year 7, construction of the Montlake Boulevard bridge over SR 520 would be complete and reconstruction of the eastbound SR 520 on-ramp at Montlake Boulevard would begin. The existing loop ramp would be closed and traffic destined for eastbound SR 520 would use the temporary on-ramp along the future alignment of the HOV direct access ramp. This configuration would result in an increased volume of southbound left turns and northbound right turns at the Montlake interchange. However, the interchange would be near its final configuration, which would provide sufficient roadway capacity to maintain traffic operations similar to or better than existing conditions at all locations.

Freeway Effects during Construction

Traffic operations and congestion on SR 520 would remain similar to existing conditions during construction. Closure of the Lake Washington Boulevard ramps is not expected to have a substantial effect on SR 520 operations; ramp closures would mostly affect local street operations. Traffic volumes would increase on the SR 520 eastbound on-ramp and westbound off-ramp at Montlake Boulevard. Congestion associated with the Lake Washington Boulevard ramps would no longer be present. The congested locations would change



periodically as the configurations of Montlake Boulevard ramps are adjusted.

When the Lake Washington Boulevard westbound off-ramp is closed, traffic that previously used it would begin using a realigned westbound off-ramp to Montlake Boulevard. Traffic operations on westbound SR 520 would remain similar to existing conditions during years 3 and 4 after the ramp is closed. The congestion and queuing that occur under existing conditions would remain during construction of the project. Eastbound freeway operations would be similar to existing conditions during years 3 and 4.

When the Lake Washington Boulevard eastbound on-ramp is closed, prior to year 5, traffic that previously used it would begin using the SR 520 eastbound on-ramp at Montlake Boulevard. The level of service during the AM peak hour would be similar to existing conditions at the ramp, but is expected to degrade slightly from LOS D to E on the eastbound main line east of the Montlake on-ramp due to the increased volumes concentrated into one merge point. Levels of service during the evening peak hour are projected to remain unchanged even with a modest increase in traffic on the eastbound on-ramp and the downstream mainline section at Montlake Boulevard. SR 520 traffic operations at the westbound off-ramp would improve in year 5 during the morning and evening peak hours due to the exit option and drop-lane configuration proposed during this phase of construction.

In year 6 of construction, westbound SR 520 would return to traffic conditions similar to existing conditions during both peak hours. Eastbound operations would remain unchanged from year 5.

In year 7, the loop ramp to eastbound SR 520 at Montlake Boulevard would be closed for reconstruction. All local traffic destined for eastbound SR 520 will use the temporary on-ramp along the alignment of the HOV direct access ramp on the newly finished portion of the Montlake lid. The merge location for the eastbound on-ramp would be much farther east than in other stages of construction. Traffic operations would be improved compared to years 5 and 6. However, LOS E is still projected for this area during the AM peak hour in year 7, which is still below the LOS D of existing conditions. Elsewhere, eastbound operations would remain similar to existing conditions for both peak hours. Westbound traffic conditions should remain unchanged during year 7.



What are the anticipated effects of construction trucks?

Local jurisdictions can limit the use of nonarterial streets for truck traffic; therefore, efforts were made to identify designated arterial streets for potential use as haul routes. Final haul routes will be identified by the contractor(s) in cooperation with local jurisdictions, and all necessary permits would be obtained as required by law. Construction trucks would use these routes to access work sites and construction staging areas. The construction staging areas would be used for a variety of activities, including access to construction sites, location of construction office and storage trailers, parking for contractors' employees and agents, and storage of equipment needed for construction activities. Potential construction haul routes and staging areas are shown in Exhibit 10-8. Refer to the Construction Techniques and Activities Discipline Report Addendum and Errata (WSDOT 2011b) for more information about construction staging areas and potential haul routes.

Where possible, the work sites would include direct access from SR 520 and the ramps, which would minimize the amount of truck traffic on local streets. However, construction truck traffic would be necessary on City of Seattle streets in the project vicinity. Haul routes would require approval of WSDOT and those on local streets would require review and approval by the City of Seattle.

The use of barges is also planned to support many activities at the construction sites. This would reduce the amount of truck traffic required on roadways. However, for this analysis it was assumed that trucks would be used for all hauling activities.

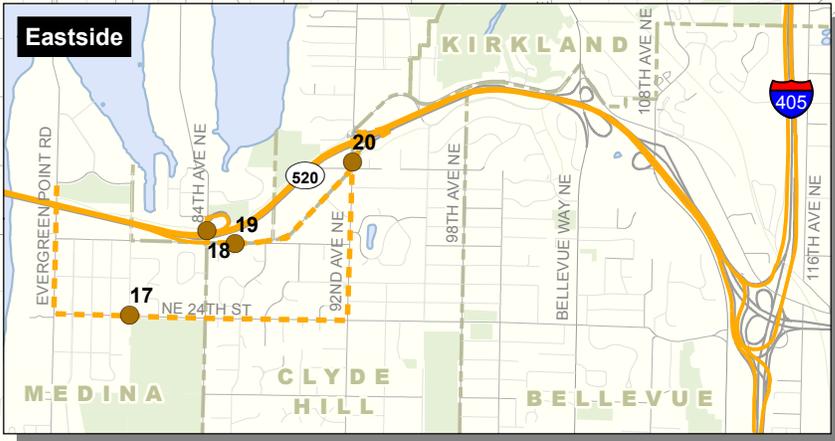
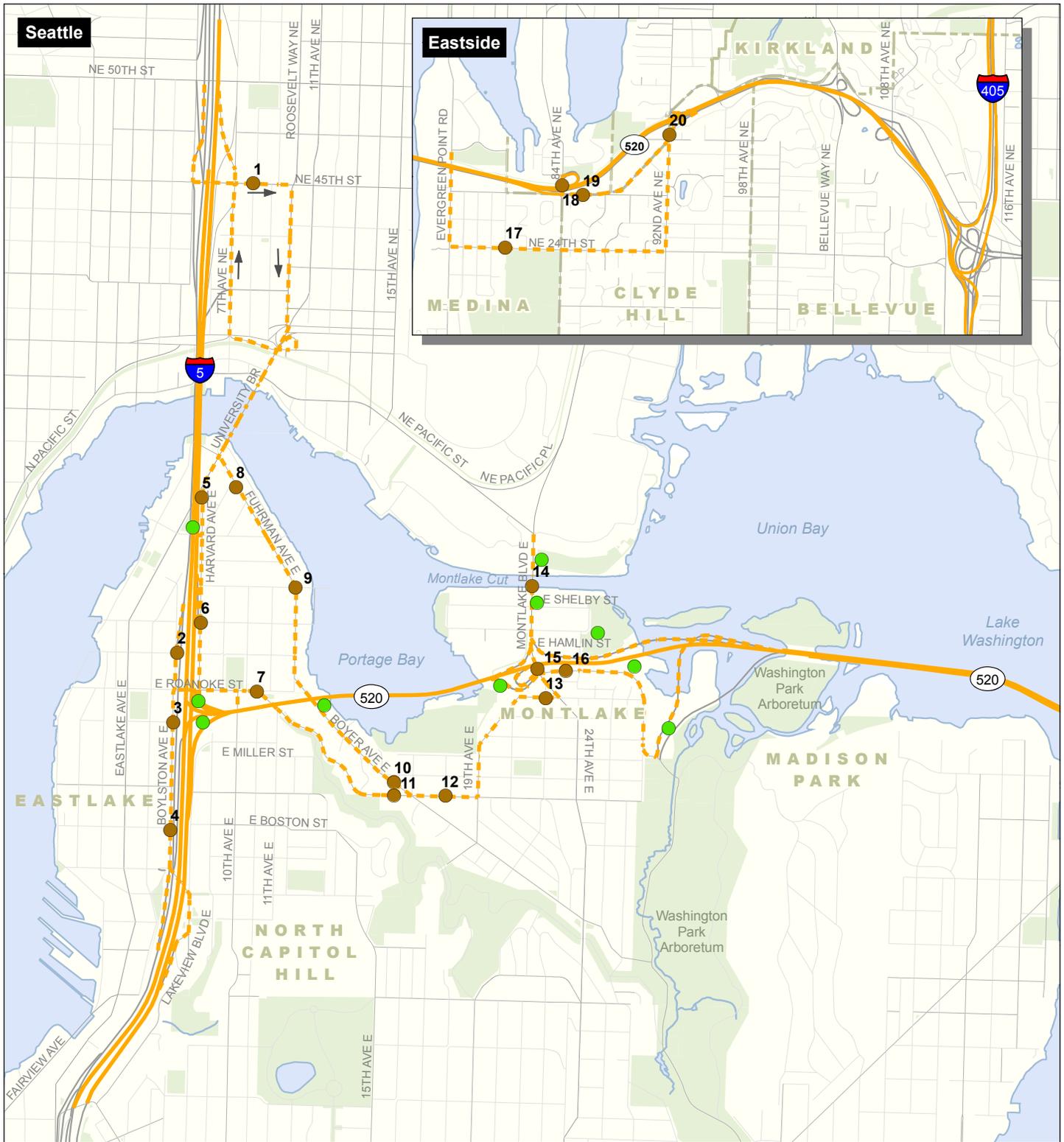
WSDOT updated the truck estimates based on preliminary construction plans for the Preferred Alternative, and summarized them by specific roadway locations in the project vicinity. The study locations for construction truck estimates are shown in Exhibit 10-8. The effects of construction trucks on local streets and freeways are described in terms of average, or typical, daily construction truck volumes and peak construction truck volumes. The results are compared to the existing average daily traffic volumes and truck volumes.



Did you know?

Seattle classifies arterials that accommodate significant freight movements through the city and to and from freight traffic generators as **major truck streets**.





- Potential Staging Area
- Haul Study Location
- Haul Route-Project Duration
- - - Haul Route-Limited Duration

Source: King County (2005) GIS Data (Streams and Streets), King County (2007) GIS Data (Water Bodies), CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

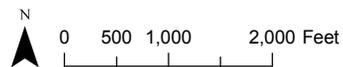


Exhibit 10-8. Potential Haul Routes

SR 520, I-5 to Medina: Bridge Replacement and HOV Project



The estimates for average daily trucks represent the typical volume of construction trucks that could be expected at each location when the haul route is in use. The actual daily volumes would vary from the average over the project duration as construction activities progress. A variation of approximately 25 percent from the average could typically be expected.

Peak construction refers to construction activities such as concrete placement that require more frequent arrivals of trucks than the average daily estimates indicate. These activities are infrequent, requiring much work and preparation on the site between occurrences. This is high-production work that requires substantial effort and above-average construction truck activity; therefore, this work is summarized separately from the typical daily results. The effects of peak construction are described for local streets and freeways in the following sections.

Construction Trucks on Local Streets

Many trucks required for construction must use local streets in addition to freeways to access work sites. Most construction trucks on local streets in Seattle would use Montlake Boulevard to access SR 520. Some trucks would also access local streets from I-5 at NE 45th Street or Boylston Avenue and Harvard Avenue via East Roanoke Street.

Some local streets on the Eastside would be used on a limited basis during construction of the Evergreen Point Bridge and Eastside transition area. Most trucks would directly access the project site from SR 520 through temporary construction entrances. During approximately the last 18 months of construction, the direct access from the site to eastbound SR 520 would be unavailable due to other construction activities east of the site. The SR 520, Medina to SR 202 project would need to close the access to complete construction of the roadway in that area. Trucks would still enter the work site directly from SR 520, but would need to leave the site along local streets to return to SR 520. Most trucks would arrive loaded and leave the site unloaded.

Exhibit 10-9 shows the estimated project effects of construction trucks on local streets compared to the for the existing heavy vehicles, which include trucks and buses. Traffic studies typically describe truck volumes as a percentage of the total vehicle volumes. Exhibit 10-9 also shows the percentages of trucks generated by the project compared to the percentages for the existing conditions at each location.



Exhibit 10-9. Daily Construction Trucks on Local Streets

Map Location	Study Street	Total Vehicle Volume	Existing Weekday		Project Average (Typical Day)		Project Peak Activities (Infrequent)	
			Daily Trucks and Buses	Trucks Percentage of Total Vehicles	Daily Trucks	Trucks Percentage of Total Vehicles	Daily Trucks	Trucks Percentage of Total Vehicles
1	NE 45th Street	36,700	1,430	3.9	15	< 0.1	220	0.6
2	Boylston Avenue East	13,360	250	1.9	25	0.2	240	1.8
3	Boylston Avenue East	10,330	240	2.3	7	0.1	60	0.6
4	Boylston Avenue East	13,700	340	2.5	25	0.2	240	1.8
5	Harvard Avenue East	8,000	310	3.9	6	0.1	110	1.4
6	Harvard Avenue East	17,640	690	3.9	15	0.1	70	0.4
7	East Roanoke Street	7,050	160	2.3	30	0.4	170	2.4
8	Fuhrman Avenue East	7,240	170	2.3	20	0.3	230	3.2
9	Boyer Avenue East	5,940	130	2.2	20	0.4	230	3.9
10	Boyer Avenue East	6,180	140	2.3	15	0.2	210	3.4
11	Delmar Drive East	4,910	100 ^a	2.0	20	0.4	160	3.3
12	East Lynn Street	5,270	110 ^a	2.1	15	0.3	120	2.3
13	East Roanoke Street	4,630	140	3.0	20	0.4	290	6.3
14	Montlake Boulevard East	57,350	1,410	2.5	10	< 0.1	100	0.2
15	Montlake Boulevard East	33,180	920	2.8	25	0.1	280	0.8
16	Lake Washington Boulevard	7,230	90	1.2	30	0.4	290	4.0
17	NE 24th Street	3,500	70	2.0	20	0.5	100	2.9
18	84th Avenue NE	7,790	220	2.8	2	< 0.1	10	0.1
19	NE 28th Street	4,390	60	1.4	5	0.1	20	0.5
20	92nd Avenue NE	5,000	90	1.8	20	0.4	100	2.0



This comparison shows how the project trucks would relate to the overall traffic conditions in the project vicinity. The volume of trucks on typical urban arterial streets is in the range of 2 to 3 percent of total vehicles, which is reflected in the data for most locations in the project vicinity. During typical construction days, the project would add trucks amounting to less than 1 percent of total traffic at any location.

