

# Alternative S6: Southbound I-5 Collector-Distributor Road Improvements

## 1. What is the project?

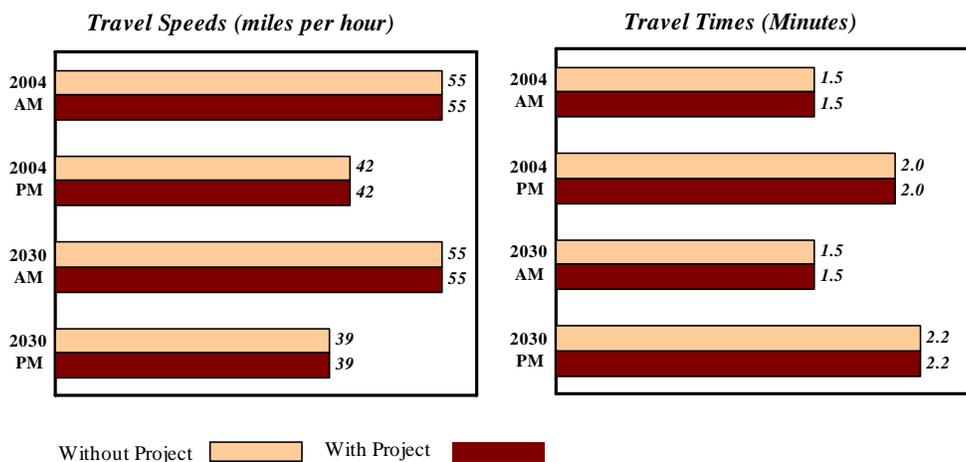
The project would add a third lane along the southbound I-5 Collector-Distributor (CD) road beginning at the I-90 westbound on-ramp and ending before S Spokane Street on the I-5 mainline. The adjacent figure shows the project area.

## 2. What are the potential benefits and impacts of this project?

The existing lane configuration along the southbound I-5 CD road forces the I-90 westbound traffic to merge with the I-90 eastbound/4th Avenue S on-ramp traffic. This creates severe queues along the I-90 westbound ramp. With an added lane, the project allows the I-90 westbound on-ramp traffic to continue south along the I-5 CD and I-5 mainline without forcing the traffic to merge with other ramps, significantly improving traffic operations for the I-90 westbound traffic. This project has limited benefit to the traffic operations along the southbound I-5 CD itself. The charts below show the resulting average travel speeds and travel times along the I-5 study segment during the peak 5-hour morning and evening commute periods.



Study Segment - Southbound I5 CD: Begin to End (1.4 miles)



## 3. What are the implementation challenges with this project?

Constructing the additional lane would require major widening of existing structures and would most likely be expensive.

# Alternative R1: Provide a Two-Lane Connection between the Reversible Lanes and the I-5 Mainline

## 1. What is the project?

The project would add a second lane along the south end portion of the reversible lanes to provide two lanes to and from the I-5 mainline. The adjacent figure shows the project area.

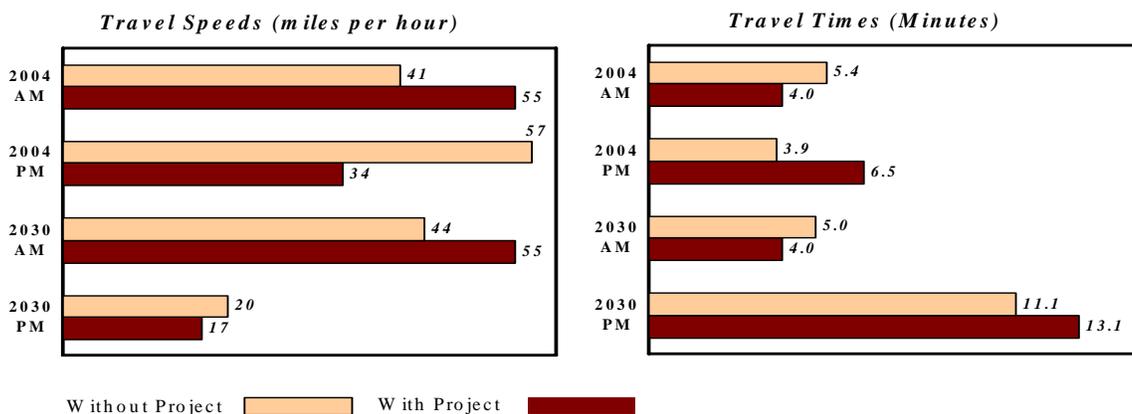
## 2. What are the potential benefits and impacts of this project?

During the AM peak period, the project would provide a two-lane connection to the I-5 mainline south of the Cherry/Columbia off-ramp. This would improve travel speeds and travel times significantly along the section of reversible lanes south of NE 42nd Street.

During the PM peak period, the project would provide a two-lane exit to the reversible lanes from the northbound I-5 mainline and would improve the traffic operations by 40 to 50 percent along the section of I-5 mainline between S Spokane Street and Seneca Street. The decrease in traffic volume through this roadway section of I-5 mainline corridor results in a higher vehicle, discharge flow rate, lower travel speeds, and increased travel times along the section of reversible lanes south of NE 42nd Street. The charts below show the resulting changes in average travel speeds and travel times along the I-5 reversible lanes and the northbound I-5 mainline during the peak 5-hour morning and evening commute periods.

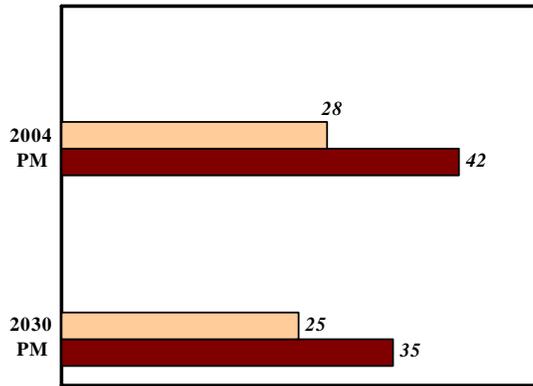


Study Segment - I-5 Reversible Lanes: Southend to NE 42nd Street (3.7 miles)

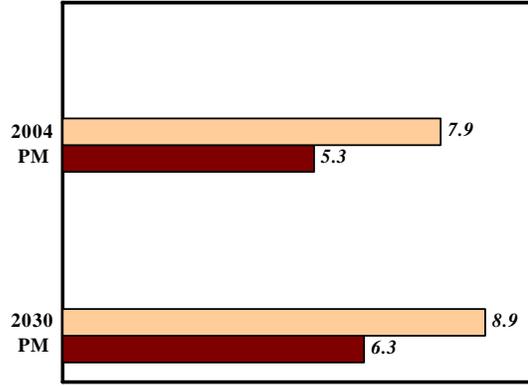


**Study Segment - I5 Northbound Mainline: I90 to SR 520 (3.7 miles)**

*Travel Speeds (miles per hour)*



*Travel Times (Minutes)*



Without Project  With Project

**3. What are the implementation challenges with this project?**

The project costs for this project would be high because the area is very constrained and there may not be enough space to widen the existing one-lane tunnel section. Either a deeper tunnel or reconstruction of the adjacent roadways and structures might be required.

# Alternative R2: Add a High-Occupancy Vehicle Ramp Connection between the Reversible Lanes and SR 520

## 1. What is the project?

The project would add a high-occupancy vehicle (HOV) ramp connection between the I-5 reversible lanes and SR 520. The ramp would be an add lane to the reversible roadway in the morning and a drop lane in the evening. This connection is also being considered as part of the SR 520 HOV and Bridge Replacement Project. The project would also narrow the I-5 reversible roadway from four to three lanes for approximately 1,500 feet north of SR 520. The adjacent figure shows the project area.

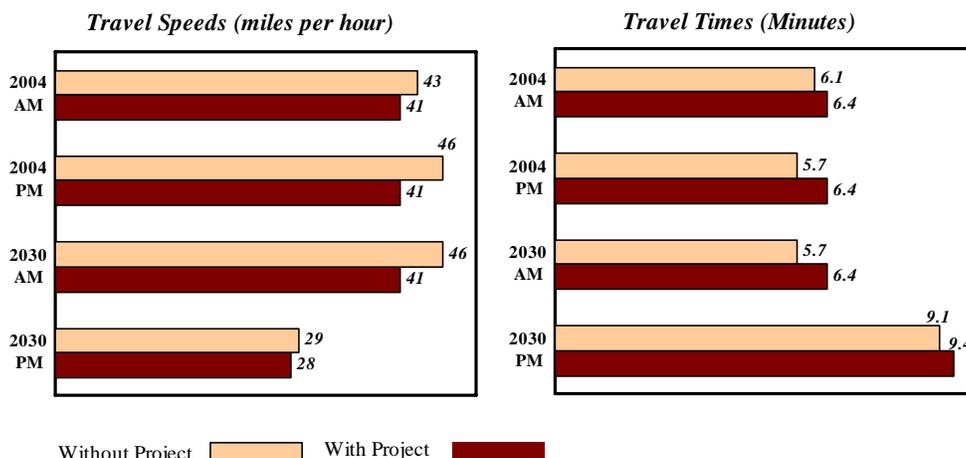


## 2. What are the potential benefits and impacts of this project?

The project would slightly increase the congestion along the I-5 reversible lanes south of Ravenna Boulevard due to an increase of approximately 400 vehicles per hour on the reversible lanes. Despite the increased congestion, this connection would benefit transit vehicles on SR 520 by providing a faster and more direct route to Downtown Seattle by avoiding congestion on the I-5 mainline. The charts below show the resulting impacts to average travel speeds and travel times along the I-5 reversible lanes during the peak 5-hour morning and evening commute periods.

