Exhibit 3.20

Delay & LOS at SR 169 Intersections (2004 - 2030)

Milepost	Intersection	SIG / UNSIG[1]	PM Peak Hour 2004 Delay[2] (in seconds)	2004 LOS[3]	2030 Delay[2] (in seconds)	2030 LOS[3]	Change in Delay 2004 to 2030
Enumclaw Segment							
0.00	Griffin Avenue	SIG	09	A	11	B	- 02
Rural / Agricultural Segment							
1.67	SE 416th Street	UNSIG	27	D	07	A	20
2.67	SE 400th Street	SIG	20	B	51	D	- 30
3.52	Enumclaw - Franklin Road	UNSIG	15	B	29	D	- 14
6.02	SE Green Valley Road	UNSIG	18	C	77	**F**[4]	- 59
Black Diamond Segment							
7.63	Lawson Street	UNSIG	13	B	> 80	**F**	- 92
7.69	Baker Street	UNSIG	20	C	> 80	**F**	> - 60
8.25	Roberts Drive	UNSIG	25	D	> 80	**F**	> - 55
8.28	Black Diamond - Ravensdale Road	UNSIG	71	**F**	> 80	**F**	> - 09
Maple Valley Segment							
11.44	SR 516 -- Kent-Kangley Road	SIG	60	**E**	77	**E**	- 17
13.53	SE 240th Street	SIG	24	C	20	B	04
13.86	Witte Road SE	SIG	53	D	46	D	07
14.04	SE Wax Road	SIG	26	C	67	**E**	- 41
14.17	SE 231st Street	SIG	30	C	52	D	- 22
Cedar River Segment							
15.07	SE 216th Way	SIG	33	C	> 80	**F**	- 75
17.68	Cedar Grove Road	SIG	17	B	45	D	- 28
Renton Segment							
19.22	Jones Road / 196th Avenue SE	SIG	19	B	45	D	- 26
22.08	152nd Avenue SE	SIG	06	A	29	C	- 23
22.32	149th Avenue SE	SIG	26	C	09	A	17
22.99	140th Way SE	SIG	41	D	> 80	**F**	- 55
25.18	I-405 Northbound Off-Ramp to Eastbound SR 169	UNSIG	> 80	**F**	--	A	--
25.26	I-405 Southbound On-Ramp -- Sunset Boulevard	SIG	39	D	> 80	**F**	> - 41

[1] SIG = Signalized Intersection; UNSIG = Unsignalized Intersection -- Typically, LOS for signalized intersections is based on the average delay for the whole intersection. At the same time unsignalized intersection LOS is based on the average delay for the worst approach. But for comparison purposes in this document average vehicle delay and LOS was used for both signalized and unsignalized intersections.

[2] Average vehicle delay per intersection in seconds.

[3] Level of Service

[4] Intersection LOSs that do not meet (or will not meet) the LOS D standard, are displayed in bold

NOTE: *Improvements in Delay and LOS between 2004 and 2030 are the result of funded improvements noted in Chapter 2, section 18 in Exhibit 2.22 starting on page 2-44.*

11 What is the projected (2030) SR 169 intersection vehicle delay?

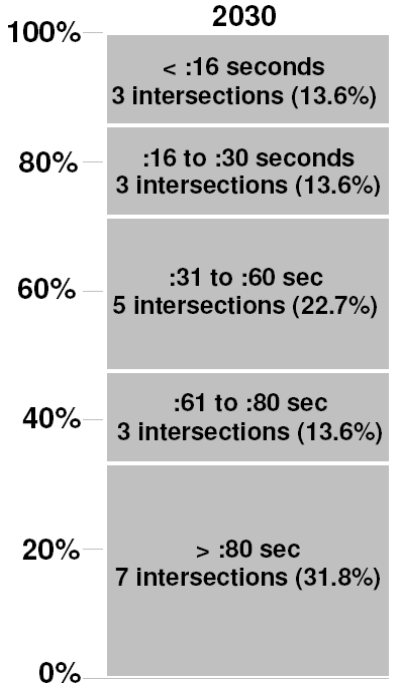
All of the 22 analyzed intersections on SR 169 are projected to experience some PM peak hour delay. One 2004 intersection was not included in 2030 future analysis because as a part of an I-405 improvement project, this intersection will be converted from an I-405 off-ramp and intersection to an I-405 off-ramp with an unrestricted right-turn onto a new eastbound right lane on SR 169, thus eliminating the "intersection" from the 2030 intersection analysis.

Ten intersections are expected to operate worse than the LOS D standard by 2030.[8] Six other intersections are estimated to operate at LOS D and all will be within 10 seconds of falling into the LOS E level of service. See Exhibit 3.20 on page 3-27 for vehicle delay at each of the 22 analyzed intersections.

The projected 2030 measured delay at all the analyzed intersections is displayed in Exhibit 3.21 on the right and provides the following:

- Most of the intersections (15 intersections – 71%) are predicted to experience more than 31 seconds of vehicle wait.
- More intersections (7 – 33%) are expected to experience greater than 80 seconds of delay than any other level of delay. Four out of those seven intersections will be in Black Diamond with another two near the SR 169 / I-405 in Renton.
- Only six intersections (28.6%) are projected to experience vehicle delays less than 31 seconds. Three of those are in the Enumclaw segment.

Exhibit 3.21
SR 169 All Intersections Projected (2030) Delay
(in seconds)



NOTE: As a part of the I-405 improvement project, this intersection will be eliminated via an unrestricted right-turn lane.

[8] See Exhibit 3.11, page 3-13. LOS D standard for the unsignalized intersections is between 26 and 35 seconds of vehicle wait time. The LOS D standard for the signalized intersections is 36 to 55 seconds of vehicle delay.