On days when peak construction activities occur, the volume of project trucks added to local streets would be similar to the existing volumes of trucks and buses at most locations. The additional trucks would range from 2 to 4 percent of existing vehicle volumes. One location, East Roanoke Street at Montlake Boulevard East, is expected to have greater than 4 percent added trucks because of its proximity to work bridges on the south side of Portage Bay Bridge. Additional trucks at that location are estimated to be about 6 percent of existing vehicle volumes. Of the remaining locations, those near the high end of the 2 to 4 percent range would be Lake Washington Boulevard East in Montlake, and Boyer Avenue East near Portage Bay. The added trucks on Montlake Boulevard East during peak construction would be just under 1 percent at the interchange and less than 0.5 percent in the Shelby-Hamlin area. At the Eastside locations, additional trucks during peak construction would be less than 3 percent of existing vehicle volumes.

Construction Trucks on Freeways

Most construction trucks would use freeways to reach the project site. The existing total vehicle volumes, including trucks and buses on freeways, are much greater than on arterial streets; therefore, the additional project trucks would not have a substantial effect. Most construction trucks would travel during off-peak traffic conditions because road congestion would delay arrivals and reduce construction productivity.

The estimated volumes of construction trucks are shown in Exhibit 10-10, together with the existing total vehicles and existing trucks and buses. The volume of construction trucks is shown for both the average and peak construction activities. Both estimates are substantially less than the existing daily volumes of trucks and buses.



Exhibit 10-10. Daily Construction Trucks on Freeways

	Existing Weekday			Preferred Alternative Construction			
	Total Vehicle Volume	Daily Trucks and Buses	Trucks Percentage of Total Vehicles	Project Average Daily Trucks	Average Truck Percentage of Total Vehicles	Project Peak Daily Trucks	Peak Trucks Percentage of Total Vehicles
SR 520, Portage Bay	104,100	4,100	3.9	60	0.1	350	0.3
SR 520, Lake Washington	115,000	4,400	3.9	60	0.1	350	0.3
SR 520, Medina	115,000	4,400	3.9	110	0.1	590	0.5
SR 520, 108th Avenue NE	113,300	4,400	3.9	120	0.1	590	0.5
I-5, North Seattle	216,600	21,700	10.0	50	< 0.1	340	0.2
I-5, Downtown Seattle	247,800	24,800	10.0	50	< 0.1	340	0.1
I-405, Kirkland	193,300	7,700	4.0	50	< 0.1	240	0.1
I-405, Bellevue	206,200	8,300	4.0	50	< 0.1	240	0.1

Most of the construction trucks using freeways would reach the project site from the west via I-5, particularly for activities on the west side of Lake Washington. For the floating bridge and Eastside transition area, most trucks would arrive from the east. Of the total project trucks, approximately 75 to 85 percent would travel on SR 520 to reach the work sites. About 65 percent would travel on I-5 and 30 percent would use the I-405 corridor. The existing volumes of trucks and buses amount to about 4 percent of total daily vehicles on SR 520 and I-405, and about 10 percent of total daily vehicles on I-5. On average construction days, the trucks added to freeways due to project activities would be negligible at all locations. During peak construction days, the estimated additional trucks would amount to 0.5 percent, or less, of total daily vehicles. The additional trucks would not affect freeway traffic operations in comparison to existing conditions. Haul routes and truck traffic resulting from project construction are not expected to affect I-90.



How would construction affect transit operations?

Construction would affect bus stops and operations on local streets in the study area, and could affect transit stations and associated bus operations along SR 520. Much like general traffic operations, most transit effects would be on the local streets rather than the freeway. The presence of construction activities, temporary roadway modifications, and increased traffic volumes would affect existing transit facilities and how riders use them. Transit travel times through the Montlake area could also be affected. The most substantial change during construction would be the closure of the Montlake Freeway Transit Station. The following sections describe the anticipated changes to transit facilities and the estimated travel time variations during construction.

Montlake Freeway Transit Station

The Montlake Freeway Transit Station on SR 520 would be permanently closed after the new Montlake lid stops are operational. The effects during construction of removing the Montlake Freeway Transit Station would be the same as those described in Chapter 8. The station would remain open during construction, but would be closed for short periods to accommodate construction activities.

During periods of closure, riders who travel from the east side of Lake Washington and currently use the station for access to Montlake or the University District would not be able to use all of the westbound SR 520 bus routes. Instead, they would need to board a bus on one of the University District routes. Riders who do not already use a University District route would need to transfer to buses at one of the SR 520 freeway transit stations on the east side of Lake Washington. Similarly, riders who travel from Montlake or the University District to the Eastside would need to use one of the University District routes on SR 520 and might need to transfer at one of the freeway transit stations. Those who transfer to and from local routes on Montlake Boulevard could do so near East Shelby Street on Montlake Boulevard, or on NE Pacific Street by the UW Medical Center.

During closures, riders who use the Montlake Freeway Transit Station for travel to and from downtown Seattle would not be able to use the SR 520 routes. Instead, they would use local bus routes through the University District and Eastlake or through Capitol Hill. Starting late in



year 5 of construction, they would also be able to use light rail as described in Chapter 8.

During closures of the Montlake Freeway Transit Station, the Eastside freeway transit stations at Evergreen Point Road and 92nd Avenue NE would be essential transfer points for riders who currently transfer at Montlake. Both of the transit stations currently serve substantial transfer functions. Sufficient capacity for the additional transfer activity must be available at these locations. WSDOT will coordinate the construction activities along SR 520 to provide the needed capacity throughout construction of the SR 520, I-5 to Medina project. Earlier construction plans, as described in the SDEIS, assumed that the Evergreen Point Freeway Transit Station would be closed for a period of time during construction. Based on current plans, this station would not be closed during construction.

Montlake Boulevard at SR 520

The bus stops on Montlake Boulevard at SR 520 would need to be relocated during construction. The current northbound bus stop at the Montlake Boulevard/SR 520 westbound ramp termini serving northbound routes would be combined with the existing bus stop at Montlake Boulevard/Shelby Street. The southbound stop on Montlake Boulevard at the eastbound off-ramp could be relocated north to the intersection with East Shelby Street until construction is complete. These changes would occur by the beginning of year 3.

Construction of the Preferred Alternative would affect trolley bus operations along Montlake Boulevard. Building the Montlake lid over SR 520 would require significant travel lane shifts and changes in channelization, especially during year 6. This temporary realignment may require construction of temporary trolley wire, including providing new switches and poles along the route or other changes to the transit facilities.

10th Avenue East

The bus stop on southbound 10th Avenue East at East Roanoke Street is located on the existing bridge over SR 520. The stop would remain near its current location during construction, but it would be moved to a nearby temporary location when the bridge is demolished. This move would not substantially affect access to transit or transit operations.



Construction of the Preferred Alternative would affect trolley bus operations on 10th Avenue East. Traffic on this street would be shifted to a temporary bridge during demolition and reconstruction of the 10th Avenue East bridge over SR 520. As with Montlake Boulevard, realignment of the overhead wires or other transit facility improvements would be required to maintain operation of the routes served by trolley buses.

Transit Travel Times

In response to comments received on the SDEIS, WSDOT evaluated the changes to midday transit travel times along Montlake Boulevard that could occur during construction. Many of the daily bus riders travel during this time and, unlike the peak periods, the Montlake Bridge openings can stop traffic during the midday periods. The estimated changes in travel times are shown by year of construction in Exhibit 10-11 for local and SR 520 bus routes that operate on Montlake Boulevard. The results indicate the expected change in minutes from the existing average travel time through the Montlake interchange area, accounting for bridge openings. The temporary road capacity improvements on Montlake Boulevard were included in the analysis, resulting in travel times similar to existing conditions for most time periods and routes.

During years 1 and 2, most construction activity would be away from the Montlake interchange and travel times would not be affected. Prior to year 3, capacity improvements at the Montlake interchange would be built to accommodate traffic from the westbound Lake Washington Boulevard exit ramp. This would allow travel times to remain similar to existing conditions with more traffic on Montlake Boulevard during years 3 and 4, after the ramp is closed. Northbound travel times for local routes could increase slightly due to the addition of a traffic signal at the westbound ramp intersection prior to year 3 of construction.

The reduction of travel times in year 5 is due to reduced traffic on Montlake Boulevard following completion of the bridge over SR 520 on 24th Avenue East. In combination with the capacity improvements on Montlake Boulevard, completed in previous stages, the bridge will improve traffic circulation at the Montlake interchange.



Exhibit 10-11. Average Off-Peak Transit and HOV Travel Times with Bridge Opening (minutes)^a

Route	Existing	Travel Time Change from Existing				
		Years 1-2	Years 3-4	Year 5	Year 6	Year 7
Southbound Montlake Boulevard NE to Eastbound SR 520 (NE Pacific Street to Foster Island)	12.9	0	0	-1	+4	+1
Southbound Montlake Boulevard NE Local Routes (NE Pacific Street to south of East Roanoke Street)	11.8	0	0	-3	0	-5
Southbound Montlake Boulevard NE to Westbound SR 520 (NE Pacific Street to Portage Bay)	12.0	0	0	-1	+2	-4
Westbound SR 520 to Northbound NE Pacific Street (Foster Island to NE Pacific Street)	5.4	0	0	-1	0	-2
Westbound SR 520 to Northbound Montlake Boulevard NE (Foster Island to Montlake Boulevard NE)	5.4	0	0	-1	0	-1
Northbound Montlake Boulevard NE Local Routes (south of East Roanoke Street to NE Pacific Street)	7.5	0	+1	-1	0	+4

^a Estimates represent the average of all HOV and transit vehicles from 3:00 p.m. to 4:30 p.m. (off-peak), with a Montlake bascule bridge opening between 3:25 p.m. and 3:30 p.m.

The southbound travel times for SR 520 routes are projected to increase in year 6 when the existing Montlake Boulevard bridge over SR 520 is reconstructed. Because of right-of-way constraints during construction activities, the potential capacity improvements on Montlake Boulevard would be limited. Also during this period, traffic volumes on the eastbound SR 520 loop ramp would continue to be higher due to the closure of the eastbound Lake Washington Boulevard ramp in year 5.

During year 7 of construction, the eastbound SR 520 loop ramp at Montlake Boulevard would be reconstructed. All traffic destined for eastbound SR 520 would use a temporary on-ramp along the alignment of the future HOV direct access ramp. This configuration would result in a high volume of traffic traveling southbound and turning left at the intersection of the westbound off-ramp/eastbound on-ramp on Montlake Boulevard. Northbound roadway capacity on Montlake Boulevard would be affected by stops required to allow the southbound left turns, resulting in increased northbound travel times. Because southbound buses to eastbound SR 520 would need to stop at a signal rather than using the loop ramp, these routes could also incur a small



increase in delay during year 7. Other routes would have shorter travel times due to completed roadway improvements.

What are the anticipated construction effects on bicyclists and pedestrians?

Construction of the Preferred Alternative would have some effects on bicycle and pedestrian access within the project corridor. In addition to general construction activities that would affect bicycle and pedestrian access, some local bicycle and pedestrian routes would be closed during construction. However, safe access meeting ADA requirements will be provided throughout construction.

Montlake Area

Under the Preferred Alternative, the Montlake Boulevard bridge over SR 520 is one of four north-south connections for pedestrians and bicyclists crossing SR 520 in the Montlake neighborhood that also include the Bill Dawson Trail, 24th Avenue East bridge, and the Arboretum Waterfront Trail. The Bill Dawson Trail runs under SR 520 along the west side of Montlake Boulevard and connects the Montlake Playfield (south of SR 520 on Portage Bay) to Montlake Boulevard north of SR 520. The 24th Avenue East bridge connects Lake Washington Boulevard to East Montlake Park. The Arboretum Waterfront Trail connects East Montlake Park to the Arboretum through Foster Island.

The 24th Avenue East bridge and the Bill Dawson Trail would be closed to pedestrian and bicycle access during the majority of construction. Montlake Boulevard would remain open to pedestrians and bicycles during construction.

Starting with construction in year 2, the 24th Avenue East bridge would be demolished to build the abutments for the proposed 24th Avenue East crossing and portions of the Montlake lid that would be constructed during years 3 and 4. Although the bridge would be open to two lanes of southbound traffic in year 5, no connection to 24th Avenue north of the westbound off-ramp would be provided until year 6. The Bill Dawson Trail is proposed as a temporary construction access road and would be closed to pedestrians and bicycles for the majority of construction. Bicycles and pedestrians would need to use Montlake Boulevard to cross SR 520 during construction.



The tunnel under Montlake Boulevard connecting the Bill Dawson Trail to the regional trail will be built during years 3 to 4 and will be open for use during year 5.

There is an on-street bicycle route on 24th Avenue East between East Shelby Street and East Lake Washington Boulevard. The 24th Avenue East bridge will be demolished during year 2 and replaced as part of the Montlake lid. Pedestrians would need to use Montlake Boulevard to cross SR 520 during construction years 2 through 4.

Major construction activities are proposed for years 2 through 6 along Montlake Boulevard near SR 520 for the Preferred Alternative. Construction methods may restrict bicycle and pedestrian access to one side of Montlake Boulevard over SR 520 during construction. Restrictions would be in place during the entire construction period to prevent the closure of bicycle and pedestrian access on both sides of Montlake Boulevard over SR 520. When traffic is detoured from the Lake Washington Boulevard ramps to the Montlake ramps, bicyclists riding in the street may face more conflicts with vehicles due to the higher volume of traffic and trucks, particularly along Montlake Boulevard compared to other routes. The project would increase the frequency of trucks on roadways; however, the exposure throughout the day would not be substantially greater than existing conditions.