The project would slightly improve traffic operations along the I-5 mainline segment between Seneca Street and SR 520 due to a decrease of approximately 400 vehicles per hour.

Study Segment - I5 Reversible Lanes: Southend to Ravenna Boulevard (4.4 miles)



## 3. What are the implementation challenges with this project?

The project costs would be high, and implementation would be more beneficial in conjunction with added HOV lanes in the SR 520 corridor.

# Alternative R3: Modify Stewart and Cherry/Columbia Ramps

## 2. What is the project?

The project would allow only high-occupancy vehicles (HOVs) to access the Stewart Street ramp but would allow all vehicular traffic to access the Cherry/Columbia ramp along the I-5 reversible lanes. The adjacent figure shows the project area.

## 3. What are the potential benefits and impacts of this project?

During the morning commute period, the capacity of the reversible lanes south of Stewart Street would be significantly increased because the project would open the roadway segment to all vehicular traffic. This would considerably improve traffic operations along the reversible lanes south of NE 42nd Street. However, drivers would experience higher delays and longer queue lengths at intersections near the 5th Avenue/Cherry/Columbia ramp terminus. The vehicular delays at local intersections along Denny Way and Stewart Street with the project would be comparable to conditions without the project.

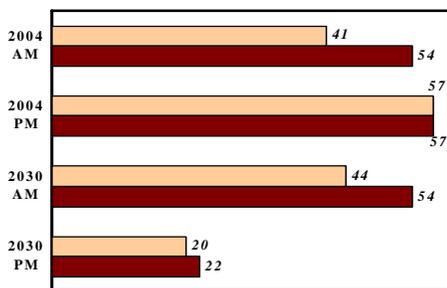
During the evening commute period, the project would cause negligible differences in traffic operations along the reversible lanes south of NE 42nd Street.

The charts below show the resulting changes in average travel speeds and travel times along the I-5 reversible lanes during the peak 5-hour morning and evening commute periods. The following figure shows level of service and delay at local study intersections during the AM peak hour.

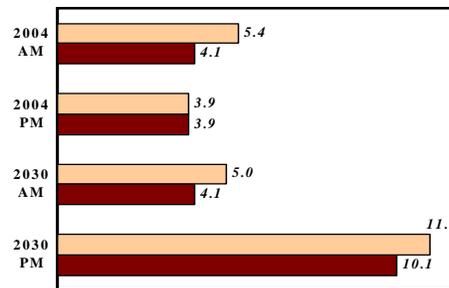


Study Segment - I-5 Reversible Lanes: Southend to NE 42nd Street (3.7 miles)

Travel Speeds (miles per hour)



Travel Times (Minutes)

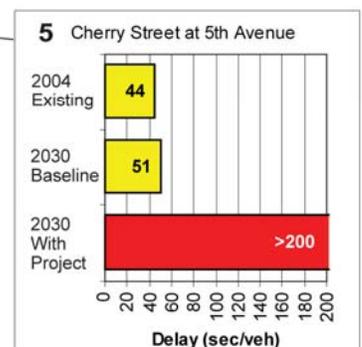
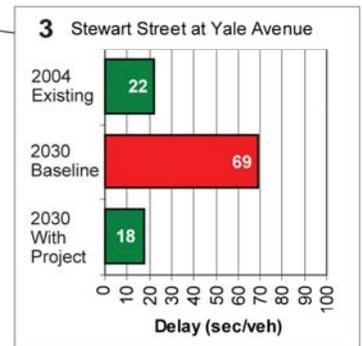
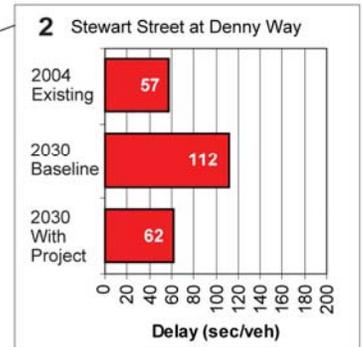
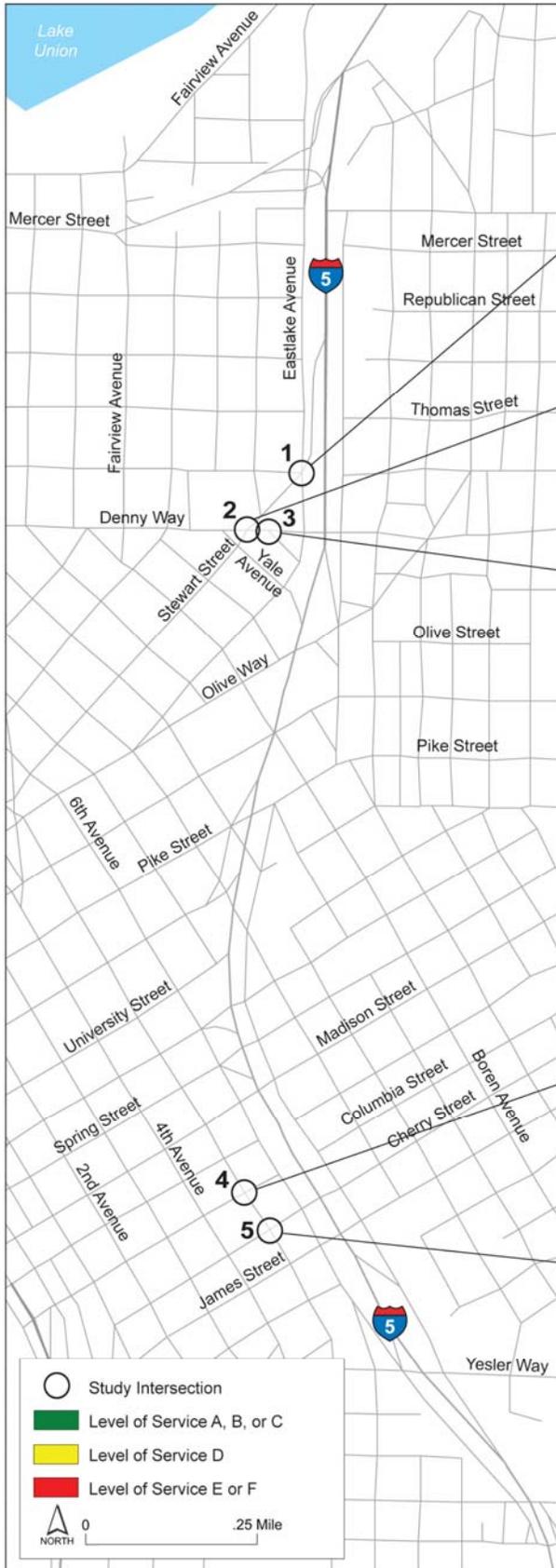


Without Project  With Project

## 4. What are the implementation challenges with this project?

Traffic congestion on the local streets near the 5th Avenue/Cherry/Columbia ramp terminus would increase. Improvements to mitigate this impact could be considered but may not be possible.

### Alternative R3 Weekday AM Peak Hour Level of Service and Delay Results



# Alternative R4: Modify Stewart and Pine/Pike Ramps

## 1. What is the project?

The project would allow only high-occupancy vehicles (HOVs) to access the Stewart Street ramp but would allow all vehicular traffic to access the Pine and Pike Street ramps along the I-5 reversible lanes. This project assumes that Pike Street would be converted to a two-way roadway between 9th Avenue and 5th Avenue. The adjacent figure shows the project area.

## 2. What are the potential benefits and impacts of this project?

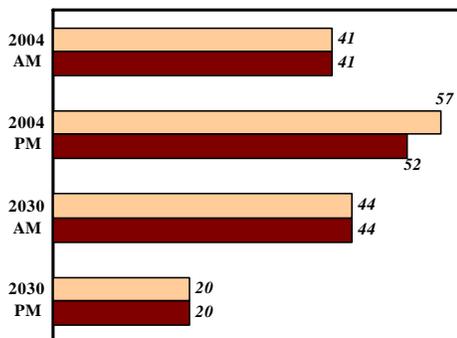
The project would cause a negligible difference in traffic operations along the reversible lanes south of NE 42nd Street. Vehicle delays and queues in the Stewart Street corridor would be significantly reduced. Vehicle delays and queues along the Pike Street corridor between 5th Avenue and 9th Avenue would significantly increase during both morning and evening peak periods.

