

# City Council Meeting

November 7, 2016

## Traffic Analysis of Mercer Island I-90 Access Options

Michael Lapham, KPG

# Background

- Light rail construction and closure of I-90 center roadway scheduled for June 2017.
- I-90 mainline between Mercer Island and Seattle will be restriped from 3 to 4 lanes. New lanes are called R8A lanes.
- East Link EIS (2011) assumed R8A lanes would be designated as HOV lanes and SOVs traveling to or from Mercer Island would be able to use the HOV lanes.

# FHWA Letter

- In an August 5, 2016 letter, FHWA states that Mercer Island SOVs will likely be restricted from using the HOV lanes due to potential HOV lane performance, safety, and legal issues.
- This potential SOV restriction could also mean that SOVs may not be allowed to use the Island Crest Way westbound on-ramp to I-90 because it connects to the HOV lane.
- Traffic mitigation in the East Link EIS does not account for the impacts from these potential SOV restrictions.

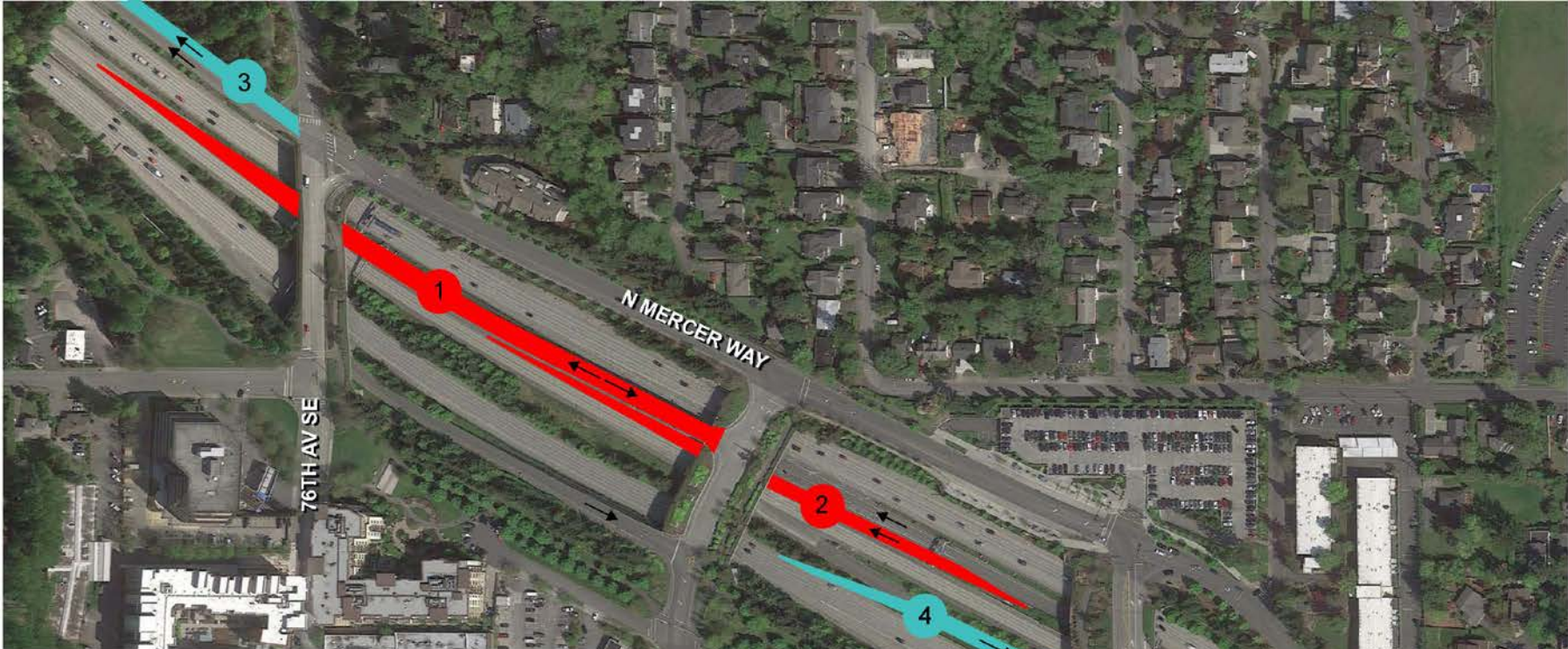
# Traffic Analysis

- KPG was contracted to analyze how the potential SOV restriction at the Island Crest Way westbound on-ramp would impact Mercer Island streets, ramps and the Town Center.
- Not contracted to analyze impacts to I-90 mainline operations or identify potential traffic mitigation.
- Analysis evaluated 2017 construction conditions with the closure of the I-90 center roadway and 2035 conditions after light rail is open.