Cyclists who board buses to cross the Evergreen Point Bridge would have to travel to NE Pacific Street to board an SR 520 route. The number of available bike racks on cross-lake buses would be reduced because there would be fewer routes from which to choose. When the Montlake Freeway Transit Station is closed after year 4, the highly used bicycle lockers at that location would also be closed due to the widening of Montlake Boulevard and construction of the new westbound off-ramp and direct access ramps. WSDOT will relocate the bicycle lockers nearby and is currently coordinating with Metro to identify a suitable location.

A major realignment of Montlake Boulevard east onto a portion of the new Montlake lid is proposed during year 6 of construction to build the portion of the lid under Montlake Boulevard. During this stage, the pedestrian crossings will be realigned along this section of Montlake Boulevard. Temporary crossing islands may be created between right-turn and through lanes by skewed geometry; however, because they are temporary, the crossing islands would likely not be protected by raised curbs.



Lane widths may be substandard during this stage due to space constraints, making it difficult for cyclists to share the road with vehicles. Marked and signal-protected pedestrian crossings will improve the 24th Avenue East intersections with Lake Washington Boulevard during year 6, and the westbound off-ramp and direct access ramps in year 7.

Delmar Drive Bridge

During year 2, a portion of the lid west of Delmar Drive East will be built to carry Delmar Drive traffic while the existing Delmar Drive crossing is demolished and reconstructed in years 3 and 4. During year 5, Delmar Drive East will be restored to its current alignment on a new structure equipped with nonmotorized facilities that meet current design standards. As a result, Delmar Drive East would remain open to bicycles and pedestrians throughout construction.

However, cyclists and pedestrians may choose to use alternative routes during construction. Potential detour routes include Boyer Avenue East on the east side of Delmar Drive East and 11th Avenue East to 10th Avenue East on the west side of Delmar Drive. Both routes are feasible for bicycle and pedestrian traffic; however, 11th Avenue East is particularly steep. Depending upon the route traveled, the Boyer Avenue East detour could require longer out-of-direction travel.

Foster Island and the Arboretum

During construction of the west approach, the portion of the Arboretum Waterfront Trail that currently travels under the existing west approach bridge would be closed. Access to the Arboretum Waterfront Trail from East Montlake Park would not be affected. However, the parking lot at the trailhead near East Montlake Park will be reconstructed and parking may not be available for up to 6 months. Parking and temporary access would otherwise be available throughout the construction period.



How would construction affect parking?

Construction would affect parking at several locations in the study area. The estimated effects during construction of the Preferred Alternative are shown in Exhibit 10-12 and described below.

Exhibit 10-12. **Parking Effects During Construction**

Location	Existing Capacity	Spaces Closed During Construction
Bagley Viewpoint	10	10
MOHAI and East Montlake Park	150	124
Husky Stadium Lot E11	429	10
NOAA Northwest Fisheries Science Center ^a	132	50
WSDOT Public Lot	24	12
24th Avenue East	5	5
Lake Washington Boulevard	35	35

^a Parking supply includes 38 spaces located on WSDOT right-of-way under the existing Portage Bay Bridge.

Bagley Viewpoint

The lot at Bagley Viewpoint (Delmar Drive East and East Roanoke Street) is located in Bagley Park, just east of the Delmar Drive overpass and north of the existing SR 520 structure. The lot currently has 10 parking stalls, of which (on average) only 1 is used. The Preferred Alternative would completely eliminate this lot during construction.

Museum of History and Industry and East Montlake Park

MOHAI is located near McCurdy Park and East Montlake Park, just east of 24th Avenue East. The MOHAI parking lot, which has 150 parking stalls, would be eliminated during construction of the Preferred Alternative. MOHAI would move to a different location prior to the start of construction. Access to East Montlake Park and the Arboretum would be maintained during construction. Once construction is complete, a trailhead parking lot containing approximately 26 parking spaces would be located just north of the stormwater facility.



24th Avenue East On-Street Parking

There are five on-street parking spaces located just west of MOHAI on the west side of 24th Avenue East, south of East Hamlin Street.

Construction activities would temporarily block the five spaces at this location.

NOAA Northwest Fisheries Science Center

NOAA has a parking lot with 132 marked spaces on the south side of its Northwest Fisheries Science Center building, south of East Hamlin Street and west of Montlake Boulevard East. Ninety-four of the parking spaces are located within the NOAA property and the remaining 38 are located under the Evergreen Point Bridge structure.

The current design for the Preferred Alternative would permanently remove all 38 parking spaces located under the existing bridge.

Approximately 15 of the NOAA parking spaces north of the bridge would be temporarily unavailable during construction of the Portage Bay Bridge. As a result, approximately 50 spaces would be unavailable during construction. Alternative parking would be needed for approximately 40 vehicles during construction. It is possible that some of the 38 lost parking spaces under the bridge could be replaced after construction is complete.

Husky Stadium Lot E11

The construction effects on parking at the U W would not be substantial. During the last year of construction, up to 10 parking spaces could be affected in Husky Stadium lot E11 due to construction on Montlake Boulevard, south of NE Pacific Street.

WSDOT Public Lot (Lake Washington Boulevard)

This parking lot contains at least 24 spaces and is located just east of Lake Washington Boulevard East at East Miller Street. The lot provides access to a trail with connections to the Arboretum. Approximately half of these spaces could be temporarily closed during construction to provide an access point for construction traffic.

Lake Washington Boulevard On-Street Parking

There are approximately 35 on-street parking spaces along Lake Washington Boulevard, east of East Montlake Boulevard. The spaces would be unavailable while the Montlake lid and the 24th Avenue East bridge are under construction.



Construction Employee Parking Considerations

The contractor may provide parking within or near the staging areas or could pursue an option such as operating a shuttle to a remote parking lot. If construction workers do not have designated parking areas, or if the construction parking supply is inadequate, workers would likely seek available long-term parking in the surrounding areas.

It is expected that construction workers would first pursue on-street spaces and then pay lots. However, the use of any on-street parking spaces by construction workers would likely need to be coordinated and approved by the City of Seattle. The City would discourage the use of on-street parking spaces by construction workers. On-street parking spaces are free weekday evenings after 6 p.m. and on Sundays. More specific details regarding construction worker parking would be developed at a later phase of the project design after preferred design options have been selected.



Chapter 11—Cumulative Transportation Effects

What is in this chapter?

This chapter summarizes the cumulative transportation effects of project alternatives in combination with other improvements to regional transportation facilities that were not included in the direct effects analyses described in Chapters 5 through 10. Because the analysis year for direct effects was 2030, the results included effects of projects that were planned and programmed to be completed by that time. The cumulative effects analysis also includes transportation projects that are planned to be completed by 2030, but were not programmed or funded at the time of the direct effects analysis. This includes evaluation of a reasonably foreseeable future tolling scenario for the year 2030. The cumulative effects scenario provides an estimate of travel demand throughout the region—taking into account all other reasonably foreseeable transportation improvement projects that may be constructed during the same time frame as the SR 520, I-5 to Medina project.

Several conclusions can be drawn by comparing projected travel demand and travel patterns from the project alternatives with those from the cumulative effects scenario. This chapter summarizes those conclusions.

The following terms are used throughout this chapter and defined as follows:

- **Cumulative Effects Scenario:** This scenario is used for traffic analysis and assumes future implementation of an extended regional package of transportation capacity improvements in addition to the SR 520, I-5 to Medina project.
- **Preferred Alternative:** The Preferred Alternative, also referred to as the Build Alternative, includes the following elements:
 - A 6-lane SR 520 corridor from I-5 in Seattle to Evergreen Point Road in Medina that includes two general-purpose and one transit/HOV lane in each direction



- Reversible transit/HOV ramp to the I-5 express lanes; headed from the Eastside to downtown Seattle in the morning and from downtown Seattle to the Eastside in the evening
- A 6-lane Portage Bay Bridge with a westbound peak-period managed shoulder
- Transit/HOV direct access ramps to and from the Eastside at the SR 520/Montlake Boulevard interchange
- Removal of the Lake Washington Boulevard ramps to and from SR 520
- A new bascule bridge across the Montlake Cut that provides additional capacity for transit/HOV, bicycles, and pedestrians

Elements of the Preferred Alternative include the transportation network assumptions described in other chapters of this report, but do not include the additional regional package of capacity improvements assumed in the cumulative effects scenario.

The following sections describe the regional transportation improvements included in the cumulative effects scenarios, as well as how those scenarios were modeled. The results of the analysis are presented primarily in terms of screenline and cross-lake travel demand for both daily and afternoon peak periods. Screenline results include the following major regional corridors: I-5, I-405, I-90, SR 522, and SR 520.

This evaluation of cross-lake travel specifically compares travel demand and mode choice between SR 520 and I-90. The No Build and Preferred Alternatives were evaluated against the cumulative effects scenario for both the screenline and cross-lake travel demand assessments.

What was included in the regional package for the cumulative effects scenario?

WSDOT decided that the transportation system modeled for the year 2030 cumulative effects scenario should include regional transportation facility improvements that are not included in the direct effects analysis of the No Build and Preferred Alternatives. This model includes transportation projects that are planned to be completed by 2030, but were not programmed or funded at the time of the direct effects



analysis. For the 2030 cumulative effects scenario, regional pricing strategies were also assumed to be in place in the I-90, I-405, and SR 99 corridors, in addition to the SR 520 toll that is included in the Preferred Alternative.

Highway Network

Exhibit 11-1 identifies additional highway projects included in the cumulative effects scenario. These projects are currently not funded, but could be completed by 2030. Of these projects, several I-405 projects are part of the I-405 Master Plan but are not funded by the 2003 Nickel, 2005 Transportation Partnership Account, or the American Recovery and Reinvestment Act. The projects referenced in Exhibit 11-1 were documented in PSRC's *Transportation 2040* (adopted May 20, 2010) and/or the I-405 Master Plan.

Exhibit 11-1. **Unfunded Highway Projects Included in the Final EIS Cumulative Effects Scenario**

Project	Notes
I-405–Southbound (SB) Braided Ramps: Construct SB braided ramps between SR 520 and NE 8th Street, including ramp connections to NE 10th Street	I-405 Master Plan, <i>Transportation 2040</i> ; estimated completion by 2030
SR 520–124th Avenue NE Interchange: Construct additional ramps to and from the east on SR 520	I-405 Master Plan, <i>Transportation 2040</i> ; unfunded. Being pursued by the City of Bellevue as part of the Bel-Red area transformation
I-405 at North 8th Street: Construct an HOV interchange on I-405 at North 8th Street in north Renton	<i>Transportation 2040</i>
I-405 at I-90: Add northbound (NB) I-405 to eastbound (EB) I-90 and EB I-90 to SB I-405 braided ramps and westbound (WB) I-90 and NB I-405 freeway-to-freeway HOV/high-occupancy toll (HOT) connection	<i>Transportation 2040</i> , estimated completion by 2030
I-405 at NE 6th Street Extension: Construct east half of interchange to provide HOV/HOT access	<i>Transportation 2040</i>
I-405 at SR 520: Add direct HOV connections in the NW, SE, and SW quadrants of the I-405/ SR 520 interchange. Includes modifying ramps at 124th Avenue NE	<i>Transportation 2040</i> , unfunded
I-405 at SR 522 Interchange: Reconfigure and rebuild the SR 522 Interchange. The existing SR 522 WB to I-405 SB ramp will remain; will include HOV direct connection in center	<i>Transportation 2040</i>



Exhibit 11-1. Unfunded Highway Projects Included in the Final EIS Cumulative Effects Scenario

Project	Notes
I-405: SR 169 to NE 6th Street express toll lanes (ETLs): Convert the existing HOV lanes and add a new lane in each direction to provide a 2-lane express toll system.	I-405 Master Plan, <i>Transportation 2040</i> ; partially funded. Initial stage(s) of this project are expected to be open to traffic by 2030
I-405: I-5 to SR 167 ETLs: Convert existing lanes into a 1-lane express toll system between I-5 and SR 167	I-405 Master Plan, <i>Transportation 2040</i>
I-405: SR 167 to SR 169 ETLs: Construct freeway-to-freeway HOT lane ramps for the NB to NB and SB to SB movements. Convert existing lanes on I-405 to provide a 2-lane express toll system between SR 167 and SR 169	I-405 Master Plan, <i>Transportation 2040</i>
I-5 at Airport/Industrial Way: Implement HOV direct access to E3 busway	<i>Transportation 2040</i> , estimated completion by 2025
I-5: Construct NB peak-period transit-lane shoulder (Olive Way – SR 520)	<i>Transportation 2040</i> , estimated completion by 2025

Local Street Network

Exhibit 11-2 identifies local street projects included in the cumulative effects scenario. These projects are currently not funded, but could be complete by 2030.

Exhibit 11-2. Unfunded Local Street Projects Included in the Final EIS Cumulative Effects Scenario

Project	Location	Notes
Mercer Corridor Improvements: Phase II – Dexter Avenue to Elliott Way West	Seattle	Not fully funded.
South Lander Street Grade Separation (1st Avenue South – 4th Avenue South)	Seattle	This project is not coded in the Final EIS Cumulative Effects model because the project will not increase capacity. <i>Transportation 2040</i> , funded by 2040.
118th Avenue NE Road Extension – north of NE 116th (new) to NE 118th Street	Kirkland	This project is not coded in the Final EIS Cumulative Effects model because the supporting road network is not available. Funding status unclear.
NE 132nd Street Road Improvements – 100th Avenue to 132nd Avenue	Kirkland	25 to 30% increase in capacity.