The charts below show the resulting changes in average travel speeds and travel times along the I-5 reversible lanes during the peak 5-hour morning and evening commute periods. The figures on the following pages show intersection level of service and delay for some of the affected local streets during the AM and PM peak hours.

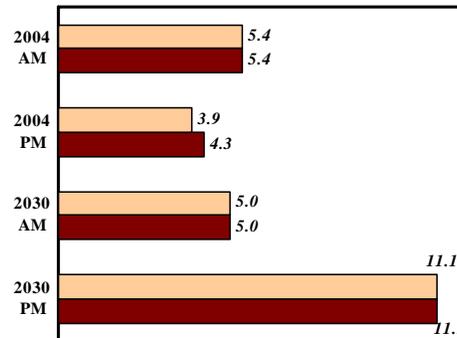


Study Segment - I5 Reversible Lanes: Southend to NE 42nd Street (3.7 miles)

Travel Speeds (miles per hour)



Travel Times (Minutes)

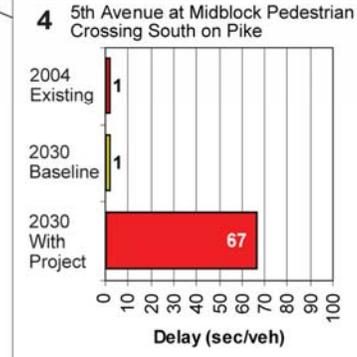
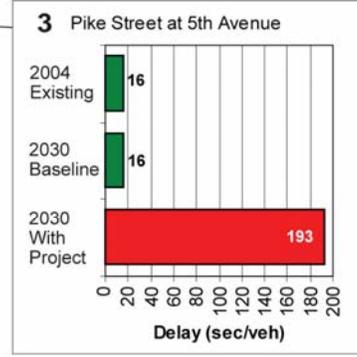
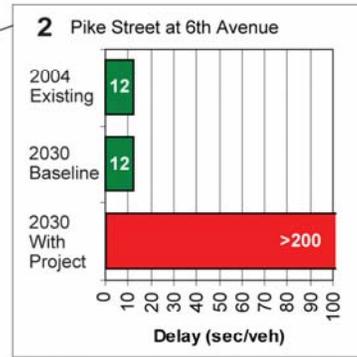
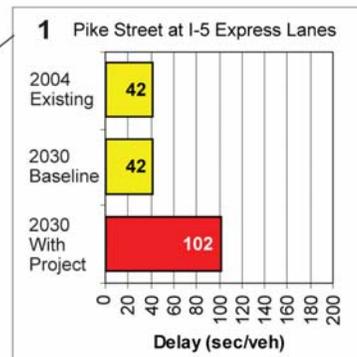
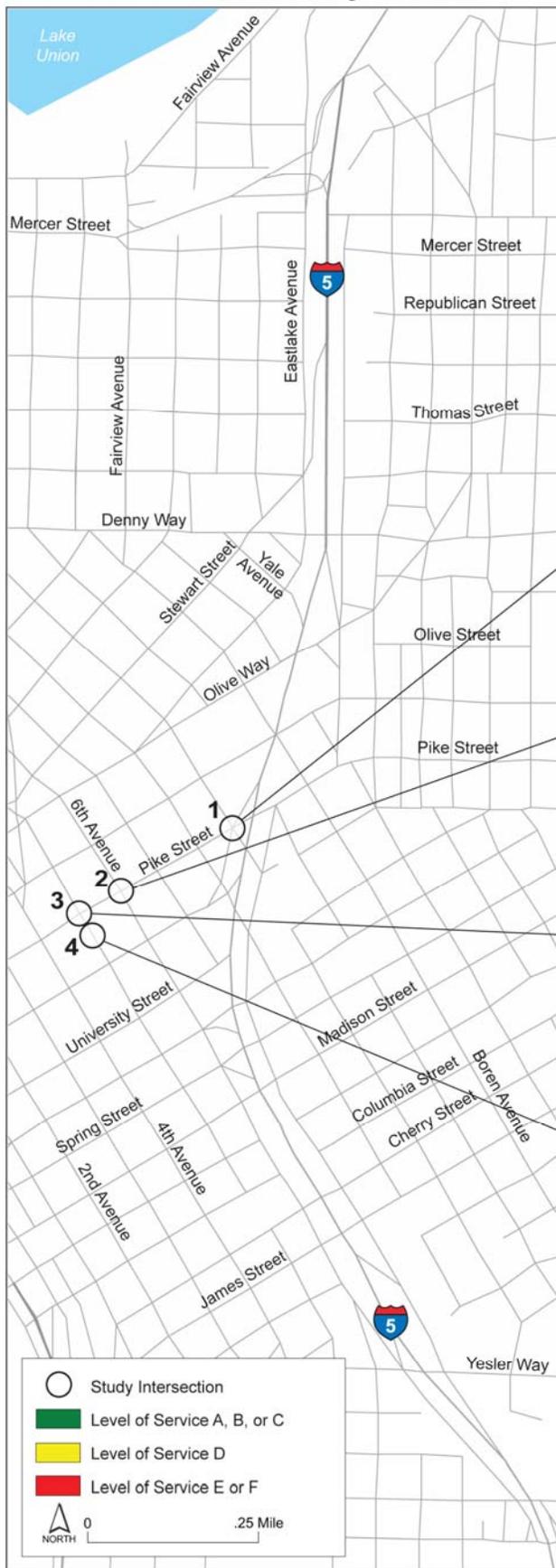


Without Project  With Project

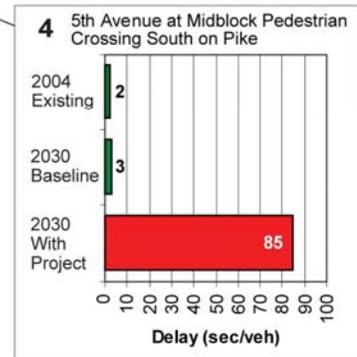
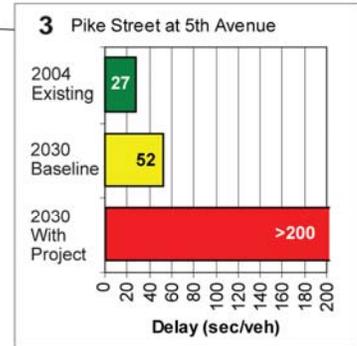
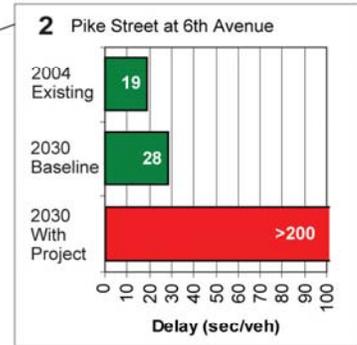
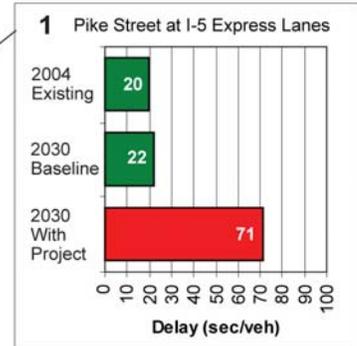
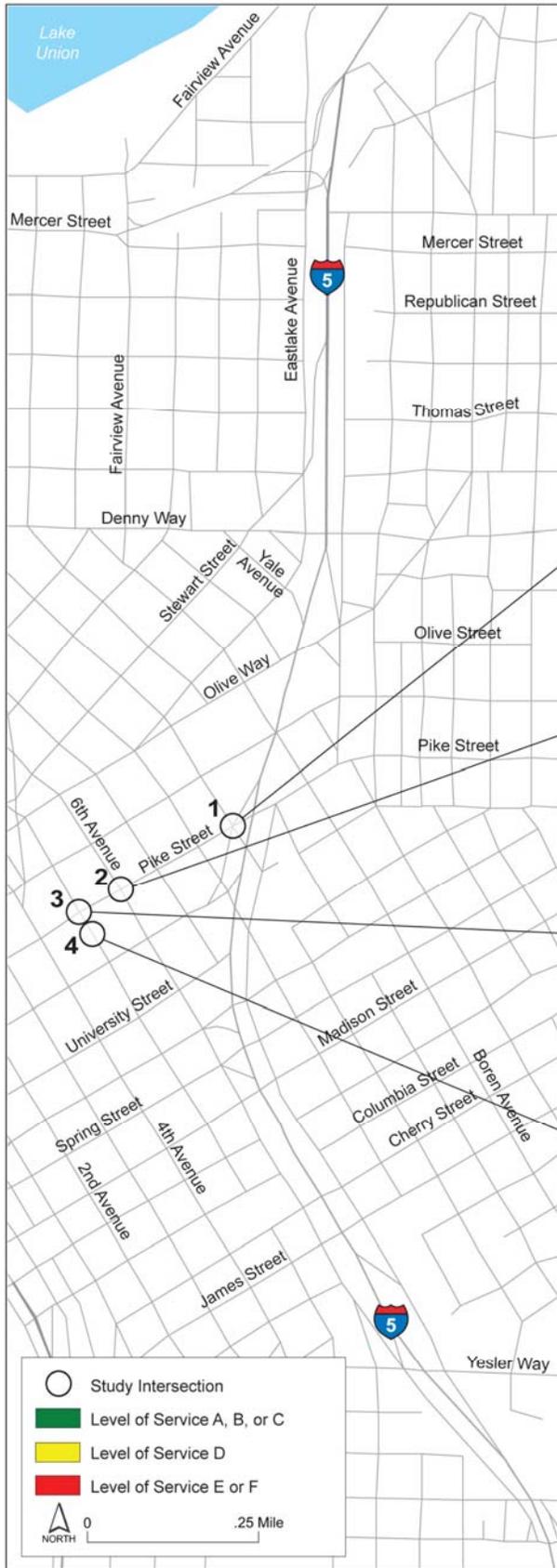
## 3. What are the implementation challenges with this project?