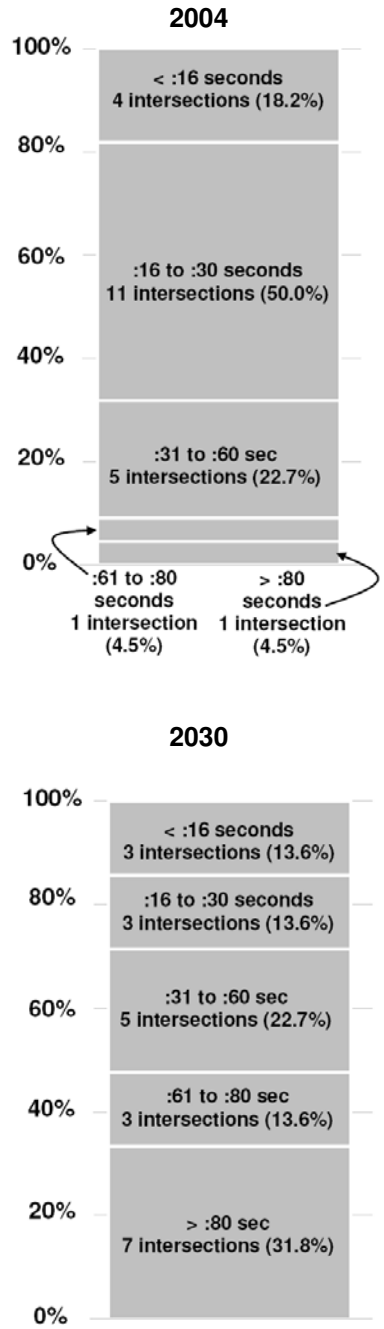
How does 2004 current intersection delay compare to 2030 projected intersection delay?

Exhibit 3.22 on the right compares the vehicle wait time in 2004 and the projected intersection delay in 2030 for all of the 22 analyzed intersections on SR 169.

Between 2004 and 2030 intersection delay is anticipated to worsen along SR 169. Delay is not only estimated to get worse at the intersections already experiencing long vehicle wait times, but delay is also expected to get worse at other intersections currently operating at acceptable levels of service.

- In 2004, there are 3 intersections (13.6%) operating below the LOS D standard. There are another 3 intersections operating at LOS D, but within 10 seconds of slipping below the standard to LOS E.
- By 2030, there are likely to be 10 intersections (47.6%) operating inferior to the LOS D standard. There may be an additional 6 intersections (27.3%) operating at LOS D, but within 10 seconds of slipping below the standard to LOS E.
- In 2004, fifteen intersections (68.2%) had less than 31 seconds delay.
- By 2030, only six intersections (29%) are estimated to experience less than 31 seconds delay.
- In 2004 only 2 intersections (9.1%) experienced more than 60 seconds of vehicle wait time.
- By 2030 ten intersections (45.5%) will experience more than 60 seconds of vehicle delay.

Exhibit 3.22
SR 169 All Intersections Current vs. Projected Delay
(in seconds)



NOTE: As a part of the I-405 improvement project, this intersection will be eliminated via an unrestricted right-turn lane.

Projected Delay at Unsignalized Intersections

Of the 8 unsignalized intersections measured along the corridor all but one are located in the southern, more rural portion of the corridor.[9] By 2030 five of the seven remaining unsignalized intersections are expected to experience delays longer than the LOS D standard of 26 to 35 seconds. Those five intersections are:

- SE Green Valley Road;
- Lawson Street;
- Baker Street;
- Roberts Drive; and
- Black Diamond / Ravensdale Road;

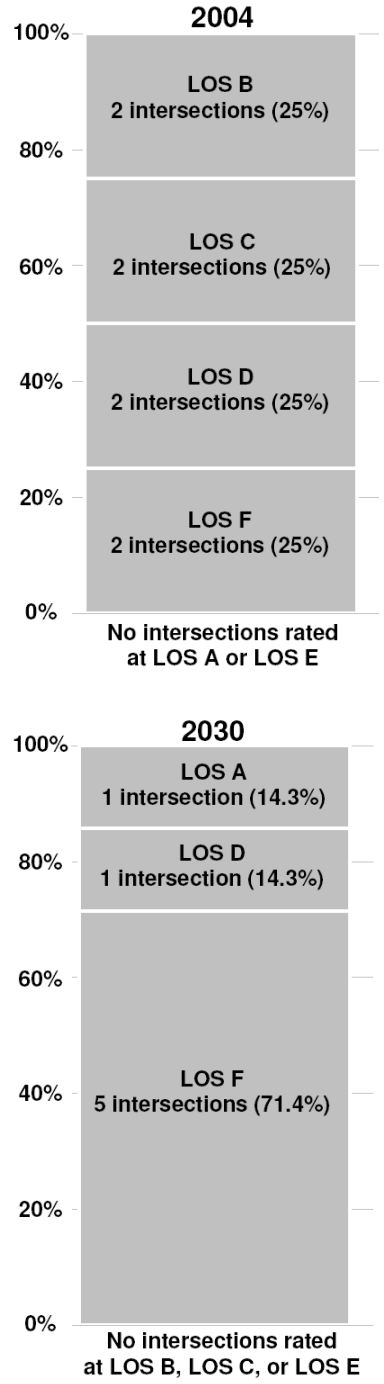
One other intersection (Enumclaw – Franklin Road) is projected to have 29 seconds of delay, leaving it just 6 seconds short of slipping down to LOS E.

How does 2004 current unsignalized intersection delay compare to 2030 projected unsignalized intersection delay?