Exhibit 11-2. **Unfunded Local Street Projects Included in the Final EIS Cumulative Effects Scenario**

Project	Location	Notes
119th Avenue NE Road Extension: NE 128th Street to NE 130th Street	Kirkland	This project is not coded in the Final EIS Cumulative Effects model because the supporting road network is not available.
NE 130th Street Road Extension: Totem Lake Boulevard to 120th Avenue NE	Kirkland	This project is not coded in the Final EIS Cumulative Effects model because the supporting road network is not available.
120th Avenue NE Road Extension: NE 116th Street north to Burlington Northern Santa Fe Railroad crossing	Kirkland	This project is not coded in the Final EIS Cumulative Effects model because the supporting road network is not available.
124th Avenue NE Road Improvement, NE 85th Street to NE 116th Street (widen to 3 lanes)	Kirkland	
132nd Avenue NE Road Improvement, NE 85th Street to Slater Avenue NE (widen to 3 lanes)	Kirkland	
NE 120th Street (west section) from 124th Avenue NE to Burlington Northern Santa Fe Railroad Crossing (construct 2 to 3 lanes as needed)	Kirkland	This project is not coded in the Final EIS Cumulative Effects model because the supporting road network is not available.
NE 4th Street Extension: 116th Avenue NE to 120th Avenue NE (construct new 3- to 5-lane roadway)	Bellevue	Increase in capacity not provided.
120th Avenue NE Corridor Widening to 5 Lanes: NE 4th Street to Northup Way	Bellevue	Only the portion of this project between NE 4th Street and NE 12th Street is coded in the Final EIS Cumulative Effects model; no increase in roadway capacity in the remaining sections. <i>Transportation 2040</i> , funded by 2040.
Bellevue Way HOV Lanes and Transit Priority (South Bellevue Park-and-Ride to I-90)	Bellevue	<i>Transportation 2040</i> , funded by 2040.
Bel-Red Regional Connectivity: Extend NE 16th Street (NE 124th Street to NE 136th Place) and widen 136th Place NE (NE 16th Street and NE 20th Street)	Bellevue	The portion of this project between 124th Avenue and 132nd Avenue is coded in the Final EIS Cumulative Effects model. Outside of these parameters, part of the supporting road network is not available and the remaining road network will not increase capacity. <i>Transportation 2040</i> , unfunded.



Exhibit 11-2. **Unfunded Local Street Projects Included in the Final EIS Cumulative Effects Scenario**

Project	Location	Notes
Bel-Red Regional Connectivity: Increased connectivity between downtown Bellevue/Overlake growth center and the new Bel-Red transit-oriented development node. Widening, non-motor improvements (120th Avenue NE, 124th Avenue NE, NE 4th Street)	Bellevue	<i>Transportation 2040</i> , funded by 2040.
Coal Creek Parkway Widening to 6 Lanes at I-405 Intersection	Bellevue	<i>Transportation 2040</i> , unfunded.
East Marginal Way Grade Separation (South Idaho Street to Spokane Street)	Port of Seattle	This project is not coded in the Final EIS Cumulative Effects model because the project will not increase capacity. <i>Transportation 2040</i> , funded by 2040.
North Argo Truck Roadway (Duwamish Avenue South to Colorado Avenue South)	Port of Seattle	This project is not coded in the Final EIS Cumulative Effects model because the supporting road network is not available. <i>Transportation 2040</i> , unfunded.
Coal Creek Parkway: Add HOV lane and transit priority (Forest Drive to I-405)	WSDOT	<i>Transportation 2040</i> , funded by 2040.

Transit Network

No additional transit improvements beyond those identified for the year 2030 No Build and Build alternatives are included in the cumulative effects scenario. All projects included in the Sound Transit 2 plan are currently funded and are now included in the year 2030 No Build and Build alternatives.

Tolling and Pricing

Exhibit 11-3 identifies the regional tolling and roadway pricing concept included in the cumulative effects scenario. These tolling and pricing assumptions are similar to PSRC's mid-range constrained tolling strategy—an early phase (year 2025) tolling implementation concept for *Transportation 2040*. PSRC's concept includes 1- and 2-lane HOT lanes (i.e., I-405 and sections of I-5), with fully tolled selected facilities (i.e., SR 520, I-90, I-5 express lanes, and sections of SR 99).



Exhibit 11-3. Tolling Components Currently Included in the Final EIS Cumulative Effects Scenario

Roadway	Toll Description	Notes
SR 520 Cross-lake	Single point toll with same toll rate as Final EIS Preferred Alternative, 3+ HOV/transit free	Same assumption as Final EIS Build Alternative
I-90 Cross-lake	Single point toll on I-90 west bridge, with same toll rate as SR 520; 3+ HOV/transit free	Consideration of tolling I-90 is consistent with the intent of Engrossed Substitute House Bill (ESHB) 3096. No project is currently identified.
I-405 ETLs: 1- to 2-lane system the length of I-405 providing buffer-separated lanes with tolled use by general-purpose traffic and free 3+ HOV/transit use	ETL toll rate of \$0.20 per mile (2010 dollars) during AM/PM peak periods; \$0.05/mile for midday, evening, and night periods; 3+ HOV/transit free	Bellevue to Lynnwood section is currently funded but tolling was not included in base model because operation of new lanes has not been determined.
SR 167	Same as existing ETL, 3+ HOV/transit free	Same as Final EIS No Build and Build alternatives
SR 99 Bored Tunnel	Scenario "C" toll rates per SR 99 Final EIS, 3+ HOV/transit free	Potential funding source for SR 99 project

A tolling and pricing concept similar to PSRC's mid-range constrained tolling strategy is used in the SR 520 Final EIS cumulative effects analysis. The SR 520 Final EIS cumulative effects tolling and pricing concept, shown in Exhibit 11-3, includes full facility tolls on SR 520, I-90, and SR 99. It also includes express toll lanes (ETLs) on I-405 and SR 167. Unlike PSRC's mid-range constrained tolling strategy, the I-5 corridor is not assumed to be tolled for the SR 520 Final EIS cumulative effects analysis because there is no clear legislative intent to move forward with pricing strategies in this corridor at this time.

The tolling strategies evaluated in this cumulative effects section are not intended to replace the necessary full study of each corridor and their more specific planning and evaluation processes. This evaluation is only intended to provide a high-level planning assessment as to the potential effect a more regional-level toll strategy might have on the SR 520 corridor traffic and person volumes.

How was the travel modeling conducted?

WSDOT used the SR 520 travel demand model to analyze potential future cumulative effects throughout the region, and specifically their effect on cross-lake travel demand. The cumulative effects scenario was



built upon the Preferred Alternative network. The SR 520 travel demand model was validated against actual travel data for this corridor. The cumulative effects scenario was then compared with the No Build Alternative and the Preferred Alternative for both daily and peak periods. The primary measures used to make the comparisons included vehicle trips and person trips.

The steps in developing the cumulative effects scenario model runs included the following:

1. The cumulative effects package of other regional projects was added to the project travel demand model with the Preferred Alternative and the model was run to obtain output for the scenario.
2. The output results from the transportation model run for the cumulative effects scenario were then compared to the results of the model runs for the Build Alternative.

To compare results from the model runs, six screenlines were developed at the following locations:

- Screenline 1: Midspan bridge (Evergreen Point Bridge and I-90 Bridge, and SR 522)
- Screenline 2: East of I-405 (between SR 520 and I-90)
- Screenline 3: North of SR 520 (between Lake Washington Boulevard NE and 148th Avenue NE)
- Screenline 4: Lake Washington Ship Canal (Fremont Bridge to Montlake Bridge, a combination of Seattle screenlines 5.12, 5.13, and 5.16)
- Screenline 5: South of I-90 (East Marginal Way to Rainier Avenue South, a combination of Seattle screenlines 9.12 and 9.13)
- Screenline 6: South of I-90 (118th Avenue SE, I-405, Factoria Boulevard SE, and 150th Avenue SE)

What are the cumulative effects findings?

WSDOT consolidated and summarized extensive data from the travel demand modeling. The results are presented in several formats to provide insight into the travel behavior of automobiles and transit



riders under the No Build Alternative, Preferred Alternative, and the cumulative effects scenario. Specifically, screenlines were used to compare the differences in cross-lake and north-south travel between the different scenarios. The following discussion represents results from the screenline data and more specific cross-lake travel trends that were observed. The vehicle and person demand data reported in this chapter should not be directly compared to the results of operations analysis in other chapters. The cumulative effect results are output from the project travel demand model and are to be used for relative comparison of transportation scenarios at a regional level. For 2030 forecasts of vehicle and person demand, refer to Chapter 5—Freeway Volumes and Operations.

Regional Travel Patterns

Several exhibits were developed that depict the results of the cumulative effects modeling in comparison to the model results of the project alternatives. Both daily and afternoon peak period screenlines were developed for vehicle and person trips. Exhibits 11-4 and 11-5 present screenline daily results for vehicle and person trips, respectively. Exhibits 11-6 and 11-7 present afternoon peak period screenline results for vehicle and person trips, respectively.

The screenline exhibits show the different forecasted vehicle and person trips for the Preferred Alternative, the cumulative effects scenario, and the No Build Alternative. The No Build Alternative results from the travel demand model were used as a basis of comparison for the Preferred Alternative model run as well as the cumulative effects model run.

General observations are as follows:

- The addition of tolls on SR 99 and I-90, including the express toll lanes on I-405 provided in the cumulative effects scenario, combined with the increased roadway capacity on I-405 would result in increased vehicle and person trips on the Eastside (see screenlines 2, 3, and 6). This is particularly true for north-south trips, and is likely because the available capacity on I-405 and SR 167 would create a more attractive regional north-south route in comparison to I-5 and a tolled SR 99 facility.
- Cross-lake vehicle and person demand (see screenline 1) would be less in the cumulative effects scenario compared to the direct effects of the project alternatives. The presence of tolls on both SR 520 and



I-90 would reduce the demand for cross-lake trips. In addition, increased north-south capacity on Eastside facilities (e.g., I-405) would improve Eastside traffic circulation and likely shift some cross-lake demand to other routes.

- Seattle screenlines (see screenlines 5 and 6) show relatively uniform decreases in north-south trips caused by the cumulative effects scenario. This would likely be due to the diversion of north-south trips through Seattle away from a tolled SR 99 corridor, as well as a diversion of trips between south King County and the Eastside away from the I-5/I-90 route.

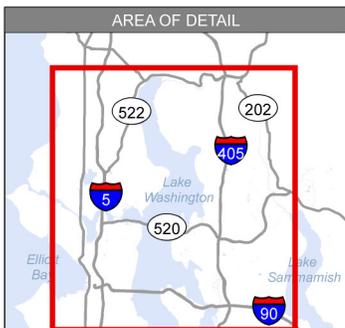
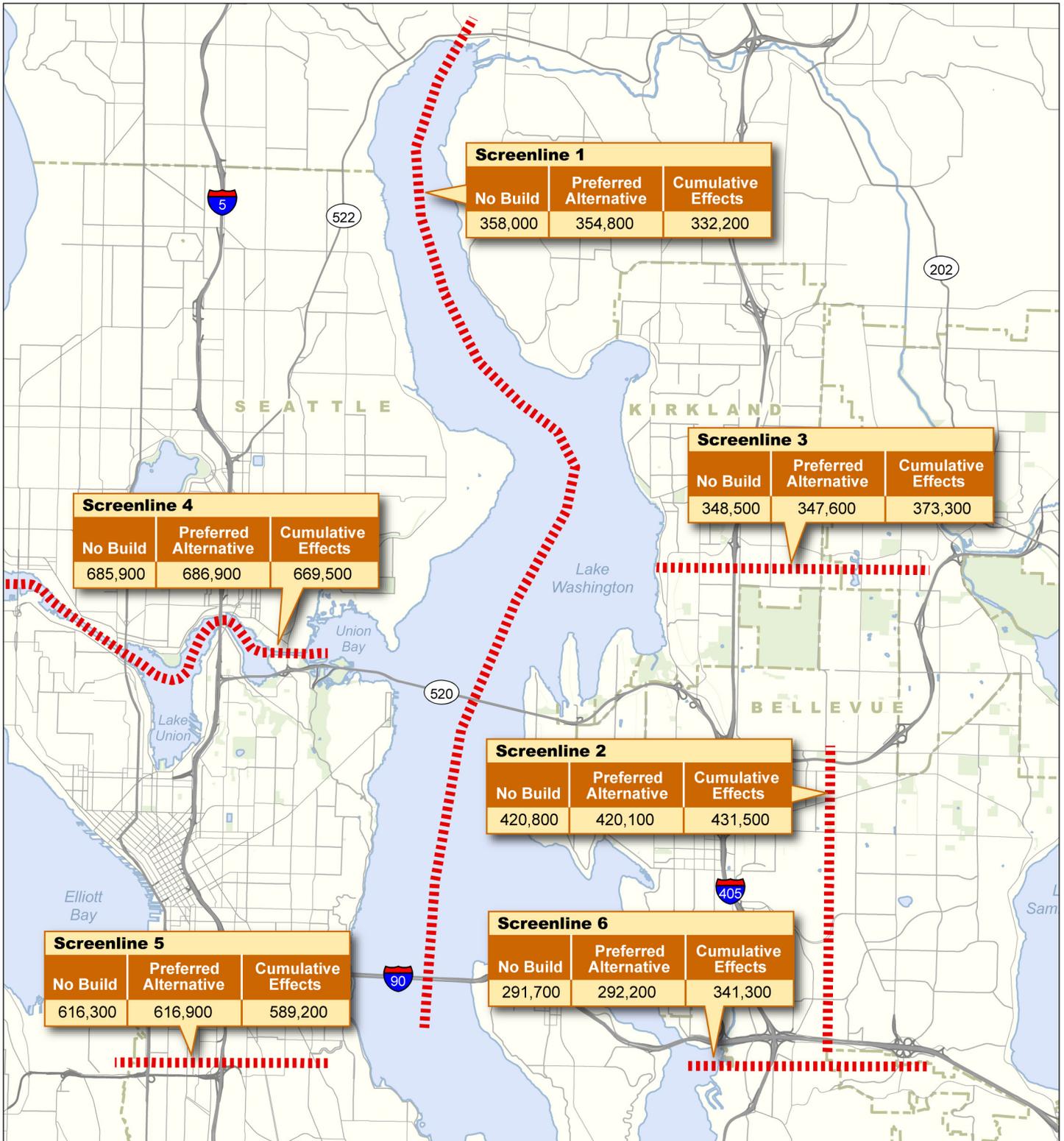
Cross-Lake Travel Demand

The results of cross-lake travel demand on I-90, SR 520, and SR 522 for cumulative effects show similar trends in both vehicle and person trips among the Preferred Alternative, No Build Alternative, and the cumulative effects scenario in both the daily and afternoon peak periods. The cumulative effects scenario shows a slight decrease in daily cross-lake vehicle demand compared to the No Build Alternative and the Preferred Alternative (about 7 percent and 6 percent, respectively). These effects are shown in Exhibits 11-4 through 11-7.