Traffic congestion on local streets in the Pike Street corridor would increase. Improvements to mitigate this impact could be considered but may not be possible.

### Alternative R4 Weekday AM Peak Hour Level of Service and Delay Results



### Alternative R4 Weekday PM Peak Hour Level of Service and Delay Results



# Alternative R5: Modify Stewart Street Ramp

## 1. What is the project?

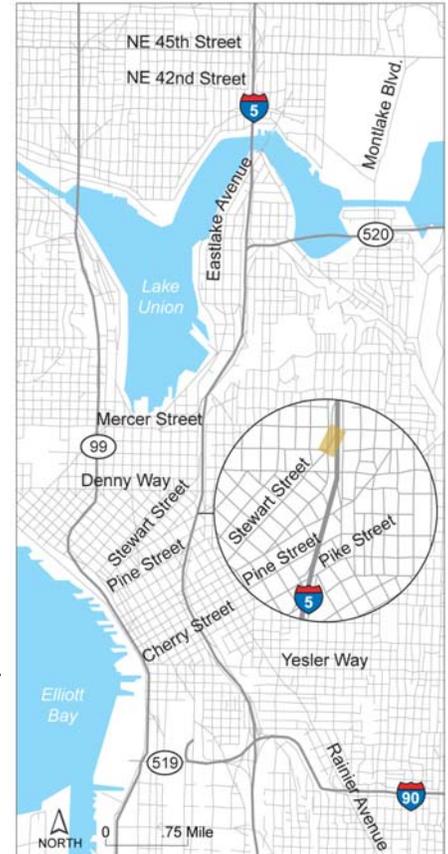
The project would allow only high-occupancy vehicles (HOVs) to access the Stewart Street ramp along the I-5 reversible lanes. The project assumes that the Stewart Street ramp would have a volume of approximately 300 HOVs per hour and the remaining general-purpose vehicles that currently use the ramp would be diverted to Mercer Street and the I-5 mainline equally. The adjacent figure shows the project area.

## 2. What are the potential benefits and impacts of this project?

During the peak morning commute period, an additional 400 vehicles per hour would be shifted to the Mercer Street off-ramp. With more traffic exiting at the Mercer Street off-ramp, the project would worsen traffic operations along the reversible lanes south of NE 42nd Street and at the Mercer Street/Fairview Avenue intersection during the morning commute period.

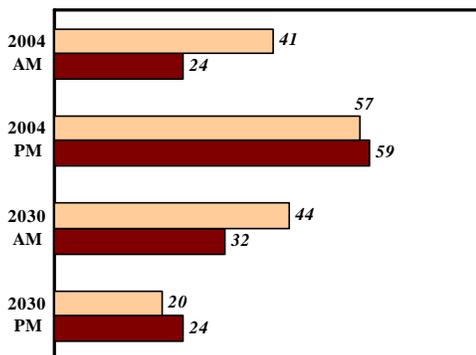
During the peak evening commute period, an additional 400 vehicles per hour would enter the I-5 reversible lanes at the Mercer Street on-ramp, resulting in increased vehicular traffic and delays at the Mercer Street/Fairview Avenue intersection. However, with overall lower volumes along the I-5 reversible lanes (approximately 400 vehicles per hour shifted to the I-5 mainline), the project improves traffic operations slightly along the I-5 reversible lanes.

The charts below show the resulting changes in average travel speeds and travel times along the I-5 reversible lanes during the peak 5-hour morning and evening commute periods.

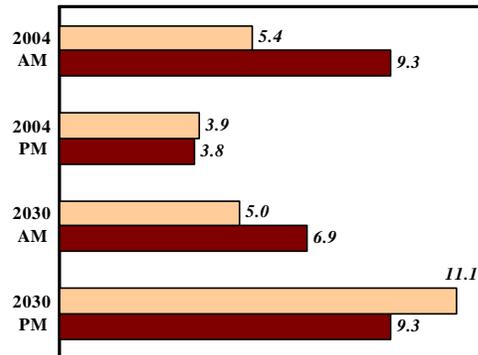


Study Segment - I5 Reversible Lanes: Southend to NE 42nd Street (3.7 miles)

Travel Speeds (miles per hour)



Travel Times (Minutes)



Without Project  With Project

## 3. What are the implementation challenges with this project?

Traffic congestion at the Mercer Street off-ramp and the Mercer Street/Fairview Avenue intersection would increase. Improvements to mitigate this impact could be considered but may not be possible.

# Alternative NC1: Braid Northbound S Spokane Street On-Ramp with the existing I-5 Collector-Distributor Road and Add a Northbound Lane between Seneca Street and SR 520 and between Ravenna Boulevard and NE Northgate Way

## 1. What is the project?

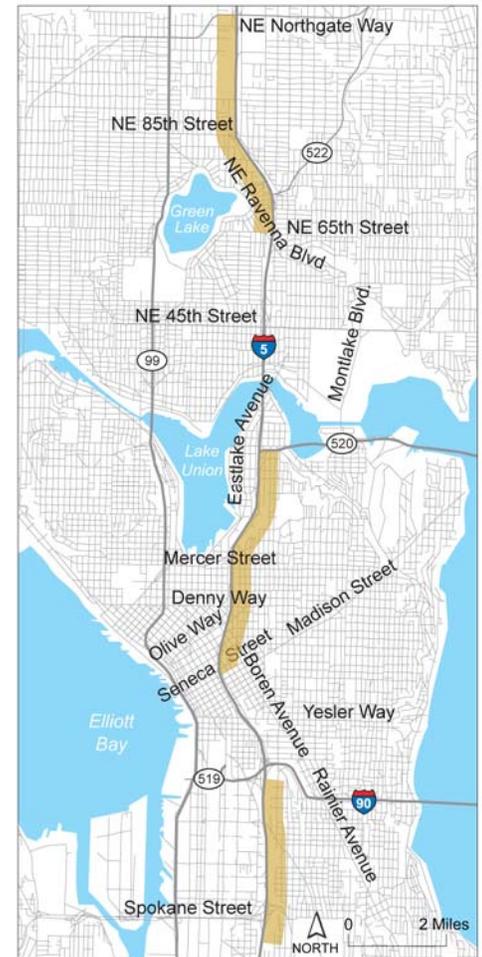
The project would close the existing I-5 exit ramp to the northbound I-5 Collector-Distributor (CD) road and braid the Spokane Street on-ramp with the northbound I-5 CD road. This would extend the northbound I-5 CD road south to S Spokane Street and provide three exiting lanes at the northbound Spokane Street/Columbian Way exit ramp. The project would also add a northbound mainline lane between Seneca Street and SR 520 and between Ravenna Boulevard and NE Northgate Way. The adjacent figure shows the project area.