Exhibit 3.24 on the next page compares the vehicle wait time for the 8 analyzed unsignalized intersections on SR 169 in 2004 and the projected delay for the 7 analyzed intersections in 2030.[10]

Between 2004 and 2030 intersection delay is estimated to increase along SR 169. Most of the intersections that are expected to fall below the LOS D standard are the unsignalized intersections in and near Black Diamond (the same intersections listed above). Other differences in unsignalized intersection delay between 2004 and 2030 are:

Exhibit 3.23
SR 169 Unsignalized Intersection Current vs. Projected LOS

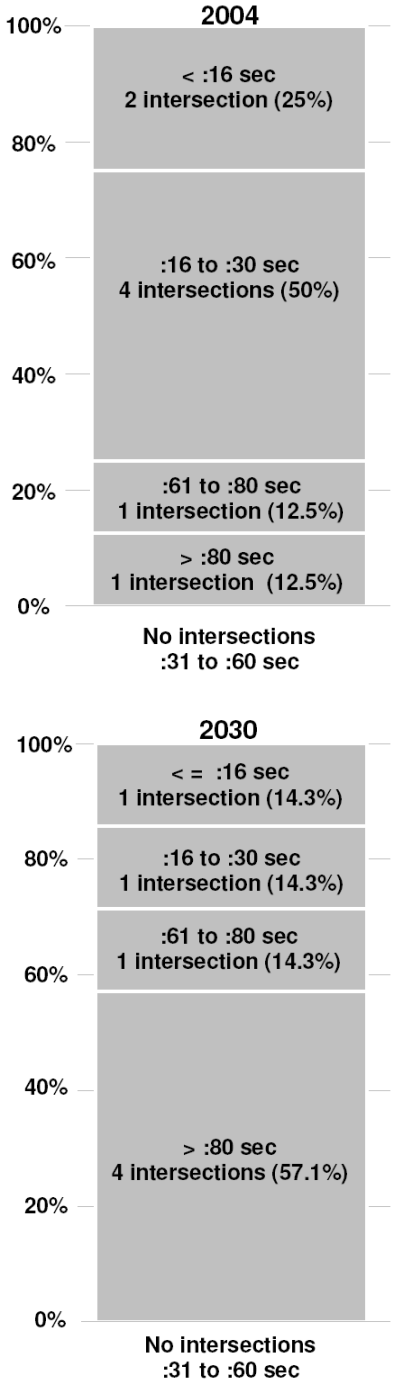


[9] The one unsignalized intersection not in the rural area is the I-405 off ramp to Eastbound SR 169. NOTE: As a part of the I-405 improvement project, this intersection will be eliminated via an unrestricted right-turn lane.

[10] Ibid.

- In 2004, there were 2 intersections (25.0%) operating worse than the LOS D standard. There were another 2 intersections operating at LOS D.
- By 2030, five of the seven (71.4%) unsignalized intersections are projected to operate at LOS F, with a sixth intersection anticipated to function at LOS D.
- In 2004, six of eight (75%) unsignalized intersections had less than 31 seconds delay.
- By 2030, only two of the seven (28.6%) unsignalized intersections are estimated to experience less than 31 seconds delay.
- In 2004, only two of eight (25%) intersections experienced more than 60 seconds of vehicle wait time.
- By 2030, five of seven (71.4%) unsignalized intersections are predicted to experience more than 60 seconds of vehicle delay.

Exhibit 3.24
SR 169 Unsignalized Intersection Current vs. Projected Delay
(in seconds)



Projected Delay at Signalized Intersections

Of the 14 signalized intersections measured along the corridor five (35.7%) are estimated to be at LOS D by 2030. All five intersections are only within 10 seconds of slipping down to rating a LOS E. Another five (35.7%) intersections are predicted to rate LOS E or LOS F.

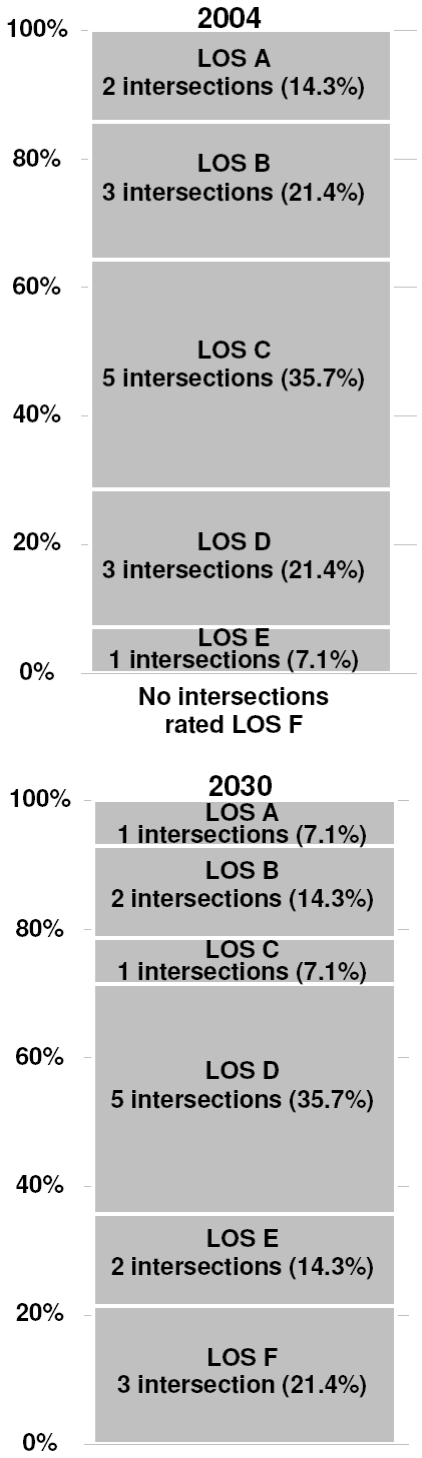
The three intersections expected to rate LOS F in 2030 are:

- 140th Way SE;
- I-405 Southbound On-Ramp – Sunset Blvd.; and
- SE 216th Way

These intersections are located in the urban areas of the corridor where volumes are predicted to be higher along SR 169.