\* Traffic analysis primarily uses 2014 traffic counts and 2035 forecasts from the Comprehensive Plan update.



# Changes to I-90 Ramps with Closure of the Center Roadway



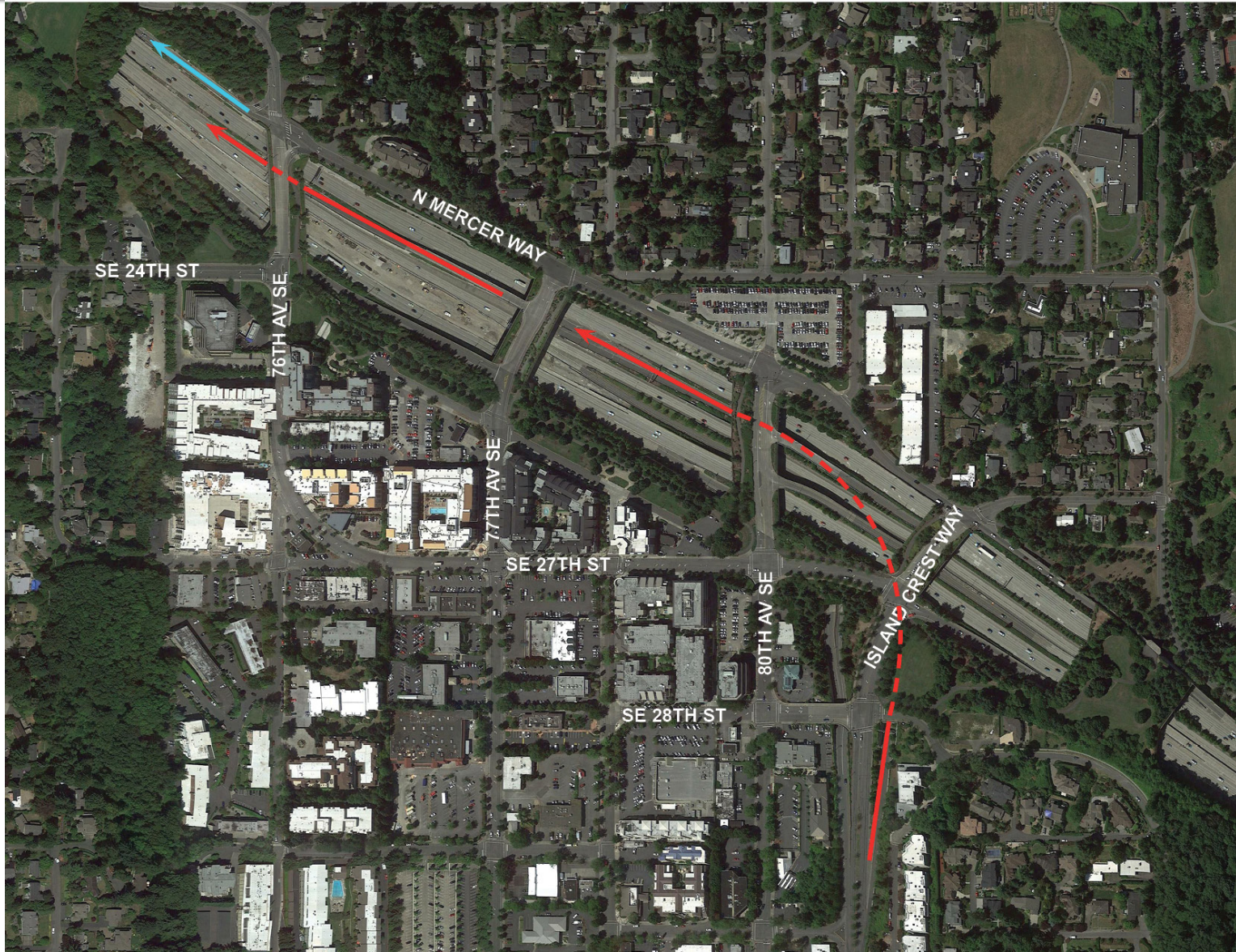
- Ramps Closed
- 1. 77th Avenue SE reversible ramp to/from the center roadway will be closed.
- 2. Island Crest Way westbound on-ramp to the center roadway will be closed.
- Ramps Modified
- 3. 76th Avenue SE westbound on-ramp will be widened to add a HOV bypass lane.
- 4. Island Crest Way eastbound off-ramp from the center roadway will be relocated to serve the R8A lane.