## 2. What are the potential benefits and impacts of this project?

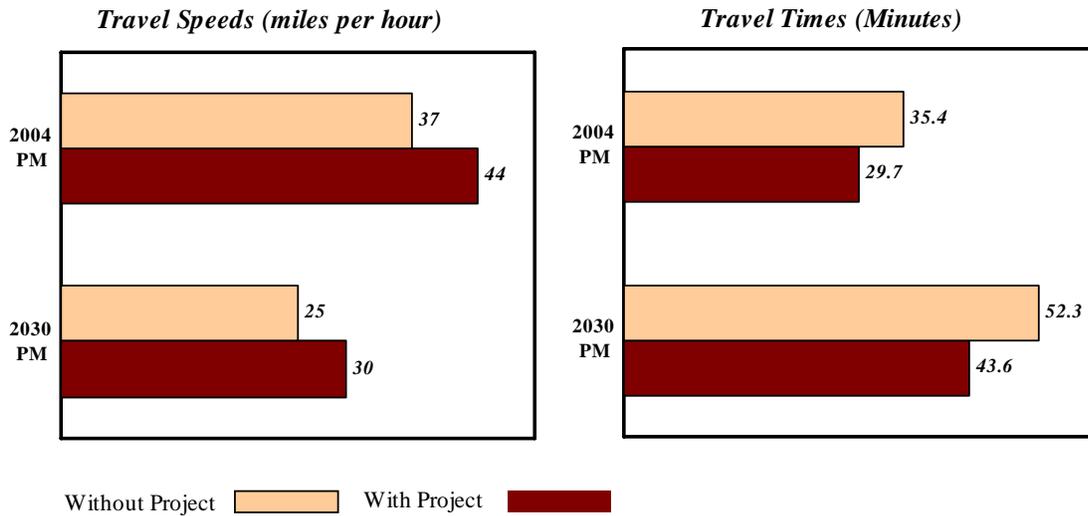
The project would remove the major weave segment on northbound I-5 between the Spokane Street/Columbian Way on-ramp and the I-5 CD off-ramp. This would improve travel speeds and travel times along the I-5 corridor between Interurban Avenue and I-90.

With additional capacity from the added lane, the project would also improve travel speeds and travel times along the sections of I-5 between Seneca Street and SR 520 and between NE 45th Street and NE 85th Street. However, higher traffic volumes and lower travel speeds are expected in the downstream sections between SR 520 and NE 45th Street and north of NE Northgate Way on I-5 under 2030 traffic conditions since upstream bottlenecks would discharge a higher number of vehicles.

The average travel speeds between Interurban Avenue and NE 205th Street would increase by approximately 20 percent under both 2004 and 2030 PM peak period conditions with this alternative. The charts below show the improved average travel speeds and travel times along the I-5 study segment during the peak 5-hour morning and evening commute periods.



**Study Segment - I5 Northbound Mainline: Interurban Avenue to 205th Street (21.8 miles)**



**3. What are the implementation challenges with this project?**

Project costs to braid the Spokane Street northbound on-ramp with the I-5 CD road and widen approximately 3 miles of the corridor between Ravenna Boulevard and NE Northgate Way would be high. Several structures and retaining walls would be constructed or reconstructed. Construction phasing and traffic control would also be a challenge. Portions of this section of I-5 between Ravenna Boulevard and Northgate Way will be impacted by Sound Transit's planned Light Rail extension to Northgate. Constructing both projects concurrently may result in some cost savings. Environmental impacts are unknown at this point and given the scale of the project could become a consideration.

Adding a northbound lane between the Seneca Street and SR 520 off-ramps would also require more significant design standard deviations compared to the current configuration, including limited shoulder widths. Active traffic management concepts such as reducing travel speeds during high-volume periods and closing the outside lane during lower-volume periods are being explored to minimize the impact of the design standard deviations.

# Alternative NC2: Braid Northbound S Spokane Street On-Ramp with the Existing I-5 Collector-Distributor Road, Add a Northbound Lane between Seneca Street and SR 520 and between Ravenna Boulevard and NE Northgate Way, and Meter Olive Way On-Ramp

## 1. What is the project?

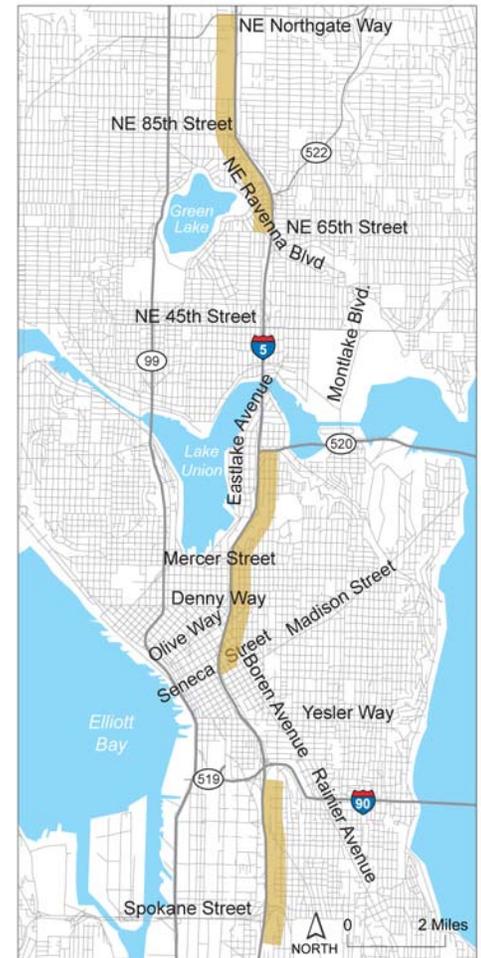
The project would close the existing I-5 exit ramp to the northbound I-5 Collector-Distributor (CD) road and braid the Spokane Street on-ramp with the northbound I-5 CD road. This would extend the northbound I-5 CD road south to S Spokane Street and provide three exiting lanes at the northbound Spokane Street/Columbian Way exit ramp. The project would also add a northbound mainline lane between Seneca Street and SR 520 and between Ravenna Boulevard and NE Northgate Way. The project would turn on the existing ramp meter on the Olive Way on-ramp to control the amount of traffic entering northbound I-5. The adjacent figure shows the project area.

## 2. What are the potential benefits and impacts of this project?

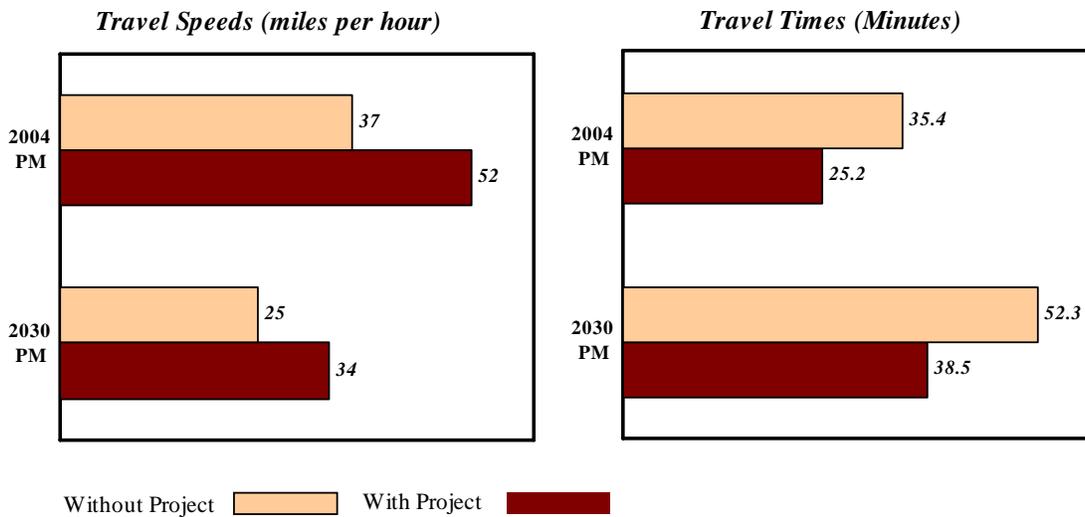
The project would remove the major weave segment on northbound I-5 between the Spokane Street/Columbian Way on-ramp and the I-5 CD off-ramp. This would improve travel speeds and travel times along the I-5 corridor between Interurban Avenue and I-90.

With the Olive Way ramp meter, the project would restrict approximately 400 to 500 vehicles per hour on the Olive Way on-ramp during evening peak periods. This reduction in northbound I-5 traffic, combined with the additional northbound capacity between Seneca Street and SR 520 and between Ravenna Boulevard and NE Northgate Way, would improve travel speeds and travel times along the section of I-5 from Seneca Street to approximately NE Northgate Way. However, this restriction would also divert some traffic to other local streets and thereby increase the traffic congestion on those roadways.

The average travel speeds between Interurban Avenue and NE 205th Street would increase by approximately 40 percent under both 2004 and 2030 PM peak period conditions with this alternative. The charts below show the improved average travel speeds and travel times along the I-5 study segment during the peak 5-hour morning and evening commute periods.



**Study Segment - I-5 Northbound Mainline: Interurban Avenue to 205th Street (21.8 miles)**



**3. What are the implementation challenges with this project?**

Project costs to braid the Spokane Street northbound on-ramp with the I-5 CD road and widen approximately 3 miles of the I-5 corridor between Ravenna Boulevard and Northgate would be high. Several structures and retaining walls would be constructed or reconstructed. Construction phasing and traffic control would also be a challenge. Portions of this section of I-5 between Ravenna Boulevard and Northgate Way will be impacted by Sound Transit's planned Light Rail extension to Northgate. Constructing both projects concurrently may result in some cost savings. Environmental impacts are unknown at this point and given the scale of the project could become a consideration.