Exhibit 3.25 on the right compares the vehicle level of service in 2004 and the projected 2030 level of service for all of the signalized intersections on SR 169.

Exhibit 3.25
SR 169 Signalized Intersection Current vs. Projected LOS



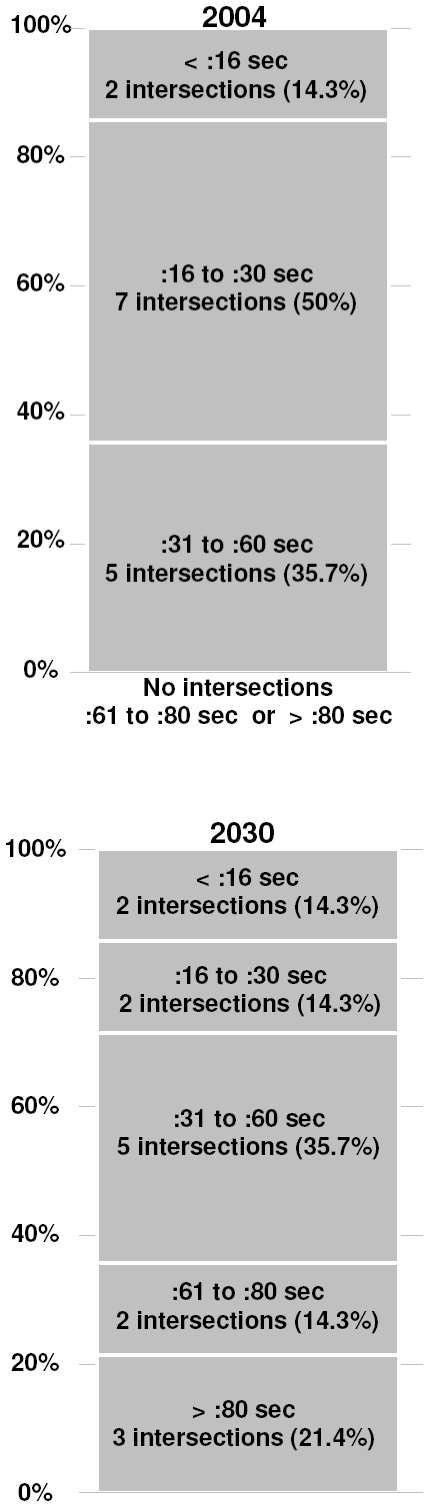
How does 2004 current signalized intersection delay compare to 2030 projected signalized intersection delay?

Exhibit 3.26 on the right compares the vehicle delay in 2004 and the projected 2030 delay for all of the signalized intersections on SR 169.

Between 2004 and 2030 intersection delay is expected to get worse along SR 169. Some of the differences between the signalized intersection in 2004 and 2030 are:

- In 2004, there were 10 intersections (71.4 0%) operating worse than the LOS D standard of 26 to 35 seconds of delay. There were another 3 intersections operating at LOS D.
- By 2030, only four of the 14 (28.6%) signalized intersections are projected to operate better than LOS D, with another five (35.7%) intersections anticipated to function at LOS D.
- In 2004, nine of 14 (64.3%) signalized intersections had less than 31 seconds delay.
- By 2030, only four of the 14 (28.6%) signalized intersections are estimated to experience less than 31 seconds delay.
- In 2004 there were no (0.0%) intersections with more than 60 seconds of vehicle wait time. The SR 169 / Kent-Kangley intersection had the longest delay right at 60 seconds.
- By 2030 five of 14 (35.7%) signalized intersections are anticipated to experience more than 60 seconds of vehicle delay.

Exhibit 3.26
SR 169 Signalized Intersection Current vs. Projected Delay
(in seconds)



Projected SR 169 PM Peak Hour Single Trip Delay

One PM Peak Hour Trip – One Vehicle in 2030:
One PM peak hour complete trip along SR 169 in 2030 would total 18.8 minutes of delay for an individual vehicle.

One PM Peak Hour Trip – All Vehicles in 2030:
Add up all of the vehicles making the same single PM peak hour trip in 2030 and then multiply that by the 18.8 minutes of each individual vehicle delay. The total would be about 990 hours of vehicle delay per day.[11]

How does 2004 current PM peak hour single trip delay compare to 2030 projected PM peak hour single trip delay?

In 2004 a single one-way trip down SR 169 would experience a total PM peak hour intersection delay of 11.2 minutes. The same trip in 2030 is projected to total 18.8 minutes of delay (67.9 percent change).

- In 2004, there were 3 intersections (13.6%) operating worse than the LOS D standard.
- By 2030, there are predicted to be 10 intersections (47.6%) operating worse than the LOS D standard.
- In 2004 intersections operating worse than the LOS D standard experienced a total amount of vehicle delay of 86 seconds (1.4 minutes).
- By 2030 intersections operating worse than the LOS D standard are anticipated to experience a total amount of vehicle delay of 331 seconds (5.5 minutes).

[11] Source: 2004 SR 169 WSDOT Traffic Counts
(1,125 PM peak hour seconds of intersection delay) X (68,980 pm peak hour vehicles) = 28,781,530 seconds of delay; or 59,692 minutes of delay; or 994.87 hours of delay.