This decrease in cross-lake vehicle trips can, in part, be attributed to several capacity improvements in the regional corridor on the Eastside that were included in the cumulative effects scenario. Increased capacity on Eastside roadways would allow some trips to shift from the cross-lake routes to other routes on the Eastside. The introduction of an I-90 Bridge toll in the cumulative effects scenario also contributes to the reduction in cross-lake trips. With the largest north-south capacity increases occurring on I-405 south of I-90, and the addition of an I-90 toll, I-90 would experience a large decrease in cross-lake vehicle travel demand. The vehicular demand to use SR 520 would remain substantial, with or without the added tolls and regional corridor improvements.

The same pattern is exhibited for daily person trips when comparing the cumulative effects scenario with the No Build and Preferred Alternatives. The cumulative effects scenario exhibits lower cross-lake person trips than either the No Build Alternative or Preferred Alternative, although the percentage difference (4 percent) is less than for vehicle trips.





Screenline

Source: King County (2008) GIS Data (Streams, Streets, Water Bodies), CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

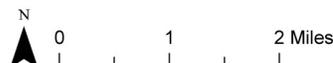
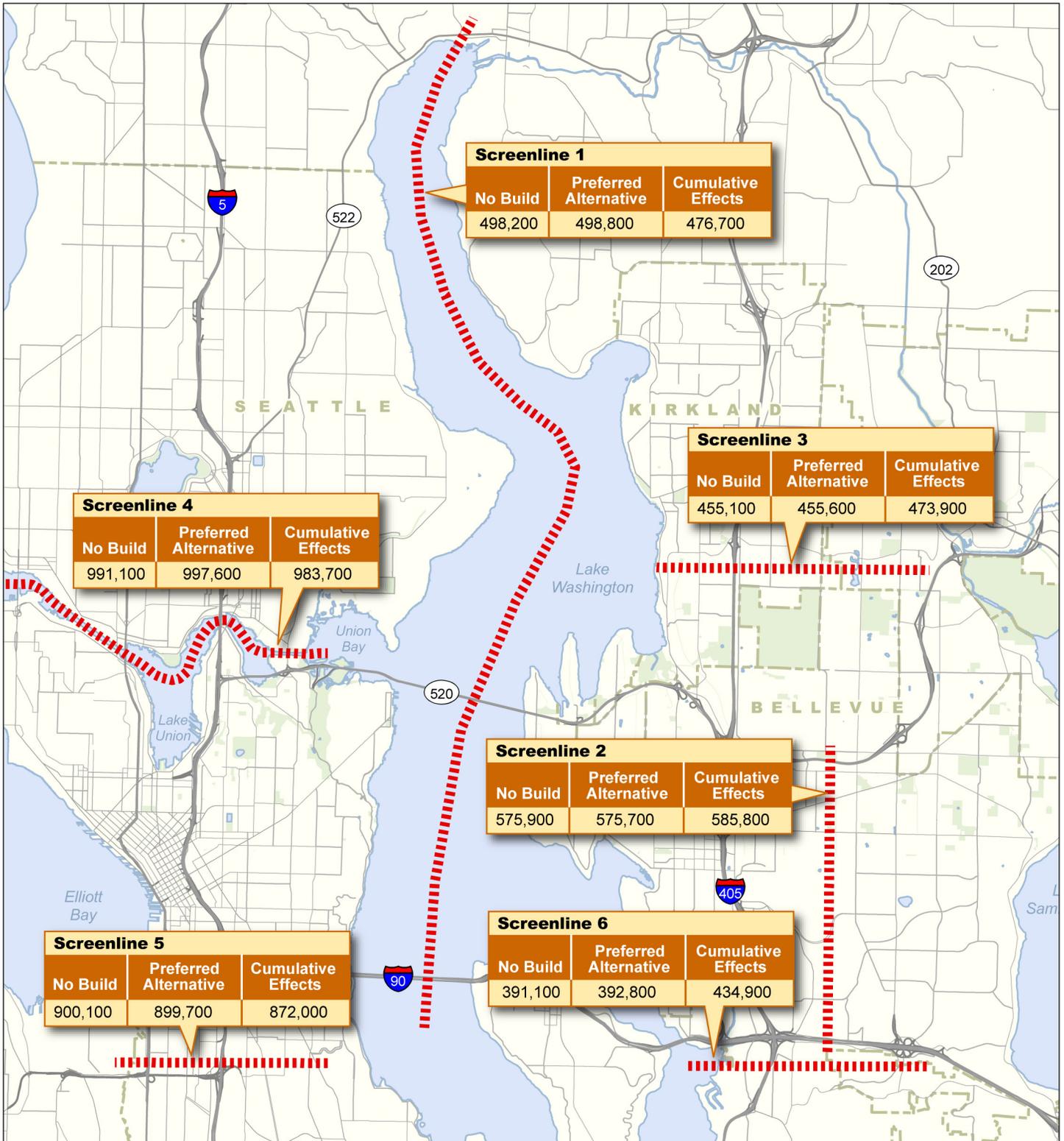


Exhibit 11-4. Screenline Daily Vehicle Trips
SR 520, I-5 to Medina: Bridge Replacement and HOV Project

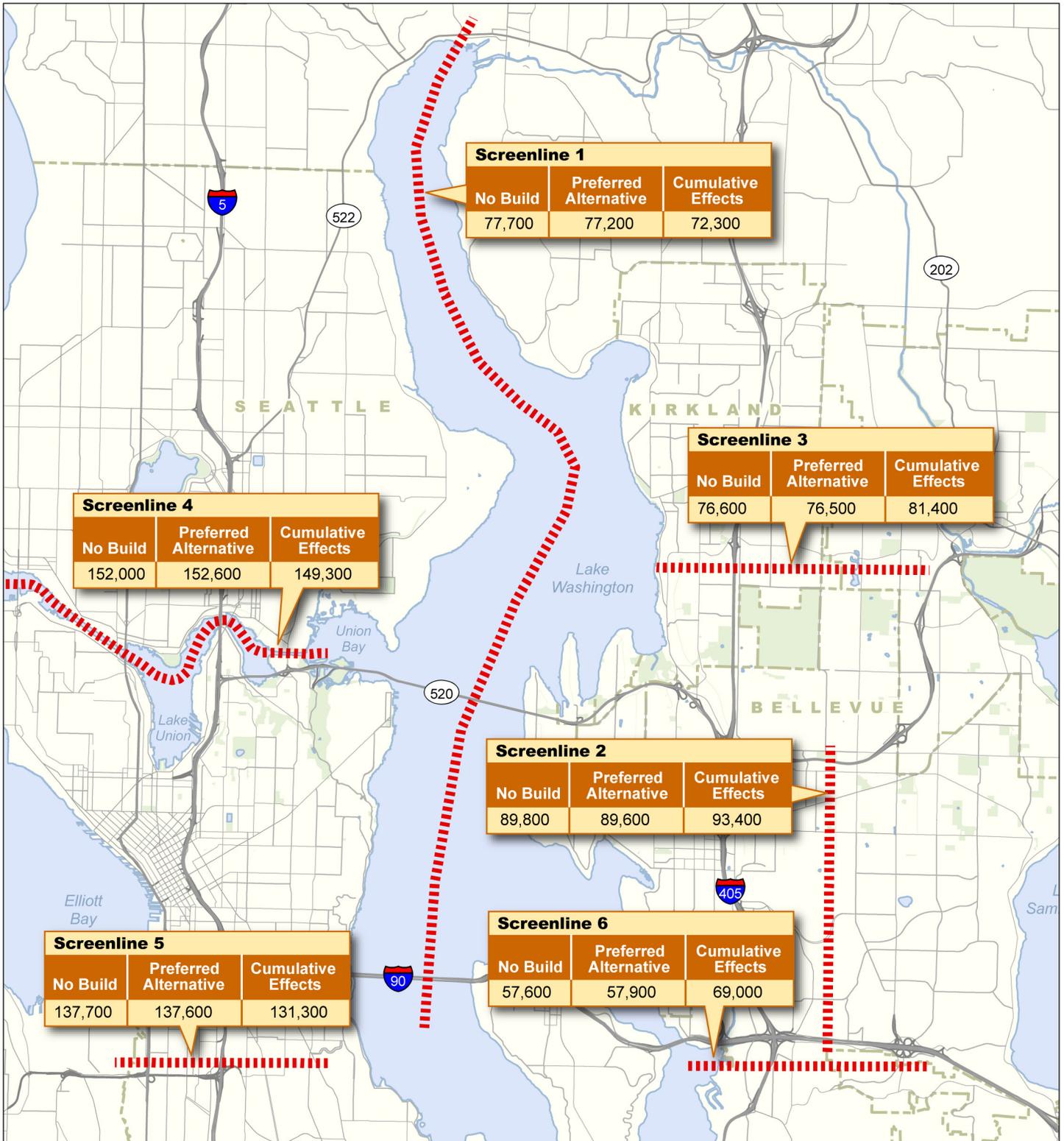


Screenline

Source: King County (2008) GIS Data (Streams, Streets, Water Bodies), CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.



Exhibit 11-5. Screenline Daily Person Trips
SR 520, I-5 to Medina: Bridge Replacement and HOV Project



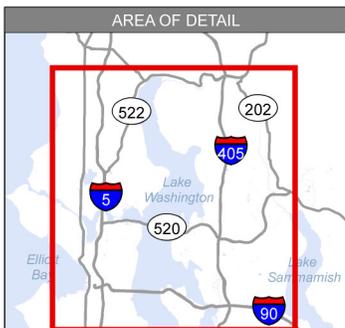
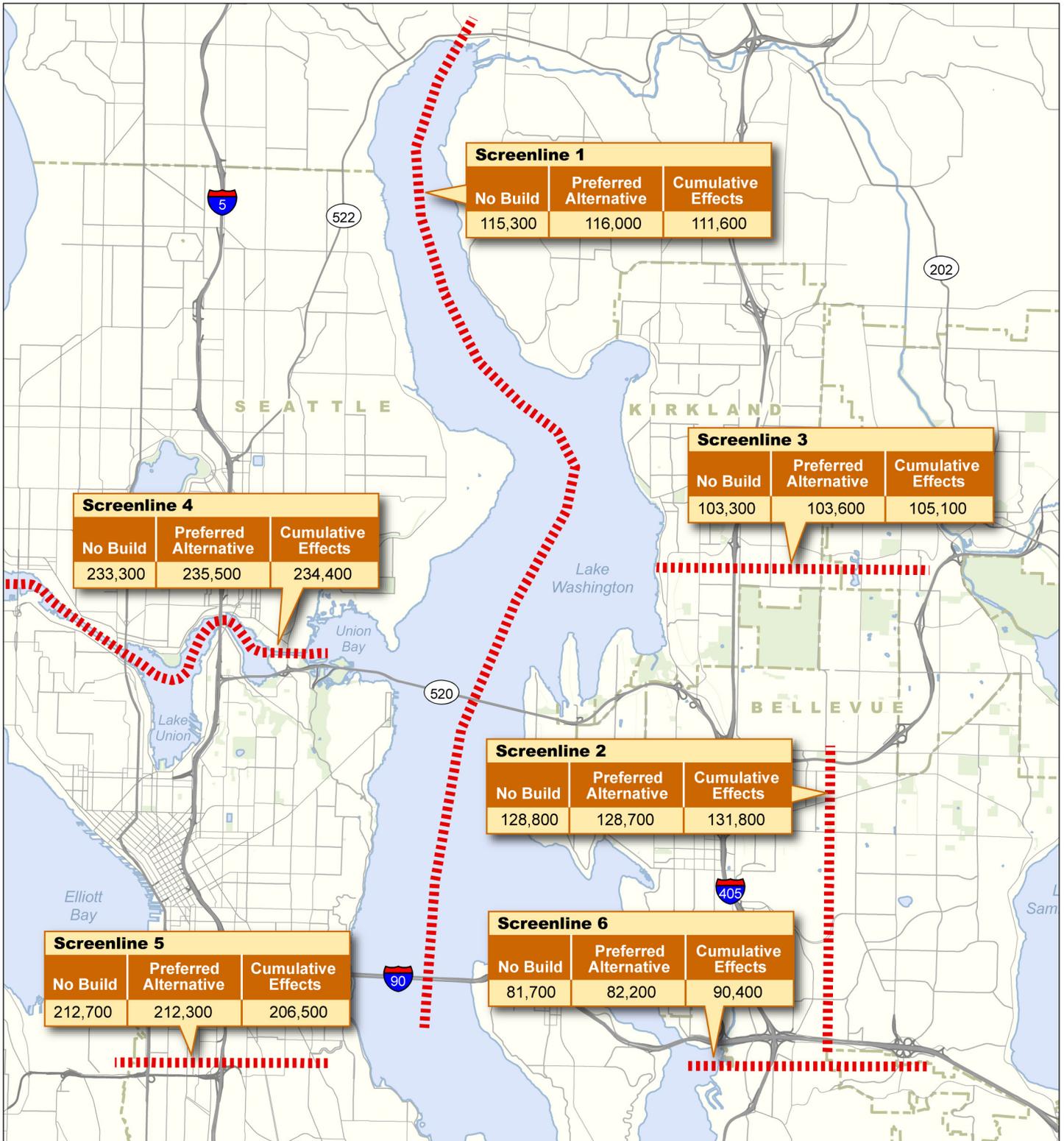
Screenline

Source: King County (2008) GIS Data (Streams, Streets, Water Bodies), CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.