Adding a northbound lane between the Seneca Street and SR 520 off-ramps would also require more significant design standard deviations compared to the current configuration, including limited shoulder widths. Active traffic management concepts such as reducing travel speeds during high-volume periods and closing the outside lane during lower-volume periods are being explored to minimize the impact of the design standard deviations.

Because the project would divert some Olive Way traffic to other local roadways during peak periods, appropriate mitigation measures should be evaluated on those roadways prior to turning on the ramp meter on the Olive Way on-ramp.

# Alternative NC3: Braid Northbound S Spokane Street On-Ramp with the existing I-5 Collector-Distributor Road and Add a Northbound Lane between Seneca Street and NE Northgate Way

## 1. What is the project?

The project would close the existing I-5 exit ramp to the northbound I-5 Collector-Distributor (CD) road and braid the Spokane Street on-ramp with the northbound I-5 CD road. This would extend the northbound I-5 CD road south to S Spokane Street and provide three exiting lanes at the northbound Spokane Street/Columbian Way exit ramp. The project would also add a northbound mainline lane between Seneca Street and NE Northgate Way. The adjacent figure shows the project area.

## 2. What are the potential benefits and impacts of this project?

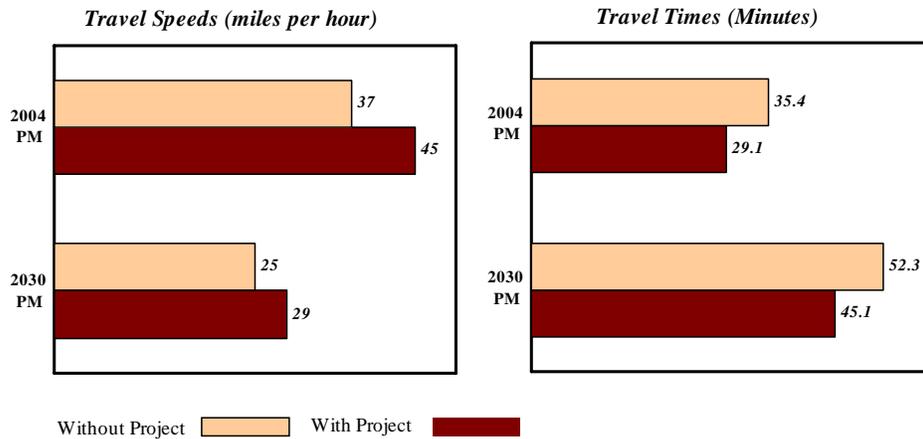
The project would remove the major weave segment on northbound I-5 between the Spokane Street/Columbian Way on-ramp and the I-5 CD off-ramp. This would improve travel speeds and travel times along the I-5 corridor between Interurban Avenue and I-90.

With additional capacity from the added lane, the project would also improve travel speeds and travel times along the section of I-5 between Seneca Street and SR 522. However, higher traffic volumes and lower travel speeds are expected in the downstream sections between SR 522 and NE Northgate Way during the PM peak period due to a higher vehicle discharge flow rate on I-5 between Seneca Street and NE Northgate Way.

The average travel speeds between Interurban Avenue and NE 205th Street would increase by approximately 20 percent under both 2004 and 2030 PM peak period conditions. However, northbound mainline travel speeds would drop by approximately 7 percent between Ravenna Boulevard and NE 205th Street under 2030 PM conditions. The project benefits along the I-5 study segment, in terms of average travel speeds and travel times during the peak 5-hour morning and evening commute periods, are graphically illustrated below.



**Study Segment - I5 Northbound Mainline: Interurban Avenue to 205th Street (21.8 miles)**



### 3. What are the implementation challenges with this project?

Project costs to braid the Spokane Street northbound on-ramp with the I-5 CD road, widen the Ship Canal Bridge, and widen approximately 3 miles of the corridor between Ravenna Boulevard and Northgate Way would be high. Several structures and retaining walls would be constructed or reconstructed. Construction phasing, staging and traffic control would also be a challenge. Portions of this section of I-5 between Ravenna Boulevard and Northgate Way will be impacted by Sound Transit's planned Light Rail extension to Northgate. Constructing both projects concurrently may result in some cost savings. Environmental impacts are unknown at this point and given the scale of the project could become a consideration.

Adding a northbound lane between the Seneca Street and SR 520 off-ramps would also require more significant design standard deviations compared to the current configuration, including limited shoulder widths. Active traffic management concepts such as reducing travel speeds during high volume periods and closing the outside lane during lower volume periods are being explored to minimize the impact of the design standard deviations.

# Alternative NC4: Braid Northbound S Spokane Street On-Ramp with the existing I-5 Collector-Distributor Road and Add a Northbound Lane between Seneca Street and NE 205th Street

## 1. What is the project?

The project would close the existing I-5 exit ramp to the northbound I-5 Collector-Distributor (CD) Road and braid the Spokane Street on-ramp with the northbound I-5 CD. This would extend the northbound I-5 CD roadway south to S Spokane Street and provide three exiting lanes at the northbound Spokane Street/Columbian Way exit ramp. The project would also add a northbound mainline lane between Seneca Street and NE 205<sup>th</sup> Street. The adjacent figure shows the project area.

## 2. What are the potential benefits and impacts of this project?

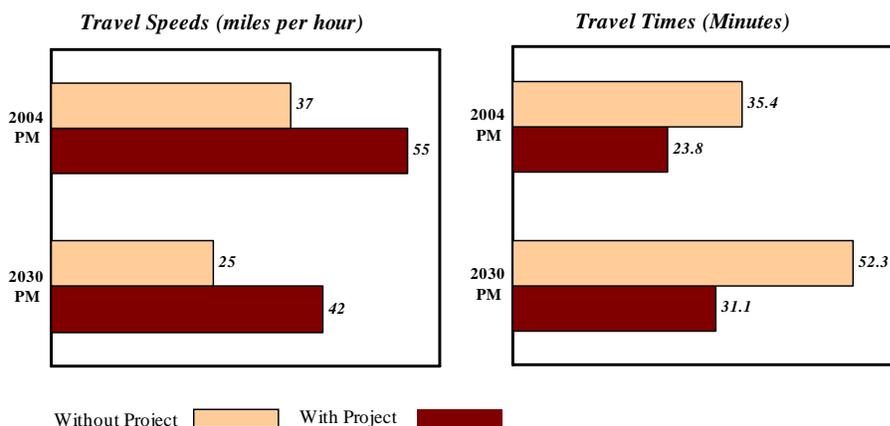
The project would remove the major weave segment on northbound I-5 between the Spokane Street/Columbian Way on-ramp and the I-5 CD off-ramp. This would improve travel speeds and travel times along the I-5 corridor between Interurban Avenue and I-90.

With additional capacity from the added lane, the project would also improve travel speeds and travel times along I-5 between Seneca Street and limits of the study area (NE 205<sup>th</sup> Street).

The average travel speeds between Interurban Avenue and NE 205<sup>th</sup> Street would increase by approximately 50 percent and 70 percent under 2004 and 2030 PM peak period conditions, respectively. The project benefits along the I-5 study segment, in terms of average travel speeds and travel times during the peak 5-hour morning and evening commute periods, are graphically illustrated below.



**Study Segment - I5 Northbound Mainline: Interurban Avenue to 205th Street (21.8 miles)**



### **3. What are the implementation challenges with this project?**

Project costs to braid the Spokane Street northbound on-ramp with the I-5 CD road, widen the Ship Canal Bridge, and widen the nearly 8 miles of the corridor between Ravenna Boulevard and NE 205<sup>th</sup> Street would be high. Several structures and retaining walls would be constructed or reconstructed. Construction phasing, staging and traffic control would also be a challenge. Portions of this section of I-5 between Ravenna Boulevard and Northgate Way will be impacted by Sound Transit's planned Light Rail extension to Northgate. Constructing both projects concurrently may result in some cost savings. Environmental impacts are unknown at this point and given the scale of the project could become a consideration.

Adding a northbound lane between the Seneca Street and SR 520 off-ramps would also require more significant design standard deviations compared to the current configuration, including limited shoulder widths. Active traffic management concepts such as reducing travel speeds during high volume periods and closing the outside lane during lower volume periods are being explored to minimize the impact of the design standard deviations.

# Alternative SC1: Add a Southbound Mainline Lane between NE 85th Street and SR 522 and Meter Southbound Yale Avenue On-Ramp

## 1. What is the project?

The project would add a southbound mainline lane between NE 85th Street and SR 522 and provide a ramp meter on the Yale Avenue on-ramp. The adjacent figure shows the project area.