Highway Section Levels of Service

12 What was the highway section level of service methodology?

In addition to intersection level of service, existing (2004) and future (2030) Highway LOS was determined in accordance with the Highway Capacity Manual 2000 methodology using both Synchro 6.0 and the Highway Capacity Software 2000. Similar to intersection LOS analysis, traffic operations for highway sections are also described alphabetically using LOS A through LOS F, with LOS A indicating free-flowing traffic and LOS F indicating extreme congestion and long vehicle delays (see figure to the right).

For this analysis, SR 169 was divided into 17 highway sections[12] grouped by highway type, as shown in Exhibit 3.28 on the next page and in Exhibit 3.29 on page 3-37. These highway sections were evaluated as follows:

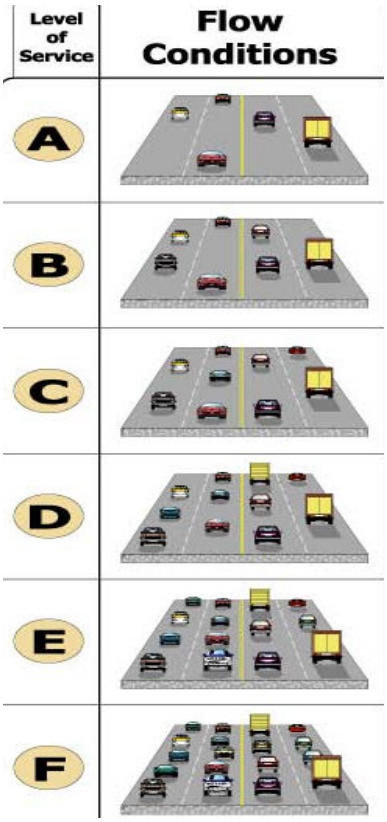
Rural Two-Lane Highway (9 sections):
These sections are usually a rural roadway with a two-lane cross section, one lane for each direction of flow, on which passing maneuvers must be made in the opposing lane.[13]

Passing a slower vehicle requires use of the opposing lane as sight distance and gaps in the opposing traffic stream permit. As traffic volumes and roadway obstructions increase, ability to pass is restricted. Levels of service on these types of highway are based on the ability to pass another vehicle and the average speed of traffic.

Two-lane highways can be analyzed either as two-way segments obtaining traffic performance measures for both directions of travel combined, or as directional segments with each direction of travel considered separately.

Exhibit 3.27

Level of Service Flow Conditions



Source: 2004 Highway Capacity Manual

[12] In some cases opposing directions of a highway section were considered separately. See Exhibit 3.29 on page 3-37.
[13] Source: Highway Capacity Manual.

Separate analysis by direction is appropriate for steep grades.[14]

Exhibit 3.28

SR 169 Highway Segment Evaluation Type

Segment Milepost	Segment	Highway Evaluation Type
Enumclaw		
0.0 - 1.5	Enumclaw Urban Area	Not evaluated, located inside an urban area
Rural / Agricultural		
1.5 - 4.3	Enumclaw Plateau	Two way, Two-lane Highway[1]
4.3 - 5.3	NB Green River South	Directional, Two-Lane Highway[2]
	SB Green River South	Directional, Two-Lane Highway
5.3 - 5.9	NB Green River North	Directional, Two-Lane Highway
	SB Green River North	Directional, Two-Lane Highway
Black Diamond		
5.9 - 7.5	Black Diamond South	Two way, Two-lane Highway
7.5 - 8.0	Black Diamond Urban Area	Not evaluated, located inside an urban area
8.0 - 11.2	Black Diamond North	Two way, Two-lane Highway
Maple Valley		
11.2 - 11.5	Four Corners Urban Area	Not evaluated, located inside an urban area
11.5 - 13.5	Maple Valley Central (5 lane)	Two way, Two-lane Highway[3]
13.5 - 14.3	Maple Valley Urban Area	Not evaluated, located inside an urban area
Cedar River		
14.3 - 19.2	Cedar River (2.Lane)	Two way, Two-lane Highway
Renton		
19.2 - 22.9	EB Cedar River (5-Lane)	Arterial – Urban Street
	WB Cedar River (5-Lane)	Arterial – Urban Street
22.9 - 25.3	EB Renton	Arterial – Urban Street
	WB Renton	Arterial – Urban Street

[1] Two way, Two-lane Highway (TWTL): refers to a two-lane highway evaluated as two-way segments obtaining traffic performance measures for both directions of travel combined.

[2] Directional, Two-Lane Highway (DTL): refers to a two-lane highway evaluated as directional segments obtaining traffic performance measures from each direction of travel separately.

In this study these segments are analyzed this way because separate evaluation is appropriate for steep grades such as those found in this Green River Gorge area.

[3] This segment was evaluated using the rural 2.lane highway methodology for the existing (2004) analysis. This segment is scheduled to be widened to 5-lanes and was evaluated using the urban arterial methodology for the 2030 No Build projected analysis.

[14] Ibid.