Exhibit 11-6. Screenline PM Peak Period Vehicle Trips

SR 520, I-5 to Medina: Bridge Replacement and HOV Project



Screenline

Source: King County (2008) GIS Data (Streams, Streets, Water Bodies), CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.



Exhibit 11-7. Screenline PM Peak Period Person Trips

SR 520, I-5 to Medina: Bridge Replacement and HOV Project

Another observation regarding cross-lake travel is a general increase in the ratio of person trips to vehicle trips. The combination of higher 3+ person HOV usage on SR 520 due to the exemption of tolls in the HOV lanes on the bridge, as well as the addition of 3+ HOV-exempt tolling on I-90 with light rail, increases the attractiveness of travel that do not involve single-occupant vehicles and the overall person-carrying efficiency of the two bridges.

The model results suggest that several specific capacity improvements, in combination with tolling on the Evergreen Point Bridge and I-90 Bridge, would encourage some cross-lake trips to remain on the Eastside. The incorporation of the 10- to 15-year Implementation Plan for I-405 assumes an increase in capacity on I-405 between I-5 in Tukwila and SR 522 in Bothell. Between now and 2030, additional capacity is also planned for SR 167 (from SE 180th Street to I-405) and SR 522 (bus lane). Both regional facilities tie into I-405 and would provide a viable alternative to the cross-lake bridges, given the additional capacity of these facilities and the requirement to pay a toll to cross either the Evergreen Point Bridge or I-90 Bridge.

North-South Travel Demand

The north-south travel demand screenlines for the cumulative effects scenario show similar trends in both vehicle and person trips during the daily and afternoon peak periods. Exhibits 11-4 through 11-7 show the increase in north-south trips on the Eastside south of I-90 (screenline 6).

The cumulative effects scenario shows daily trips on the Eastside south of I-90 increasing by 17 percent in vehicle trips, and by 11 percent for daily person trips compared to the No Build and Preferred Alternatives. This increase reflects the capacity improvements in the form of express toll lanes assumed along I-405 and SR 167.

I-5 would also be affected by the change in roadway capacity on the Eastside. In fact, given that I-405 would become more attractive with its additional capacity, travel demand on the I-5/ SR 99 corridor south of I-90 (see screenline 5) would decrease by approximately 4 percent on a daily basis.

The north-south screenline north of SR 520 and east of Lake Washington (screenline 3) shows an increase in daily vehicle trips by approximately 7 percent and person trips by approximately 4 percent with the cumulative effects scenario compared to the No Build and Preferred Alternatives. This increase suggests that more north-south



trips would be made in the I-405 corridor due to the additional capacity provided by the year 2030 and the introduction of tolling on the SR 99 corridor.

East-west demand would increase slightly east of I-405 (screenline 2) in the cumulative effects scenario. The daily increase, compared to either the No Build Alternative or Preferred Alternative, would be about 3 percent for daily vehicle trips and 2 percent for daily person trips. Given the increased attractiveness of the I-405 corridor due to the increased capacity in the cumulative effects scenario and the fact that more trips would remain on the Eastside, an increase in trips along this stretch of SR 520 is reasonable.

What happens to cross-lake mode choice?

Exhibits 11-8 through 11-11 show the modeled results for year 2030 cross-lake daily and afternoon peak-period vehicle and person trips. With this information, travel demand was compared among HOVs, general-purpose vehicles, and transit across the Evergreen Point Bridge and I-90 Bridge. The following paragraphs discuss the key findings from that analysis.

When evaluating the choice of cross-lake travel mode for the Preferred Alternative and the cumulative effects scenario, it is necessary to isolate the effects on cross-lake vehicle demand to avoid erroneous conclusions. Capacity improvements in the SR 167/I-405 corridor contained in the cumulative effects scenario would cause a

considerable number of trips that would be traveling along I-5 and I-90 to divert to the I-405 corridor. In addition, the introduction of tolls on both the SR 520 and I-90 corridors would likely deter some travelers from making cross-lake trips.

As shown in Exhibit 11-8, the cross-lake daily vehicular traffic would be about 6 to 7 percent less in the cumulative effects scenario than in the No Build and Preferred Alternatives. The primary decrease in vehicle trips would occur on I-90, where total daily vehicle trips are shown to decrease by approximately 28,000 (or 16 percent) compared to the No Build Alternative and 30,000 (or 17 percent) compared to the Preferred Alternative.

In summary, the percentage of people on each corridor using HOV modes of travel increases or stays the same in the cumulative effects scenario when compared with the Preferred Alternative.

Location	% HOV		Cumulative Effects Scenario
	No Build Alternative	Preferred Alternative	
SR 522	12%	10%	11%
SR 520	12%	24%	24%
I-90	31%	26%	30%
Total	22%	23%	25%



On SR 520, daily vehicle trips are expected to increase with the cumulative effects scenario by approximately 1,500 (or 1 percent) compared to the No Build Alternative and by 7,900 (or 7 percent) compared to the Preferred Alternative. These numbers suggest that the introduction of a toll on I-90 would result in a considerable decrease in vehicle trips on I-90 and a relatively small increase in trips on SR 520. Negligible changes in vehicle trips would occur on SR 522 among the No Build Alternative, Preferred Alternative, and cumulative effects scenario. A review of vehicle volumes during the afternoon peak period, shown in Exhibit 11-10, yields similar comparisons.

Some changes to cross-lake transit and HOV person trips are also associated with the cumulative effects scenario when compared with the No Build and Preferred Alternatives. Exhibits 11-9 and 11-11 show that total cross-lake transit ridership would remain similar (within 10 percent of total daily person trips) with the No Build Alternative, Preferred Alternative, and cumulative effects scenario. However, with the cumulative effects scenario, total daily cross-lake HOV person trips would increase by approximately 15 percent compared to the No Build Alternative and by about 6 percent compared to the Preferred Alternative.

On SR 520, the addition of an HOV lane and a toll on non-HOV vehicles associated with the Preferred Alternative would result in a substantial increase (approximately 20,000 trips or 125 percent) in daily HOV person trips compared to the No Build Alternative. The addition of an I-90 toll with the cumulative effects scenario would result in further increases in daily HOV person trips on SR 520 over the Preferred Alternative (approximately 2,400 trips or 7 percent).

For I-90, the changes to SR 520 associated with the Preferred Alternative would reduce the number of daily HOV person trips by approximately 10,000 (or 25 percent) when compared to the No Build Alternative. The introduction of an I-90 toll with the cumulative effects scenario would, in turn, result in approximately 1,700 trips (or 6 percent) increase in daily HOV person trips on I-90 over the Preferred Alternative because some general-purpose trips would likely shift to HOV usage to avoid a toll.



What are the conclusions of the cumulative effects evaluation?

Several conclusions are apparent in comparing the cumulative effects scenarios to the project alternatives. These are summarized below.

- Total traffic crossing the SR 520 corridor is forecasted to increase by 7 percent in the cumulative effects scenario compared to the Preferred Alternative. This is a 1 percent increase in total traffic compared to the No Build Alternative. All of the increase in volume compared to the No Build Alternative would occur in the HOV lanes. The HOV lane in the SR 520 corridor would have adequate capacity to accommodate this level of increase. This means that if the regional projects assumed in the cumulative effects scenario are implemented in conjunction with the SR 520, I-5 to Medina project, more person trips would likely be made across Lake Washington using SR 520; as a result, traffic conditions within the project corridor may fall somewhere between what has been estimated with the No Build and Preferred Alternatives in the Final EIS.
- Because the SR 520, I-5 to Medina project completes the HOV lane system between Redmond and Seattle, and assuming carpools and transit would not be required to pay a toll, a considerable increase in HOV demand would occur along SR 520 with the Preferred Alternative compared to the No Build Alternative. The combination of reduced travel time and cost avoidance is a powerful incentive for carpool and transit use. An additional, but smaller, increase in carpool demand is also projected in the cumulative effects scenario compared to the Preferred Alternative with the introduction of a toll on I-90.
- Total net peak and daily cross-lake vehicle travel with the cumulative effects scenario would be lower when compared to the No Build and Preferred Alternatives. However, the number of peak and daily cross-lake HOV vehicle trips is expected to increase while the number of cross-lake general-purpose trips would decrease.
- Cross-lake vehicle trips would decrease at a higher rate than person trips. This means that more people would be moved by fewer vehicles with the cumulative effects scenario than with the No Build and Preferred Alternatives.



- Total cross-lake HOV travel would increase with the cumulative effects scenario compared to the No Build and Preferred Alternatives. This is due to the increasing shift to HOV travel that would result from the implementation of tolls on both SR 520 and I-90.
- Internal traffic circulation on the Eastside would improve. Also, more trips would likely remain on the Eastside due to the introduction of tolls on SR 99 and I-90 and capacity improvements along regional corridors such as I-405 and SR 167. Therefore, the volume across the cross-lake screenline is expected to decrease, while volumes across screenlines on the Eastside are projected to increase with the cumulative effects scenario.



Exhibit 11-8. 2030 Cross-Lake Average Weekday Vehicle Trip Volumes

Roadway Facility	Average Weekday Vehicle Volumes		
	Total Non-HOV ^a	HOV (3+)	Total
2030 No Build Alternative			
SR 522 (West of 61st Avenue NE)	52,550	1,760	54,310
SR 520 (Evergreen Point Bridge)—General-Purpose Lanes	123,040	4,530	127,570
SR 520 (Evergreen Point Bridge)—HOV Lanes	—	—	—
I-90 (West Bridge)—General-Purpose Lanes	164,750	2,090	166,840
I-90 (West Bridge)—HOV Lanes	—	9,320	9,320
I-90 Light Rail	—	—	—
Total Cross-Lake	340,340	17,700	358,040
2030 Preferred Alternative^b			
SR 522 (West of 61st Avenue NE)	53,970	1,520	55,490
SR 520 (Evergreen Point Bridge)—General-Purpose Lanes	111,640	—	111,640
SR 520 (Evergreen Point Bridge)—HOV Lanes	—	9,470	9,470
I-90 (West Bridge)—General-Purpose Lanes	170,150	1,760	171,910
I-90 (West Bridge)—HOV Lanes	—	6,320	6,320
I-90 Light Rail	—	—	—
Total Cross-Lake	335,760	19,070	354,830
2030 Cumulative Effects^b			
SR 522 (West of 61st Avenue NE)	53,430	1,590	55,020
SR 520 (Evergreen Point Bridge)—General-Purpose Lanes	118,960	—	118,960
SR 520 (Evergreen Point Bridge)—HOV Lanes	—	10,080	10,080
I-90 (West Bridge)—General-Purpose Lanes	139,620	300	139,920
I-90 (West Bridge)—HOV Lanes	—	8,200	8,200
I-90 Light Rail	—	—	—
Total Cross-Lake	312,010	20,170	332,180

^a Includes non-HOV and commercial vehicles.

^b Toll model run was executed for mode choice and route diversion effects using trip distribution results from the 2030 Preferred Alternative toll-free model run.

Notes: Model results are bi-directional and for comparison purposes.

The model was validated for the SR 520 corridor. Other regional facilities included in the model were validated as part of the regional modeling process.



Exhibit 11-9. 2030 Cross-Lake Average Weekday Person Trip Volumes

Roadway Facility	Average Weekday Person Trip Volumes				
	Non-HOV	HOV (3+)	Commercial	Transit	Total
2030 No Build Alternative					
SR 522 (West of 61st Avenue NE)	56,490	6,200	3,290	1,840	67,820
SR 520 (Evergreen Point Bridge)—General-Purpose Lanes	123,750	16,020	15,340	3,670	158,780
SR 520 (Evergreen Point Bridge)—HOV Lanes	—	—	—	—	—
I-90 (West Bridge)—General-Purpose Lanes	164,780	7,360	23,070	—	195,210
I-90 (West Bridge)—HOV Lanes	—	33,030	—	1,990	35,020
I-90 Light Rail	—	—	—	41,390	41,390
Total Cross-Lake	345,020	62,610	41,700	48,890	498,220
2030 Preferred Alternative^a					
SR 522 (West of 61st Avenue NE)	58,410	5,340	2,910	1,590	68,250
SR 520 (Evergreen Point Bridge)—General-Purpose Lanes	111,690	—	15,450	—	127,140
SR 520 (Evergreen Point Bridge)—HOV Lanes	—	33,690	—	7,050	40,740
I-90 (West Bridge)—General-Purpose Lanes	172,300	6,190	21,570	—	200,060
I-90 (West Bridge)—HOV Lanes	—	22,270	—	1,990	24,260
I-90 Light Rail	—	—	—	38,360	38,360
Total Cross-Lake	342,400	67,490	39,930	48,990	498,810
2030 Cumulative Effects^a					
SR 522 (West of 61st Avenue NE)	58,090	5,560	2,600	1,570	67,820
SR 520 (Evergreen Point Bridge)—General-Purpose Lanes	121,870	—	13,740	—	135,610
SR 520 (Evergreen Point Bridge)—HOV Lanes	—	36,090	—	7,270	43,360
I-90 (West Bridge)—General-Purpose Lanes	142,790	1,060	18,040	—	161,890
I-90 (West Bridge)—HOV Lanes	—	29,140	—	1,750	30,890
I-90 Light Rail	—	—	—	37,100	37,100
Total Cross-Lake	322,750	71,850	34,380	47,690	476,670

^a Toll model run was executed for mode choice and route diversion effects using trip distribution results from the 2030 Preferred Alternative toll-free model run.