## 2. What are the potential benefits and impacts of this project?

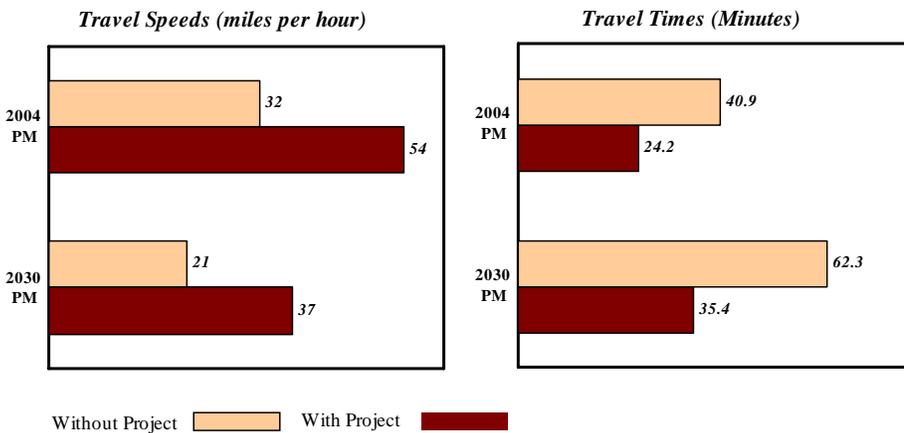
The project would provide an additional lane and capacity along the southbound I-5 segment between NE 85th Street and SR 522 which would improve travel speeds and travel times on southbound I-5 between NE 205th Street and SR 522. The higher traffic volumes and lower travel speeds that would be expected downstream of SR 522 due to the increased vehicle discharge flow rate would be partially offset by the effects of the Yale Avenue ramp meter.

The Yale Avenue ramp meter would restrict approximately 300 to 500 vehicles per hour on the Yale Avenue on-ramp during peak periods. While this would have a positive effect on travel speeds and travel times on the I-5 mainline, this restriction would divert most of this traffic to other local streets and highways resulting in congestion on some roadways including Spring Street and 5th Avenue.

The average travel speeds between NE 205th Street and Interurban Avenue would increase by approximately 70 percent and 75 percent under 2004 and 2030 PM peak period conditions, respectively. The project benefits along the I-5 study segment, in terms of average travel speeds and travel times during the peak 5-hour morning and evening commute periods, are graphically illustrated below.



Study Segment - I5 Southbound Mainline: Interurban Avenue to 205th Street (21.8 miles)



**3. What are the implementation challenges with this project?**

The project costs associated with this widening project would be moderate and would involve reconstruction of several structures and retaining walls. Because the project would divert some Yale Avenue traffic to other local roadways during peak periods, appropriate mitigation measures should be evaluated on these roadways prior to installing a ramp meter on the S Yale Avenue on-ramp. In addition, ramp storage is very limited and queues that develop behind the meter may interfere with other traffic movements along Yale Avenue and Howell Street, as well as possibly Denny Way and Stewart Street.

# Alternative SC2: Add a Southbound Mainline Lane between NE 85th Street and SR 522, Meter Southbound Yale Avenue On-Ramp, and Provide Southbound I-5 Collector-Distributor Road Improvements

## 1. What is the project?

The project would add a southbound mainline lane between NE 85th Street and SR 522, provide a ramp meter on the Yale Avenue on-ramp, and add a third lane along the southbound I-5 Collector-Distributor (CD) Road beginning at the I-90 westbound on-ramp and ending before S Spokane Street on the I-5 mainline. The adjacent figure shows the project area.

## 2. What are the potential benefits and impacts of this project?

The project would provide an additional lane and capacity along the southbound I-5 segment between NE 85th Street and SR 522 which would improve travel speeds and travel times on southbound I-5 between NE 205th Street and SR 522. The higher traffic volumes and lower travel speeds that would be expected downstream of SR 522 due to a higher vehicle discharge flow rate would be partially offset by the effects of the Yale Avenue ramp meter.

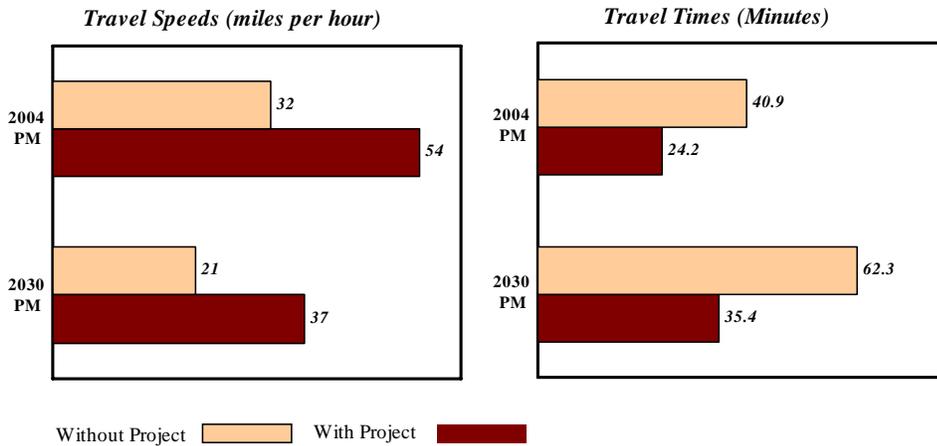
The Yale Avenue ramp meter would restrict approximately 300 to 500 vehicles per hour on the Yale Avenue on-ramp during peak periods. While this would have a positive effect on travel speeds and travel times on the I-5 mainline, this restriction would divert most of this traffic to other local streets and highways resulting in congestion on some roadways including Spring Street and 5th Avenue.

The added lane along the southbound I-5 CD road allows the I-90 westbound off-ramp to I-5 southbound on-ramp traffic to continue south along the I-5 CD and I-5 mainline without forcing the traffic to merge with other ramps, resulting in significant traffic operations improvements for the I-90 westbound traffic. This project has limited benefit to the traffic operations along the southbound I-5 CD itself.

The average travel speeds between NE 205th Street and Interurban Avenue would increase by approximately 70 percent and 75 percent under 2004 and 2030 PM peak period conditions, respectively. The project benefits along the I-5 study segment, in terms of average travel speeds and travel times during the peak 5-hour morning and evening commute periods, are graphically illustrated below.



**Study Segment - I5 Southbound Mainline: Interurban Avenue to 205th Street (21.8 miles)**



**3. What are the implementation challenges with this project?**

The project costs associated with the widening between NE 85<sup>th</sup> Street and SR 522 would be moderate and would involve reconstruction of several structures and retaining walls.

Because the project would divert some Yale Avenue traffic to other local roadways during peak periods, appropriate mitigation measures should be evaluated on these roadways prior to installing a ramp meter on the S Yale Avenue on-ramp. In addition, ramp storage is very limited and queues that develop behind the meter may interfere with other traffic movements along Yale Avenue and Howell Street, as well as possibly Denny Way and Stewart Street.

Constructing the additional lane on the CD road would require major widening of existing structures and would most likely be expensive.

# Alternative SC3: Add a Southbound Mainline Lane between NE 85th Street and SR 522, Meter Southbound Yale Avenue On-Ramp, and Manage Southbound High Occupancy Vehicle Lanes

## 1. What is the project?

The project would add a southbound mainline lane between NE 85th Street and SR 522, provide a ramp meter on the Yale Avenue on-ramp, and allow general purpose (GP) traffic to use the existing High Occupancy Vehicle (HOV) lane along southbound I-5 between Mercer Street and Corson Avenue during high-volume time periods. The adjacent figure shows the project area.

## 2. What are the potential benefits and impacts of this project?

The project would provide an additional lane and capacity along the southbound I-5 segment between NE 85th Street and SR 522 which improve travel speeds and travel times on southbound I-5 between NE 205th Street and SR 522 during the PM peak period. The higher traffic volumes and lower travel speeds that would be expected downstream of SR 522 due to more discharged vehicles from upstream bottlenecks would be partially offset by the effects of the Yale Avenue ramp meter.