Directional two-lane highway methodology:

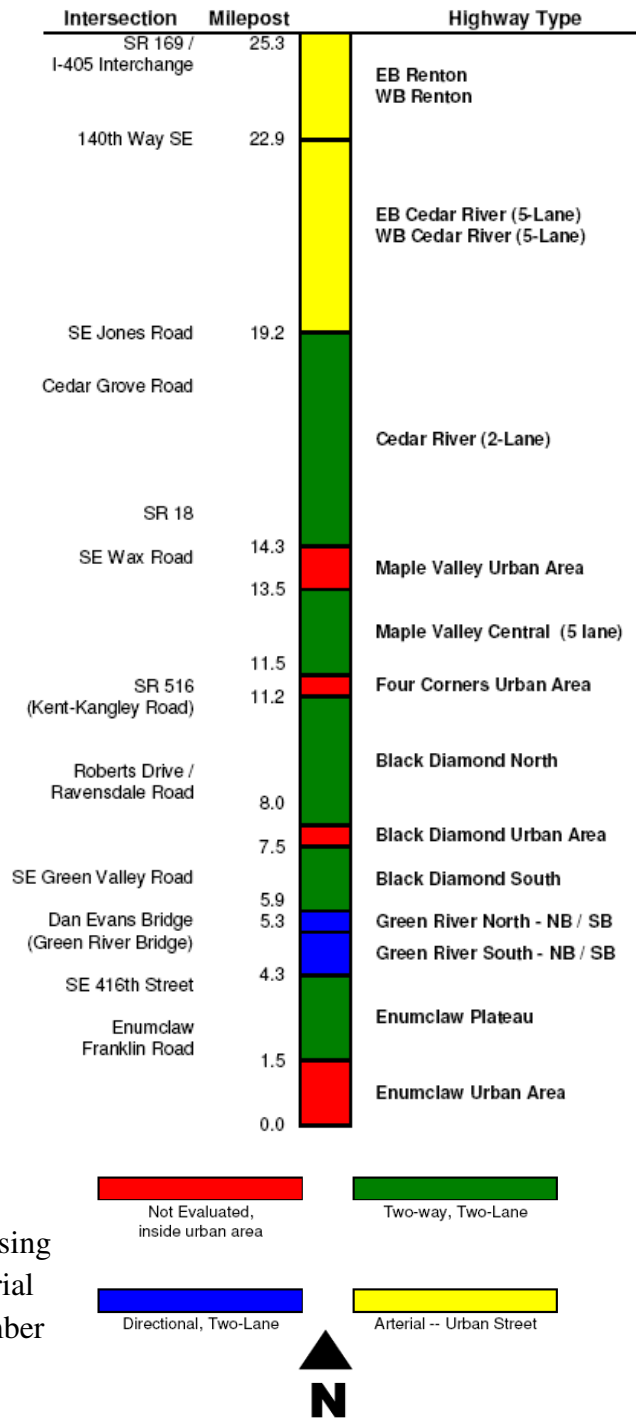
Four of the nine SR 169 rural sections are located on steep grades going into and out of the Green River Gorge in the Rural / Agricultural segment. These sections were evaluated with the directional two-lane highway methodology.

Two-way two-lane highway methodology: The five other rural sections are located along portions of the corridor leading into and out of urban areas. These segments were analyzed using two-way two-lane highway methodology, where both directions of the highway were analyzed together. These segments were analyzed using the 2000 Highway Capacity Software.

Urban – Arterial Urban Street (4 sections): These sections are highways with at least two lanes for the exclusive use of traffic in each direction, with no control or partial control of access. But this type of highway may have periodic interruptions to flow at signalized intersections no closer than 2 miles.[15] The arterial urban street differs from the two-lane highway primarily because a driver on a multilane highway is able to pass slower-moving vehicles without using lanes designated for oncoming traffic. An arterial urban street is also influenced both by the number

Exhibit 3.29

SR 169 Highway Segment Evaluation Type & Location



[15] Ibid.

of signals per mile and by the intersection control delay.

Levels of service on these types of highway are typically based on the average speed and density of traffic. These four SR 169 urban sections are located between Jones Road and I-405 (MP 19.22 to MP 25.26). These segments were analyzed using the HCM arterial LOS methodology Synchro.

Urban – Highway Section Inside Urban Areas (4 sections)
The four remaining sections were not evaluated because they were within urban areas. In urban areas intersection operations become the controlling factor. These sections are located in the urban areas of Enumclaw, Black Diamond, and Maple Valley.

Level of Service Criteria for Urban and Rural Sections
Factors influencing highway LOS include traffic volumes, percentage of heavy vehicles (large trucks), design speed of the highway, number of passing zones, shoulder and lane widths, grade, and directional distribution of traffic.[16]

The measurement criteria for urban and rural highway segment level of service are different. Direct comparisons between the two are not useful. Steep grades, frequent trucks and lack of passing lanes make the rural two-lane highway sections function at poor LOS at fairly low volumes compared to the urban multilane volumes.

13 What are the current rural SR 169 highway section levels of service?

Current peak hour LOS along the rural highway sections of SR 169 are operating worse than the state standard of LOS D. Frequent slow-moving trucks and the highway's single-lane configuration into and out of the steeply graded section of the rural Green River Valley Gorge area create a bottleneck to traffic flow. The need for a passing lane is addressed in the list of recommendations later in this Route Development Plan.

---

[16] The specific methods for calculating LOS can be found in the Transportation Research Board's (TRB) Highway Capacity Manual (HCM) 2000.

Exhibit 3.30

SR 169 Rural Highway Segments
Current vs. Projected LOS and Average Speed
(2004 and 2030)

Milepost	Segment	Highway Type[1]	2004 PM Peak Hour LOS[2]	2004 PM Peak Hour Average Speed[3]	2030 PM Peak Hour LOS	2030 PM Peak Hour Average Speed
Enumclaw						
Rural / Agricultural						
1.5 - 4.3	Enumclaw Plateau	TWTL	E	36.2	E	35.2
4.3 - 5.3	NB Green River South	DTL	E	34.2	F	23.9
	SB Green River South	DTL	F	30.7	F	25.5
5.3 - 5.9	NB Green River North	DTL	E	38.2	E	29.5
	SB Green River North	DTL	F	37.8	F	30.7
Black Diamond						
5.9 - 7.5	Black Diamond South	TWTL	E	37.3	E	31.8
8.0 - 11.2	Black Diamond North	TWTL	E	36.6	E	29.0
Maple Valley						
11.5 - 13.5	Maple Valley Central (5 lane)	TWTL	E	26.9	E	23.0
Cedar River						
14.3 - 19.2	Cedar River (2.Lane)	TWTL	E	32.2	E	28.1
Renton						