# Reductions to Westbound SOV On-Ramp Capacity

- Island Crest Way forms the primary north-south transportation spine providing access between I-90 and the southern 3/4 of the island.
- Mercer Island traffic volumes onto westbound I-90 are highest during the morning commute.
- Currently, during the morning commute, the Town Center and Island Crest Way have SOV access onto westbound I-90 from 3 on-ramps at 76<sup>th</sup> Avenue SE, 77<sup>th</sup> Avenue SE (reversible) and Island Crest Way.
- These 3 SOV on-ramps would be reduced to 1 on-ramp at 76<sup>th</sup> Avenue SE with the potential SOV restriction at Island Crest Way.



# Reductions to Westbound SOV On-Ramp Capacity



# Impacts of SOV Restriction at Island Crest Way On-Ramp

- The diversion to the 76<sup>th</sup> Avenue SE on-ramp is projected to be 600 AM peak hour vehicles and 200 PM peak hour vehicles.
- The 76th Avenue SE on-ramp would not be able to support the almost 1,200 vehicles projected during the morning peak hour with 1 general purpose lane and 1 HOV bypass lane.
- Travel times from Island Crest Way to westbound I-90 would increase by more than 5 minutes during peak periods.



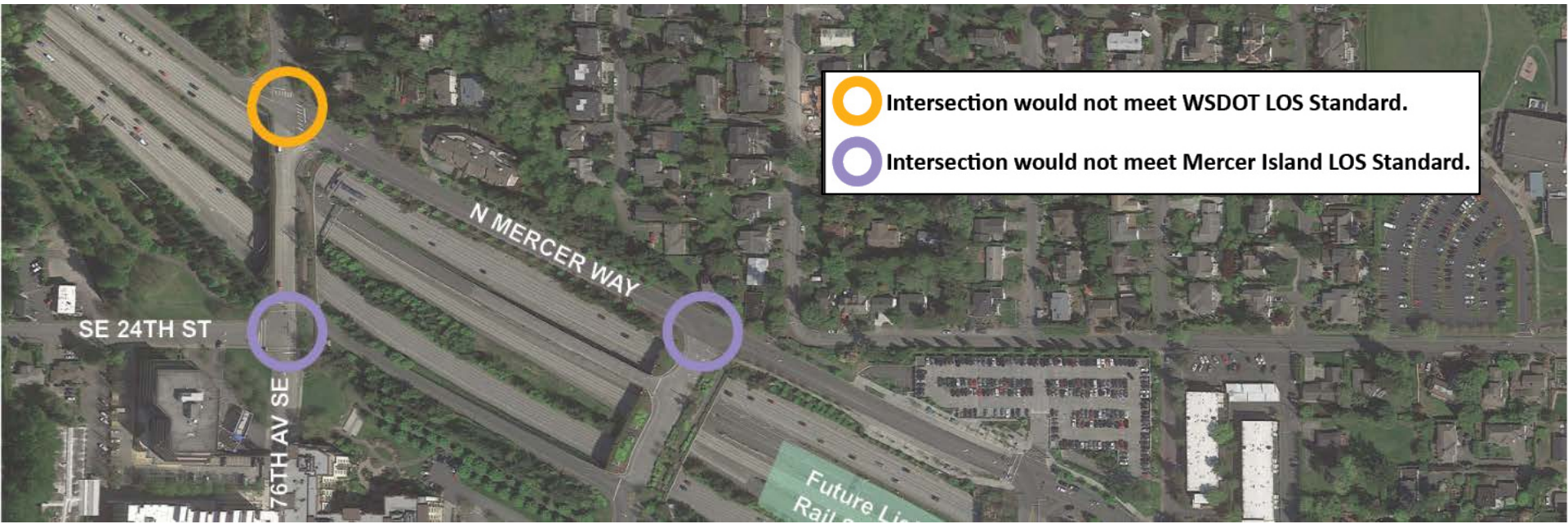
# Intersection Level of Service

- Mercer Island adopted a LOS C standard for intersections in and around the Town Center.
- WSDOT uses a LOS E standard for intersections it controls at or near freeway ramps.