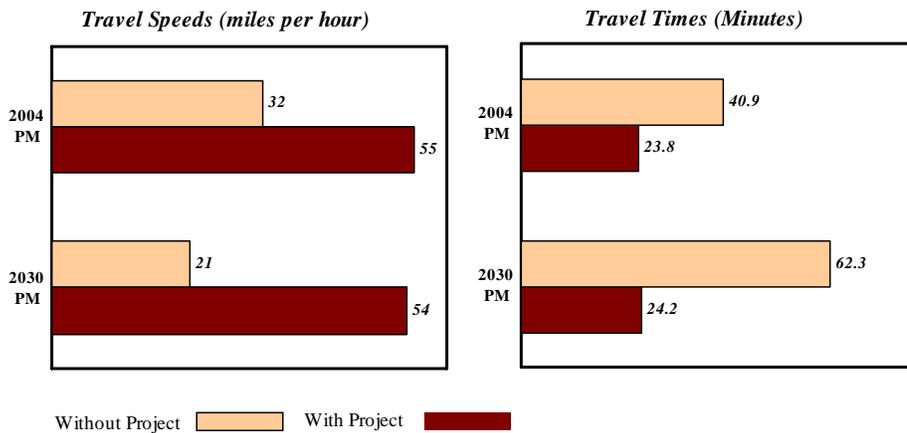
The Yale Avenue ramp meter would restrict approximately 300 to 500 vehicles per hour on the Yale Avenue on-ramp during peak periods. While this would have a positive effect on travel speeds and travel times on the I-5 mainline, this restriction would divert most of this traffic to other local streets and highways resulting in congestion on some roadways including Spring Street and 5th Avenue.

Allowing GP traffic to use the existing HOV lane along southbound I-5 between Mercer Street and Corson Avenue would significantly reduce the GP weave movements from the Mercer Street on-ramp and the weave movements to the existing southbound HOV lane. This would reduce the traffic congestion, improve safety, and improve travel speeds and travel times significantly along southbound I-5 between NE 85th Street and Corson Avenue.

The average travel speeds between NE 205<sup>th</sup> Street and Interurban Avenue would increase by approximately 70 percent and 160 percent under 2004 and 2030 PM peak period conditions, respectively. The project benefits along the I-5 study segment, in terms of average travel speeds and travel times during the peak 5-hour morning and evening commute periods, are graphically illustrated below.



**Study Segment - I5 Southbound Mainline: Interurban Avenue to 205th Street (21.8 miles)**



**3. What are the implementation challenges with this project?**

The project costs associated with the widening between NE 85<sup>th</sup> Street and SR 522 would be moderate and would involve reconstruction of several structures and retaining walls.

Because the project would divert some Yale Avenue traffic to other local roadways during peak periods, appropriate mitigation measures should be evaluated on these roadways prior to installing a ramp meter on the S Yale Avenue on-ramp. In addition, ramp storage is very limited and queues that develop behind the meter may interfere with other traffic movements along Yale Avenue and Howell Street, as well as possibly Denny Way and Stewart Street.

Allowing GP traffic in an HOV lane has some sight distance and design speed constraints. Active traffic management concepts such as reducing travel speeds during high-volume periods and closing the outside lane during lower-volume periods are being explored to minimize the impact of the design deficiencies of the existing HOV lane. Allowing GP traffic to use an existing HOV lane may also be viewed by some as counter to the long standing policy of encouraging HOV use by providing travel time and reliability advantages over GP traffic.

# Alternative SC4: Add a Southbound Mainline between NE 85th Street and SR 522 and Manage Southbound High Occupancy Vehicle Lanes

## 1. What is the project?

The project would add a southbound mainline lane between NE 85th Street and SR 522 and allow general purpose (GP) traffic to use the existing High Occupancy Vehicle (HOV) lane along southbound I-5 between Mercer Street and Corson Avenue during high-volume time periods. The adjacent figure shows the project area.

## 2. What are the potential benefits and impacts of this project?

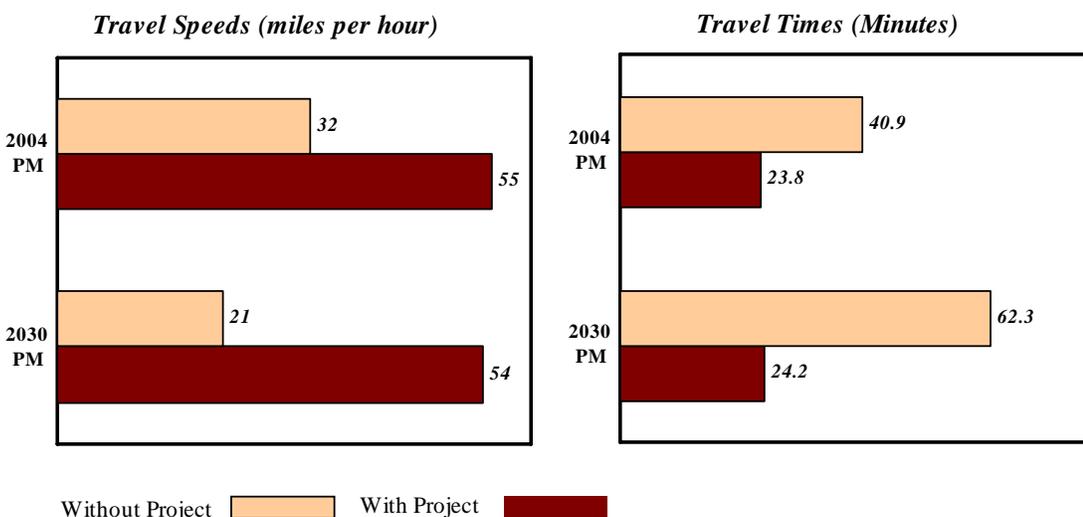
The project would provide an additional lane and capacity along the southbound I-5 segment between NE 85th Street and SR 522 which improve travel speeds and travel times on southbound I-5 between NE 205th Street and SR 522 during the PM peak period.

Allowing GP traffic to use the existing HOV lane along southbound I-5 between Mercer Street and Corson Avenue would significantly reduce the GP weave movements from the Mercer Street on-ramp and the weave movements to the existing southbound HOV lane. This would reduce the traffic congestion, improve safety, and improve travel speeds and travel times significantly along southbound I-5 between NE 85th Street and Corson Avenue.



The average travel speeds between NE 205th Street and Interurban Avenue would increase by approximately 70 percent and 160 percent under 2004 and 2030 PM peak period conditions, respectively. The project benefits along the I-5 study segment, in terms of average travel speeds and travel times during the peak 5-hour morning and evening commute periods, are graphically illustrated below.

**Study Segment - I5 Southbound Mainline: Interurban Avenue to 205th Street (21.8 miles)**



### **3. What are the implementation challenges with this project?**

The project costs associated with the widening between NE 85<sup>th</sup> Street and SR 522 would be moderate and would involve reconstruction of several structures and retaining walls.

Allowing GP traffic in an HOV lane has some sight distance and design speed constraints. Active traffic management concepts such as reducing travel speeds during high-volume periods and closing the outside lane during lower-volume periods are being explored to minimize the impact of the design deficiencies of the existing HOV lane. Allowing GP traffic to use an existing HOV lane may also be viewed by some as counter to the long standing policy of encouraging HOV use by providing travel time and reliability advantages over GP traffic.



# Chapter 5 Next Steps

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## **1 What are the next steps for alternatives to be considered further?**

The next steps for considering any of the alternatives further would be to develop a detailed project definition and conceptual design to prepare a reasonable cost opinion. Environmental documentation, traffic analysis, and preliminary design work would follow on the group of alternatives moving forward. Environmental documentation could range from relatively short and simple Documented Categorical Exclusions (DCE) on a relatively small improvement demonstrated to have independent utility from other improvements to a full Environmental Impact Statement (EIS) process and document for larger and more complex improvements.

Depending on the range of alternatives carried forward into the next phase, some or all of the alternatives could be combined into a single comprehensive environmental review process and document. Another option would be to cover some of the improvements as mitigation measures for the ongoing Alaskan Way Viaduct and Seawall Replacement Project.

## **2 What alternatives should be dropped from further consideration?**

Based on the results of the traffic operations analysis, WSDOT has developed an initial list of alternatives to drop from further consideration. The following alternatives are not recommended for further work because they have little to no benefit to traffic

flow and operations or have significant implementation challenges that would be difficult or costly to overcome:

- Alternative N1 – Manage northbound HOV lane operations north of Spokane Street. This alternative is not recommended for further study because the added vehicles in this lane would increase traffic congestion at the Seneca Street off-ramp during the AM peak period, and there is little to no traffic operations benefit in the PM peak period.
- Alternative N2 – Meter northbound Spokane Street on-ramp. This alternative is not recommended for further study because of the significant traffic congestion increase expected on the Spokane Street Viaduct and the West Seattle Bridge. The alternative would also increase traffic volumes and congestion on several arterial routes in South Seattle.
- Alternative N6 – Shift northbound Mercer Street on-ramp from left to right side. This alternative is not recommended for further study because construction costs would be high because the ramp modification would require a tunnel under I-5. In addition, the project has the potential to have short term and/or long term environmental and possibly community impacts given the constrained environment.
- Alternative R1 – Add a second lane along the south end portion of the reversible lanes to maintain two lanes to and from the mainline. This alternative is not recommended for further study because of constructibility issues and cost.
- Alternative R5 – Modify Stewart Street off-ramp to HOV-only. This alternative is not recommended for further study because traffic congestion during the AM peak period would increase in the reversible roadway with only the Mercer Street exit designated for general purpose traffic use.