Notes: Model results are bi-directional and for comparison purposes.

The model was validated for the SR 520 corridor. Other regional facilities included in the model were validated as part of the regional modeling process.



Exhibit 11-10. 2030 Cross-Lake Afternoon Peak Period Vehicle Trip Volumes (General-Purpose and HOV)

Roadway Facility	Afternoon Peak Period Vehicle Volumes		
	Total Non-HOV ^a	HOV (3+)	Total
2030 No Build Alternative			
SR 522 (West of 61st Avenue NE)	11,500	290	11,790
SR 520 (Evergreen Point Bridge)—General-Purpose Lanes	25,950	620	26,570
SR 520 (Evergreen Point Bridge)—HOV Lanes	—	—	—
I-90 (West Bridge)—General-Purpose Lanes	36,230	230	36,460
I-90 (West Bridge)—HOV Lanes	—	2,900	2,900
I-90 Light Rail	—	—	—
Total Cross-Lake	73,680	4,040	77,720
2030 Preferred Alternative^b			
SR 522 (West of 61st Avenue NE)	11,700	240	11,940
SR 520 (Evergreen Point Bridge)—General-Purpose Lanes	24,150	—	24,150
SR 520 (Evergreen Point Bridge)—HOV Lanes	—	2,400	2,400
I-90 (West Bridge)—General-Purpose Lanes	36,870	160	37,030
I-90 (West Bridge)—HOV Lanes	—	1,710	1,710
I-90 Light Rail	—	—	—
Total Cross-Lake	72,720	4,510	77,230
2030 Cumulative Effects^b			
SR 522 (West of 61st Avenue NE)	11,530	250	11,780
SR 520 (Evergreen Point Bridge)—General-Purpose Lanes	24,780	—	24,780
SR 520 (Evergreen Point Bridge)—HOV Lanes	—	2,710	2,710
I-90 (West Bridge)—General-Purpose Lanes	30,960	—	30,960
I-90 (West Bridge)—HOV Lanes	—	2,050	2,050
I-90 Light Rail	—	—	—
Total Cross-Lake	67,270	5,010	72,280

^a Includes non-HOV and commercial vehicles.

^b Toll model run was executed for mode choice and route diversion effects using trip distribution results from the 2030 Preferred Alternative toll-free model run.

Notes: Afternoon peak period represents 3 hours.

Model results are bi-directional and for comparison purposes.



Exhibit 11-11. Cross-Lake Afternoon Peak Period Person Trip Volumes (General-Purpose and HOV)

Roadway Facility	Afternoon Peak Period Person Trip Volumes				
	Non-HOV	HOV (3+)	Commercial	Transit	Total
2030 No Build Alternative					
SR 522 (West of 61st Avenue NE)	12,340	1,020	810	630	14,800
SR 520 (Evergreen Point Bridge)—General-Purpose Lanes	26,270	2,220	3,260	1,130	32,880
SR 520 (Evergreen Point Bridge)—HOV Lanes	—	—	—	—	—
I-90 (West Bridge)—General-Purpose Lanes	36,030	830	5,440	—	42,300
I-90 (West Bridge)—HOV Lanes	—	10,370	—	990	11,360
I-90 Light Rail	—	—	—	13,940	13,940
Total Cross-Lake	74,640	14,440	9,510	16,690	115,280
2030 Preferred Alternative^a					
SR 522 (West of 61st Avenue NE)	12,690	830	680	530	14,730
SR 520 (Evergreen Point Bridge)—General-Purpose Lanes	23,950	—	3,760	—	27,710
SR 520 (Evergreen Point Bridge)—HOV Lanes	—	8,650	—	2,350	11,000
I-90 (West Bridge)—General-Purpose Lanes	37,470	570	4,710	—	42,750
I-90 (West Bridge)—HOV Lanes	—	6,050	—	990	7,040
I-90 Light Rail	—	—	—	12,770	12,770
Total Cross-Lake	74,110	16,100	9,150	16,640	116,000
2030 Cumulative Effects^a					
SR 522 (West of 61st Avenue NE)	12,620	880	570	530	14,600
SR 520 (Evergreen Point Bridge)—General-Purpose Lanes	25,590	—	2,870	—	28,460
SR 520 (Evergreen Point Bridge)—HOV Lanes	—	9,840	—	2,470	12,310
I-90 (West Bridge)—General-Purpose Lanes	31,390	—	4,410	—	35,800
I-90 (West Bridge)—HOV Lanes	—	7,380	—	870	8,250
I-90 Light Rail	—	—	—	12,170	12,170
Total Cross-Lake	69,600	18,100	7,850	16,040	111,590

^a Toll model run was executed for mode choice and route diversion effects using trip distribution results from the 2030 Preferred Alternative toll-free model run.

Notes: Afternoon peak period represents 3 hours.

Model results are bi-directional and for comparison purposes.



Chapter 12—Traffic and Parking Improvement Guidelines

What is in this chapter?

This chapter describes jurisdiction guidelines for traffic and parking improvements and summarizes the traffic improvement measures and design modifications for the SR 520, I-5 to Medina project. WSDOT will coordinate with local jurisdictions to determine if traffic and parking improvements are required for the project and how they should be implemented. Agreements with jurisdictions may supersede jurisdiction-specific guidelines for project-related improvements.

How have agency policies guided development of the Final EIS Preferred Alternative?

A Draft EIS and addendum were completed in August 2006 for the SR 520, I-5 to Medina project. The Draft EIS addendum included design options for a Montlake area interchange between I-5 and the western shore of Lake Washington. The public response to the proposed design options was not favorable, forcing the state to reconsider the configuration of the Montlake area interchange option near Montlake Boulevard and SR 520.

The Washington State Legislature passed ESSB 6099 during the 2007 legislative session. ESSB 6099 directed the Office of Financial Management to hire a mediation group to facilitate an agreement on the interchange configuration on the west approach of SR 520. The goal of mediation was to select an interchange option for the 6-Lane Alternative configuration that would be analyzed further in the SDEIS.



In January 2010, WSDOT published the SDEIS that evaluated the three design options developed in the mediation process for the Montlake interchange area. In April 2010, WSDOT announced a Preferred Alternative for the floating bridge and Seattle interchanges.

The Preferred Alternative was developed based on public and agency comment received on the SDEIS. The Preferred Alternative includes:

- Four general-purpose lanes and two new lanes dedicated to transit and carpools
- An urban interchange at Montlake Boulevard, with an extended lid to maximize open space and pedestrian/bicycle connections
- A new bascule bridge and dedicated transit/carpool lanes across the Montlake Cut
- A path for bicyclists and pedestrians across the lake on the north side of the floating bridge
- Investments to treat stormwater and reduce traffic noise

Around the same time, the Washington State Legislature passed ESSB 6392 during the 2010 legislative session to convene a workgroup to refine specific elements of the Preferred Alternative. The workgroup consisted of WSDOT, City of Seattle, King County, UW, Sound Transit, and other designees. The workgroup was supported by two technical groups: the Technical Coordination Team and the Montlake Triangle Charrette. These groups of technical experts from local governments and agencies discussed transit connections and design refinements in great detail (WSDOT 2010g). The Technical Coordination Team provided technical review, analyzed specific topics, and developed preliminary recommendations for workgroup consideration. The Montlake Triangle Charrette recommended design options to begin developing the Montlake Triangle into a multimodal transit hub—a key element identified in the 2008 SR 520 High Capacity Transit Plan (WSDOT 2008c).

The recommendations made during the ESSB 6392 process are consistent with the environmental documentation and any refinements that affect the project footprint were addressed in the Final EIS. As the project design advances and moves into construction, WSDOT and the City of Seattle will continue to work with the communities and the public to implement the ESSB 6392 Workgroup recommendations.



How were project guidelines for traffic and parking improvements developed?

WSDOT design standards and Seattle concurrency thresholds for local traffic operations and parking policies were reviewed to establish project standards and thresholds for traffic and parking improvements. These standards and thresholds are described below.

WSDOT Standards

WSDOT design guidelines for traffic operations, which are based on LOS grades, are discussed in this section. WSDOT has acknowledged that meeting design standards for year 2030 in an urban environment may be difficult. However, the design standards should be used as first level guidance for alternative development with the acknowledgement that the final design decisions could be based on agreements between WSDOT and local jurisdictions.

Highway Main Line

SR 520 is a designated Highway of Statewide Significance (HSS). WSDOT uses an LOS standard of D as the minimum operational standard for an HSS corridor. Under this standard, LOS D or better is the preferred operating condition for highways in urban areas.

Arterial Intersections at Ramp Terminals

WSDOT recommends that traffic operation improvements be considered if an existing ramp terminal intersection operates at LOS E or worse and is negatively affected by the project (compared to the No Build Alternative).

New intersections, such as the intersection at the terminus of the westbound off-ramp at 24th Avenue East, are typically designed to operate at LOS D for the horizon year. WSDOT would consider additional improvements if queue spillback from an on- or off-ramp were to exceed the available storage and affect freeway operations.

WSDOT can also develop agreements with local jurisdictions that modify the above recommendations for new and existing intersections. In the case of the Preferred Alternative, this was accomplished through the ESSB 6392 Workgroup process.



Level-of-Service Standards for Regionally Significant Highways

Montlake Boulevard is an urban arterial connecting the Montlake/Madison Park/Capitol Hill neighborhoods to the University District/Sandpoint/Laurelhurst neighborhoods. Montlake Boulevard (also known as SR 513) is designated as a Non-Highway of Statewide Significance (Non-HSS) by WSDOT and a Regionally Significant State Highway (RSSH) by PSRC.

Based on its classification as an RSSH, Montlake Boulevard has an LOS threshold of LOS E, which calls for improvements to reduce traffic congestion when the afternoon peak hour falls below LOS E.

Coordination with Local Jurisdictions

Design standards and concurrency thresholds from local jurisdictions were also considered as the project effects were evaluated. WSDOT coordinates with local jurisdictions to determine what types of traffic improvement measures should be included in the project and how the measures will be implemented.

Some jurisdictions require that local development projects conform to the jurisdiction's concurrency and maximum operational thresholds. Local development projects include housing, condominium, apartment, and business development that generate varying levels of traffic into the local street network.

The SR 520, I-5 to Medina project is not considered a local development project because it would not include any new facilities that *generate* vehicle trips within city limits. Therefore, the criteria used for identifying local street traffic improvement measures for project effects along the corridor do not directly correlate to specific jurisdictions' concurrency thresholds.

City of Seattle Concurrency Guidelines

Seattle's *Comprehensive Plan: Toward a Sustainable Seattle* (City of Seattle 2005) divides the city into more than 20 subareas for which average screenline traffic operations are measured. To determine whether a project meets or exceeds Seattle's concurrency thresholds, a project's V/C ratios across screenlines would be calculated.

Each of the screenlines identified for the SR 520, I-5 to Medina project has a V/C ratio threshold of 1.2. The V/C ratio of 1.2 indicates that the traffic demand crossing the screenline may be no more than 20 percent



greater than the capacity; this ratio is calculated for both morning and afternoon peak hours.

Comprehensive Plan Policy T67 states, “When the calculated LOS for a screenline approaches the LOS standard for that screenline, first pursue strategies to reduce vehicular travel demand across the screenline before increasing the operating capacity across the screenline.”

What are SR 520 Program guidelines for traffic and parking improvements?

The SR 520 Program guidelines for traffic operations indicate that the project should result in operations similar to or better than the No Build Alternative within the study area. Therefore, the project will not require improvements to traffic operations that are unrelated to direct project effects.

Local

Exhibit 12-1 presents the project’s guidelines for determining if traffic improvement measures are necessary at a local level. These guidelines were developed as a part of the transportation methodology report for the project.

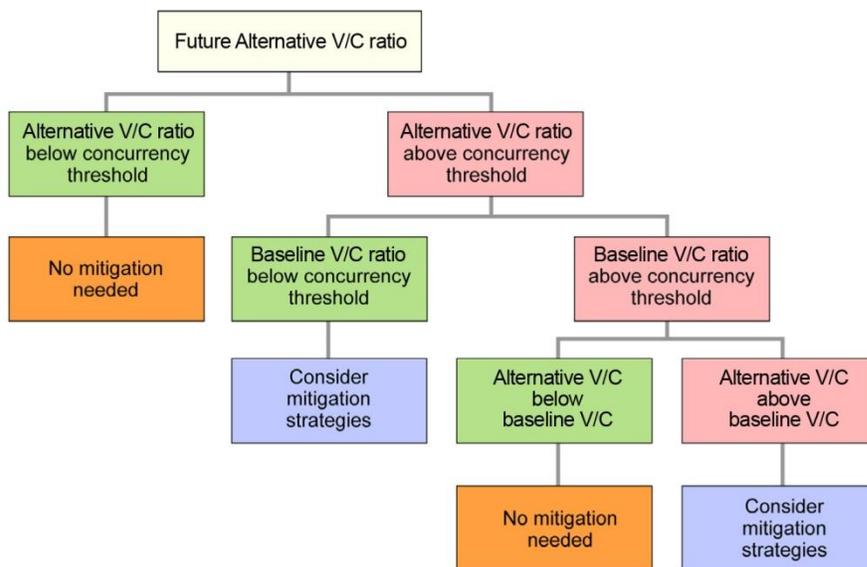


Exhibit 12-1. Guidelines for Considering Local Traffic Operation Improvements

Based on City of Seattle criteria, the V/C ratios across a screenline or within a subarea must be below a designated threshold. Because the analysis for the SR 520, I-5 to Medina project focused on groups of



individual intersections, the screenline level of information was not prepared.