<b>LOS</b>	<b>Signalized Average Delay per Vehicle (seconds)</b>	<b>Unsignalized Average Delay per Vehicle (seconds)</b>
<b>A</b>	0 to 10	0 to 10
<b>B</b>	10 to 20	10 to 15
<b>C</b>	20 to 35	15 to 25
<b>D</b>	35 to 55	25 to 35
<b>E</b>	55 to 80	35 to 50
<b>F</b>	> 80	> 50

# 2017 Intersection Operations

- Reflects closure of I-90 center roadway in June 2017.
- City has not received plans to implement the East Link EIS mitigation improvements. These improvements are not included in 2017 analysis.
- Potential SOV restriction at the Island Crest Way westbound on-ramp would result in the 76<sup>th</sup> Avenue SE on-ramp being over capacity and 3 intersections falling below LOS standards.



# East Link EIS Mitigation

- EIS mitigation addresses combined impacts of center lane roadway closure, light rail opening, and future year traffic volumes.
- East Link EIS mitigation improvements at 5 intersections are planned to be constructed by 2023:
  - Revised westbound channelization at N Mercer Way/76<sup>th</sup> Avenue SE
  - New signal or roundabout at N Mercer Way/77<sup>th</sup> Avenue SE
  - New signal at I-90 eastbound off-ramp/77<sup>th</sup> Avenue SE
  - New signal at SE 27<sup>th</sup> Street/80<sup>th</sup> Avenue SE
  - Add southbound left turn lane at SE 24<sup>th</sup> Street/W Mercer Way



# 2035 Intersection Operations

- Evaluates operations with completion of the light rail and East Link EIS mitigation.
- In addition to the 3 intersections that operate below the LOS standard in 2017, 3 new intersections would fall below the LOS standards during either the 2035 AM or PM peak hours.

# Town Center Impacts



# Analysis Findings

The potential SOV restriction at the Island Crest Way westbound on-ramp would result in the following impacts:

- 6 intersections fall below the LOS standard.
- Traffic diversion to the 76<sup>th</sup> Avenue SE westbound on-ramp results in extensive queuing and impacts to local street circulation.
- Added traffic volumes along N Mercer Way and Town Center streets will impact bus operations around the light rail station and increase the potential for pedestrian-vehicle conflicts.
- Current East Link EIS mitigation is not sufficient to address impacts. Additional mitigation options will need to be coordinated between the City of Mercer Island and Sound Transit, WSDOT and FHWA.



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Questions?


# 2017 AM Peak Hour LOS

2017 AM Peak Hour Intersection LOS for With and Without SOV Access to the Island Crest Way Westbound On-Ramp

Intersection		Traffic Control	LOS Standard	2014 Existing Conditions	2017 With SOV Access to ICW Westbound On-Ramp	2017 Without SOV Access to ICW Westbound On-Ramp
1	I-90 Westbound On-Ramp/76th Ave SE	All-way stop	E	B	C	F
2	SE 24th Street/76th Ave SE	All-way stop	C	A	B	C*
3	N Mercer Way/77th Ave SE	North leg stop	C	C	C	E
4	I-90 Eastbound Off-Ramp/77th Ave SE	West leg stop	E	B	B	B
5	SE 27th Street/77th Ave SE	Signal	C	B	B	B
6	SE 27th Street/78th Ave SE	Signal	C	A	A	A
7	N Mercer Way/80th Ave SE (Park and Ride)	Signal	E	B	B	C
8	SE 27th Street/80th Ave SE	All-way stop	C	B	B	C
9	SE 28th Street/80th Ave SE	All-way stop	C	B	B	B
10	I-90 Westbound Off-Ramp/Island Crest Way	Signal	E	C	C	E
11	I-90 Eastbound On-Ramp/Island Crest Way	Signal	E	C	C	C
12	SE 28th St/Island Crest Way	Signal	C	B	B	B

Note: 2010 Highway Capacity Manual Level of Service methodology. For 2-way stop-controlled intersections, delay reported for the worst stop-controlled approach.

\*Traffic simulation indicates that vehicle queuing from the 76th Avenue SE westbound on-ramp would cause the intersection to fall below the LOS standard.

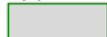
 Shading indicates that intersection does not meet LOS standard.