1. *HCM LOS methodology used:*
   TWTL = two-way, two-lane highway;
   DTL = directional two-lane highway
   (In this study these segments are analyzed this way because separate evaluation is appropriate for steep grades such as those found in this Green River Gorge area.)*;*
   Art – Urb St = arterial (urban street).
2. *Level of service.*
3. *Average speed per vehicle in miles per hour.*

NOTE: *Posted speed limits on SR 169 are listed in Exhibit 2.11 on page 2-25.*

4. *Not evaluated – within an urban area.*

Any mention of average travel speed in these tables discussing highway segment level of service should also consider the posted speed limit's impact. The posted speed limit varies from 35 to 50 miles per hour within one of the analyzed rural highway sections. A listing of the posted speed limits is in Exhibit 2.11 on page 2-25 earlier in this document.

14 What are the projected (2030) rural SR 169 highway section levels of service?

Similar to existing conditions, each rural two-lane highway segment fails to meet the regional LOS D standard in 2030. This is not only due to the high volume of traffic, but the condition of the roadway itself. The steep grades, narrow shoulders and winding curves make passing difficult, especially in the Rural / Agricultural segment. The high volume of truck traffic creates additional slow downs throughout the entire corridor.

15 What are the current urban SR 169 highway section levels of service?

As discussed earlier, the arterial urban street differs from the two lane highway because of the ability to pass without facing oncoming traffic and the number of signals per mile. The northern 6 miles of SR 169 are all multilane urban arterial street sections. The current levels of service on those northern SR 169 sections are all operating better than the state LOS D standard. The four remaining sections were not evaluated because they were within urban areas. Intersection operations are the controlling factor within urban areas.

Exhibit 3.31

SR 169 Urban Highway Segments
Current vs. Projected LOS and Average Speed
(2004 and 2030)

Milepost	Segment	Highway Type[1]	2004 PM Peak Hour LOS[2]	2004 PM Peak Hour Average Speed[3]	2030 PM Peak Hour LOS	2030 PM Peak Hour Average Speed
Enumclaw						
0.0 - 1.5	Enumclaw Urban Area	--[4]	NA	35.0	NA	35.0
Rural / Agricultural						
Black Diamond						
7.5 - 8.0	Black Diamond Urban Area	--[4]	NA	35.0	NA	35.0
Maple Valley						
11.2 - 11.5	Four Corners Urban Area	--[4]	NA	23.9	NA	11.2
13.5 - 14.3	Maple Valley Urban Area	--[4]	NA	19.9	NA	13.7
Cedar River						
Renton						
19.2 - 22.9	EB Cedar River (5-Lane)	Art – Urb St	A	42.5	B	37.2
	WB Cedar River (5-Lane)	Art – Urb St	A	42.5	A	42.7
22.9 - 25.2	EB Renton	Art – Urb St	C	25.2	E	14.6
	WB Renton	Art – Urb St	B	29.4	C	24.8

1. *HCM LOS methodology used:*
   TWTL = two-way, two-lane highway;
   DTL = directional two-lane highway
   Art – Urb St = arterial (urban street).
2. *Level of service.*
3. *Average speed per vehicle in miles per hour.*
4. *Not evaluated – within an urban area.*

Any mention of average travel speed in these tables discussing highway segment level of service should also consider the posted speed limit's impact. The posted speed limit varies from 35 to 50 miles per hour within one of the analyzed urban highway sections. A listing of the posted speed limits is in Exhibit 2.11 on page 2-25 earlier in this document.

16 What are the projected (2030) urban SR 169 highway section levels of service?

Current projects already in various stages of implementation in the Maple Valley and Renton areas[17] will assist the arterial urban street sections in Renton in meeting the LOS standards during the 2030 PM peak hour. The one area of exception is the traffic in the initial Renton eastbound lanes between I-405 and 140th Way SE. The eastbound direction (toward Enumclaw) is the peak direction during the PM peak hour. This Renton segment is expected to experience the highest traffic volumes along the corridor and is also where a majority of the traffic on SR 169 enters the corridor. Projects listed later in this SR 169 RDP are recommended to address this travel deficiency.

The majority of the SR 169 corridor is currently operating at levels of service worse than the PM peak hour regional standard of LOS D. Without any additional capacity improvements, this operational condition is expected to continue in the future and travel speeds are expected to decrease in most areas as traffic volumes increase by 2030.

[17] Maple Valley – SR 169 and SR 516 intersection, and Renton – SR 169 and I-405 interchange.

Segment Travel Times

17 What was the segment travel time analysis methodology?

Average free flow and congested travel times were developed for each corridor segment using traffic modeling software. Travel times for the urban portions of the corridor (Renton) were developed using the Synchro traffic model. The model is based on average delay per vehicle at intersections plus travel time between intersections. The travel time methodology accounted for delays observed at congested signalized intersections along the urban segments. For the remaining non-urban segments of the corridor, the 2000 Highway Capacity Software was used to develop free flow and congested travel times.

Travel times are based upon the capacity of a two-lane rural highway, posted speed limits, and the average time spent following slower vehicles. All travel times are expressed in minutes. The travel times were developed primarily for the purpose of comparison of each segment over time. It is important to note that each segment has a different distance, configuration, density, and traffic volumes. Comparison between segments would not be valid or appropriate. But examining the difference in percent change in travel times between segments would be valid and appears later in this section. Travel times for the 2030 No Build option, compared with the existing (2004) PM peak period travel times are shown in Exhibit 3.32 on the next page.