WSDOT adapted the City's criteria for use on the project by determining the average of the maximum lane group V/C ratio of each intersection. This resulted in an interchange area maximum V/C ratio. V/C ratios were obtained from analysis provided in the *Highway Capacity Manual* report of the Synchro analysis tool (Transportation Research Board 2000).

The interchange area maximum values were then compared to the City's screenline V/C thresholds. This method results in a more conservative analysis than the City's methodology because it emphasizes the worst approach of each intersection within the interchange area. Exhibit 12-2 shows the results of that comparison.

The No Build and Preferred Alternative have similar maximum v/c ratios and are below the City's adopted threshold of 1.2.

Exhibit 12-2. Montlake Boulevard/Lake Washington Boulevard Interchange Area Maximum V/C Ratios

Peak Hour	Year 2030	
	No Build Alternative	Preferred Alternative
AM	0.76	0.77
PM	0.93	0.92

Parking

Local jurisdiction parking policies focus on managing congestion by encouraging commuters to choose alternative modes of travel other than single-occupant vehicles. However, the importance of providing enough parking to sustain economic vitality in commercial areas is acknowledged. The guidelines for improving parking availability in conjunction with a project are not as clearly defined as those for improving traffic operations.

The parking policies allow local jurisdictions to provide input on the type of parking improvements that may be warranted when existing parking is affected by a project. Negative effects on the undesignated use of public right-of-way for parking would not be considered a cause for new parking improvements.

The remainder of this chapter identifies areas affected by the SR 520, I-5 to Medina project and describes proposed improvements to traffic and parking conditions. WSDOT will discuss these proposed



improvements with the City of Seattle prior to design and incorporation into the project.

What has the project done to avoid or minimize negative effects?

Continued growth over the past two decades has resulted in worsening traffic levels and congestion on the SR 520 corridor. With the No Build Alternative, traffic levels and congestion on the SR 520 corridor would continue to degrade. One of the purposes of the project's Preferred Alternative is to address the negative effects of the No Build Alternative by building new transportation facilities that improve mobility for people and goods on the SR 520 corridor. By design, the Preferred Alternative improves mobility and safety and decreases congestion in the corridor; thus, it avoids negative transportation effects.

After the announcement of the Preferred Alternative in April 2010 as part of ESSB 6392 and the general design refinement process, the 6392 Technical Coordination Team proposed design modifications for the Preferred Alternative that would further improve the mobility benefits. Design modifications included the number of lanes needed for on- and off-ramps, and intersection configurations and stop control adjacent to the corridor. Following are some examples of design modifications incorporated into the Preferred Alternative that minimize negative effects on transportation.

- Provides access to Montlake lid transit stops for SR 520 buses during off-peak hours
- Removes the Lake Washington Boulevard ramps, reducing traffic volumes traveling through the Arboretum compared to the No Build Alternative
- Provides a wider (18-foot) pedestrian path along the new bascule bridge across the Montlake Cut
- Relocates transit stops on Montlake Boulevard to minimize walk distance to new bus connections on the Montlake lid
- Provides an alternative route for pedestrians and bicyclists on the new path under SR 520, allowing for separation between nonmotorized modes and vehicular traffic on 24th Avenue East



What project design refinements could further minimize negative effects?

WSDOT reviewed the operational results for the various signalized intersection networks presented in Chapters 5 and 6 to determine if additional traffic improvement measures were warranted. The effects of the Preferred Alternative on nonmotorized facilities (Chapter 7) and parking (Chapter 9) were also reviewed. The results of these reviews are reported below for traffic operations, nonmotorized facilities, and parking.

Traffic Operations

The Montlake Boulevard interchange area V/C ratios are under the City of Seattle threshold of 1.2.

In addition to reviewing project effects for the overall interchange area, WSDOT reviewed individual intersection operations to identify where additional design changes could be considered based on its LOS guidelines.

In the AM peak hour, traffic operations at the eastbound ramps intersection with Montlake Boulevard East/East Lake Washington Boulevard/SR 520 are slightly worse with the Preferred Alternative (LOS F, 10 percent over capacity) compared to the No Build Alternative (LOS E, 5 percent over capacity). The operations at this intersection may be included in further discussions with the City of Seattle such as coordinating with the City to develop the City's traffic management plan for this area. Because the comparison does not include the congestion effects from the SR 520 corridor, the Preferred Alternative would likely operate better than the No Build Alternative due to the substantial improvements to the SR 520 corridor.

Nonmotorized Facilities

The Preferred Alternative would result in the loss of 54 bicycle locker spaces and 53 bicycle rack spaces near the existing Montlake Freeway Transit Station. WSDOT, Metro, and Sound Transit will continue to work together to determine the best way to replace these bicycle parking facilities.



Parking

Exhibit 12-3 identifies the parking that exists today and capacity lost with the project. Parking may not be replaced in kind at Bagley Viewpoint and the NOAA facility due to a shortage of space available for replacement. Coordination and discussion among WSDOT, the City of Seattle, and affected land owners are required to determine the actual parking measures that may be implemented as part of the project. For instance, WSDOT is coordinating with the City of Seattle to further develop design details for the lids, which could include replacement parking for the loss of 10 parking spaces at Bagley Viewpoint.

Exhibit 12-3. Existing Parking and Capacity Changes with the Project

Location	Existing Capacity	Preferred Alternative Parking Supply	Capacity Reduction	Comments
Bagley Viewpoint (Delmar Drive East and East Roanoke Street)	10	0	10	Potential replacement parking to be provided on 10th and Delmar lid
NOAA Northwest Fisheries Science Center (2725 Montlake Boulevard East)	132 ^a	94	38	38 spaces removed from WSDOT property
MOHAI (2700 24th Avenue East)	150	26	124	MOHAI to be relocated; 26 spaces retained for East Montlake Park

^a Parking supply includes 38 spaces located on WSDOT right-of-way under the existing Portage Bay Bridge.

How can the project minimize negative effects during construction?

Similar to any large construction project, some level of traffic congestion is expected in the study area as a result of construction activities. The project construction plans will include staging techniques and temporary improvements to reduce the potential construction effects on traffic. These plans include specific restrictions on construction methods, prescribed work times for construction to avoid peak travel periods, and temporary roadway improvements. Details about construction methods and transportation effects are in the Construction Techniques and Activities Discipline Report Addendum and Errata (WSDOT 2011b) and in Chapter 10 of this report.

These methods serve to manage the timing of construction activities and alleviate capacity constraints through the construction area. In



addition to these physical methods, the strategies described in this section may be used to manage the flow of traffic and minimize the traffic demand during construction.

Safety

The FHWA published the Work Zone Safety and Mobility Rule on September 9, 2004, in the Federal Register (69 FR 54562). In accordance with this rule, the project would develop a temporary traffic control plan. This plan would address traffic safety and control throughout the work zone.

Traffic Management Plan

The contractor selected to construct the project will be required to prepare a Traffic Management Plan (TMP) to be approved by WSDOT, in coordination with the City of Seattle, to ensure that construction effects on local streets, property owners, and businesses are minimized. The TMP will include, as a minimum, the following measures:

- Details on required street and lane closures (duration and timing)
- Proposed detours and signing plans (for vehicles, pedestrians, freight, and bicycles)
- Measures to minimize impacts on transit operations and access to/from transit facilities (in coordination with transit service providers)
- Traffic enforcement measures, including deployment of police officers
- Coordination with emergency service providers
- Measures to minimize traffic and parking impacts from construction employees
- Measures to minimize effects of truck traffic for equipment and material delivery
- Measures to minimize disruption of access to businesses and properties
- Measures to minimize conflicts between construction activities and traffic during events (this may or may not include stopping construction activities during certain hours)
- Public outreach communication plan



Work Zone Management Techniques

Other options for construction traffic management include developing and implementing various work zone management strategies. These strategies may include using Intelligent Transportation Systems (ITS), traveler information, real-time work zone monitoring, traffic incident management, and enforcement techniques.

Traveler Information Systems

Traveler information systems are designed to inform the public of construction activities and transportation system operating conditions. They allow drivers to avoid traffic problems, save time, and reduce frustration. Examples include, but are not limited to, dynamic and variable message signs, highway advisory radio, e-mail alerts, and project Web sites that provide real-time information on traffic conditions around construction and outlying areas. The traveler information system already in place will be used for this project, which includes all the above-mentioned examples, except for a project-specific Web site with real-time information.

Incident Management Systems

WSDOT's current incident response program will continue to be used for this project. Incident management systems are planned and coordinated strategies to detect, respond to, and remove traffic incidents to restore traffic capacity as safely and quickly as possible.

The process of restoring traffic capacity involves a number of public and private sector partners, including law enforcement, fire and rescue, emergency medical services, transportation, public safety communications, emergency management, towing and recovery services, hazardous material contractors, and traffic information media. Incident management systems can help reduce impacts during construction for the following types of incidents:

- Incident clearance time: 38 to 66 percent
- Emergency vehicle response time: 20 to 30 percent
- Primary crashes: 35 to 40 percent
- Secondary crashes: 30 to 50 percent

Active Traffic Management

Active traffic management technology dynamically controls traffic based on the prevailing conditions. Using integrated systems and a



coordinated response, both recurrent and non-recurrent congestion can be managed to improve roadway safety and traffic flows. Potential tools used as part of an active traffic management system include:

- **Overhead signs**—to display variable speed limit and real-time traffic information over each lane
- **Variable speed limit**—to dynamically and automatically reduce speed limits approaching areas of congestion, collisions, or special events
- **Queue warning**—to warn motorists of downstream queues (or backups) and direct through traffic to alternative lanes
- **Travel time signs**—to display estimated travel time and other condition reports as well as communicate travel and traffic conditions; WSDOT currently uses variable message signs to post travel time information

Construction Worker Shuttle Service

Construction worker shuttle service moves workers from outlying temporary or permanent parking facilities into the work zones, thereby reducing the number of vehicles arriving and leaving the work zone areas.

Special Events

Several strategies would be used to help mitigate construction activities during special events, such as those at the UW:

- Tailor special event traffic management plans to consider project construction congestion, including transit priority and special event shuttle services
- Increase shuttle services so access is provided to and from events
- Provide event discounts with the use of transit shuttles
- Implement additional event date/time-specific parking restrictions
- Add police officer traffic control as needed
- Provide a Web site and other outreach regarding construction and travel options to special events that are accessible and understandable
- Restrict construction activities during major events



Transportation Demand Management

Transportation demand management (TDM) includes a variety of strategies that provide alternatives to driving in single-occupant vehicles, particularly during peak traffic periods. TDM programs include outreach to increase public awareness about travel options and services, including incentives that help people choose a new travel option. They even provide new travel options such as vanpools to encourage a shift away from travel in single-occupant vehicles. TDM is implemented in a regional context through a variety of ongoing state and local jurisdiction TDM programs.

Purpose of TDM During Construction

The SR 520, I-5 to Medina project will be built over a period of approximately 7 years; as with any major project, construction activities will affect the normal travel patterns of road users within the project vicinity. TDM may be used, in addition to other techniques, to minimize these effects by reducing the number of vehicle trips through the study area.

TDM and Transit

The goal of TDM is to increase the efficiency of travel on roadways by moving more people in fewer vehicles. Transit is typically a primary consideration for any comprehensive TDM program because it is a reliable mode of moving many people in fewer vehicles. This is particularly true in urban areas with well-established transit systems in place. The people-moving capacity of transit is necessary for many TDM strategies to be successful. WSDOT is engaged in coordination with Metro and Sound Transit to develop construction management plans that maintain the reliability of transit as an alternative to driving. WSDOT will continue this coordination throughout construction.

Implementing TDM During Construction

A trip reduction plan is one part of the overall plan for managing traffic during construction. WSDOT is developing a plan focused on keeping people moving through congested areas during construction. As part of the construction traffic management plan, WSDOT will evaluate a set of temporary TDM and transit enhancements to provide additional travel options to people who travel through the study area.

TDM is not a physical part of the roadway or a requirement of the construction methods like many of the other measures that are used to minimize construction effects. Instead, it seeks to improve the efficiency



with which people use the roadway. In order for demand management to be effective on a specific project, it must be implemented in a manner that reaches out to the primary users of the affected roadway facility. Because SR 520 is classified as an RSSH, many of the users originate in communities well beyond the project limits and travel to destinations both within and beyond the project vicinity.

Many jurisdictions where SR 520 users live and work have existing TDM programs. Bellevue, Kirkland, Redmond, and Seattle have established programs that provide travel options to commuters. King County also provides these services through its own efforts in addition to operating a popular vanpool program. WSDOT supports local jurisdictions through its investment in a variety of strategies and through the Commute Trip Reduction (CTR) program.

WSDOT will focus on supporting existing programs rather than implementing an entirely new program during the construction period. Therefore, a significant aspect of the project TDM strategy will involve communication and cooperation with local experts who are already implementing successful programs. WSDOT will coordinate with jurisdictions affected by SR 520 to offer services to travelers through programs they already use. This approach will encourage continuity in the services provided to users. When construction is complete, it will allow a streamlined transition of project-related TDM services back to the ongoing programs managed by the local jurisdictions.

The project will include a communications plan to ensure that both the implementers and users of TDM programs receive the information they need about construction activities on the project. Prior to construction, project personnel will work with WSDOT staff to find out who needs to be engaged in the process.

Conditions often change during construction of complex projects, and it will be necessary to communicate changes quickly and accurately to those who are affected. The TDM strategy will include a feedback process to constantly monitor its effectiveness. The feedback will be used to identify improvement opportunities and under-performing elements so that adjustments can be made to ensure that the project meets its goals.

WSDOT is working to develop a general strategy for trip reduction during construction and will further refine the strategy prior to construction. The strategy will include a range of potential trip



reduction options based on the estimated construction effects on traffic for the Preferred Alternative. The strategy will be coordinated with other traffic management techniques tailored for construction areas such as temporary roadway improvements and prescribed construction methods. Trip reduction will be used to maximize traveler options in areas where temporary capacity improvements are not possible.



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