# 2017 PM Peak Hour LOS

2017 PM Peak Hour Intersection LOS for With and Without SOV Access to the Island Crest Way Westbound On-Ramp

	Intersection	Traffic Control	LOS Standard	2014 Existing Conditions	2017 With SOV Access to ICW Westbound On-Ramp	2017 Without SOV Access to ICW Westbound On-Ramp
1	I-90 Westbound On-Ramp/76th Ave SE	All-way stop	E	C	C	D
2	SE 24th Street/76th Ave SE	All-way stop	C	B	B	B
3	N Mercer Way/77th Ave SE	North leg stop	C	D	D	D
4	I-90 Eastbound Off-Ramp/77th Ave SE	West leg stop	E	B	B	B
5	SE 27th Street/77th Ave SE	Signal	C	B	B	B
6	SE 27th Street/78th Ave SE	Signal	C	A	A	A
7	N Mercer Way/80th Ave SE (Park and Ride)	Signal	E	C	C	C
8	SE 27th Street/80th Ave SE	All-way stop	C	B	B	C
9	SE 28th Street/80th Ave SE	All-way stop	C	C	C	C
10	I-90 Westbound Off-Ramp/Island Crest Way	Signal	E	D	D	E
11	I-90 Eastbound On-Ramp/Island Crest Way	Signal	E	C	C	C
12	SE 28th St/Island Crest Way	Signal	C	C	C	C

Note: 2010 Highway Capacity Manual Level of Service methodology. For 2-way stop-controlled intersections, delay reported for the worst stop-controlled approach.

 Shading indicates that intersection does not meet LOS standard.



# 2035 AM Peak Hour LOS


2035 AM Peak Hour Intersection LOS for With and Without SOV Access to the Island Crest Way Westbound On-Ramp

	Intersection	Traffic Control	LOS Standard	2014 Existing Conditions	2035 With SOV Access to ICW Westbound On-Ramp	2035 Without SOV Access to ICW Westbound On-Ramp
1	I-90 Westbound On-Ramp/76th Ave SE	All-way stop^	E	B	C	F
2	SE 24th Street/76th Ave SE	All-way stop	C	A	B	C*
3	N Mercer Way/77th Ave SE	North leg stop/ Roundabout^	C	C	A	C*
4	I-90 Eastbound Off-Ramp/77th Ave SE	West leg stop/Signal^	E	B	B	B
5	SE 27th Street/77th Ave SE	Signal	C	B	C	C
6	SE 27th Street/78th Ave SE	Signal	C	A	B	B
7	N Mercer Way/80th Ave SE (Park and Ride)	Signal	E	B	B	D
8	SE 27th Street/80th Ave SE	All-way stop/Signal^	C	B	B	B
9	SE 28th Street/80th Ave SE	All-way stop	C	B	C	C
10	I-90 Westbound Off-Ramp/Island Crest Way	Signal	E	C	D	F
11	I-90 Eastbound On-Ramp/Island Crest Way	Signal	E	C	C	D
12	SE 28th St/Island Crest Way	Signal	C	B	B	D

Note: 2010 Highway Capacity Manual Level of Service methodology. For 2-way stop-controlled intersections, delay reported for the worst stop-controlled approach.

^Includes mitigation improvements identified in the East Link EIS.

\*Traffic simulation indicates that vehicle queuing from the 76th Avenue SE westbound on-ramp would cause the intersection to fall below the LOS standard.

 Shading indicates that intersection does not meet LOS standard.

# 2035 PM Peak Hour LOS

2035 PM Peak Hour Intersection LOS for With and Without SOV Access to the Island Crest Way Westbound On-Ramp

Intersection		Traffic Control	LOS Standard	2014 Existing Conditions	2035 With SOV Access to ICW Westbound On-Ramp	2035 Without SOV Access to ICW Westbound On-Ramp
1	I-90 Westbound On-Ramp/76th Ave SE	All-way stop^	E	C	E	E
2	SE 24th Street/76th Ave SE	All-way stop	C	B	C	C
3	N Mercer Way/77th Ave SE	North leg stop/ Roundabout^	C	E	B	C
4	I-90 Eastbound Off-Ramp/77th Ave SE	West leg stop/Signal^	E	B	A	A
5	SE 27th Street/77th Ave SE	Signal	C	B	C	C
6	SE 27th Street/78th Ave SE	Signal	C	A	B	B
7	N Mercer Way/80th Ave SE (Park and Ride)	Signal	E	C	C	C
8	SE 27th Street/80th Ave SE	All-way stop/Signal^	C	C	B	B
9	SE 28th Street/80th Ave SE	All-way stop	C	C	F	F
10	I-90 Westbound Off-Ramp/Island Crest Way	Signal	E	D	E	F
11	I-90 Eastbound On-Ramp/Island Crest Way	Signal	E	C	C	D
12	SE 28th St/Island Crest Way	Signal	C	C	C	D

Note: 2010 Highway Capacity Manual Level of Service methodology. For 2-way stop-controlled intersections, delay reported for the worst stop-controlled approach.

^Includes mitigation improvements identified in the East Link EIS.

 Shading indicates that intersection does not meet LOS standard.