Exhibit 3.32

SR 169 Current and Future Travel Time Comparison

(2004 and 2030 Average PM Peak Period)

Segment	Distance (miles)	Average Free Flow[1] Travel Time (minutes)	2004 Current Average PM Travel Time (minutes)	2030 No Build Average PM Travel Time (minutes)	Percent Change: 2004 to 2030 Travel Time (minutes)
Enumclaw	1.5	2.4	2.6	2.6	0.0%
Rural / Agricultural	4.4	5.3	7.5	8.2	9.3%
Black Diamond	5.3	7.1	8.2	9.8	19.5%
Maple Valley	3.1	4.5	7.5	9.6	28.0%
Cedar River	4.9	6.1	9.1	10.5	15.4%
Renton	6.1	7.9	10.3	12.9	25.2%
Totals:	**25.3**	**33.3**	**45.2**	**53.6**	**18.6%**

[1] *Free Flow Travel refers to the time it would take to travel the whole corridor at the posted speed limits and unrestricted by other traffic.*

18 What are the current and projected (2030) SR 169 highway segment travel times?

Current highway segment travel times

The current (2004) travel times are displayed in Exhibit 3.32 above. The total current travel time for one PM peak period trip along the corridor is 45.2 minutes.

The travel times were developed primarily for the purpose of comparison of each segment over time. It is important to note that each segment has a different distance, configuration, density, and traffic volumes. Comparison between segments would not be valid or appropriate.

Projected (2030) highway segment travel times

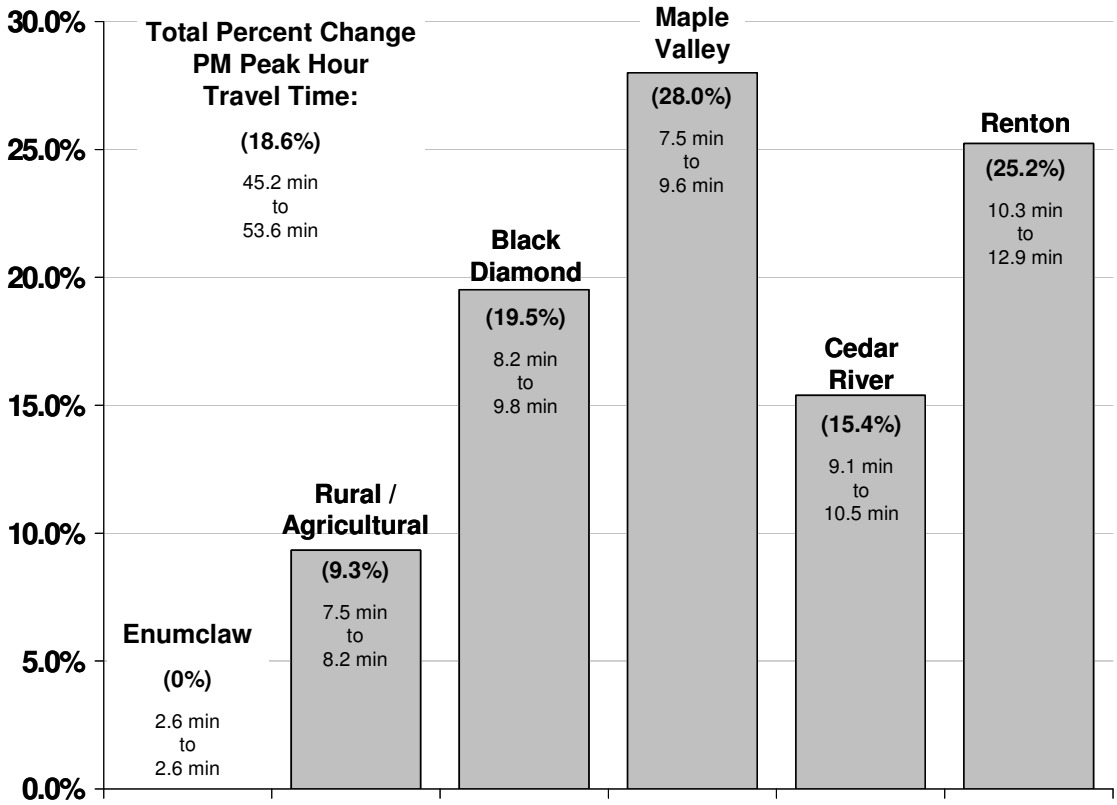
The 2030 PM peak period travel time for each segment is longer than their current travel times (with the exception of the Enumclaw segment). The total for one PM peak trip along the corridor is predicted to increase from 45.2 minutes to 53.6 minutes (18.6 percent increase) to travel the SR 169 corridor in 2030.

The segment with the largest percent increase in travel time is expected to be the Maple Valley segment, where the PM peak travel time is projected to increase from 7.5 minutes to nearly 10 minutes (9.6 minutes – 28.0 percent increase). This is likely due to the anticipated increase in vehicle trips between 2004 and 2030 concentrated in this segment. The percent change differences in segment travel time between 2004 and 2030 can be seen in Exhibit 3.33 below.

Exhibit 3.33

SR 169 Average PM Peak Hour Travel Time

Percent Change 2004 to 2030



The PM peak hour intersection LOS analysis, the segment LOS analysis, and the average travel time analysis all show that the existing corridor has capacity deficiencies which are anticipated to worsen over the next 20 years. Improvements to the entire corridor will be necessary to bring the SR 169 corridor level of service up to the state standard of level of service D or better.

Safety Conditions

19 What are the current SR 169 safety conditions?

Safety is a top priority on all our state highways. The growth of residential communities along SR 169 has changed the use of the highway from a small two-lane, rural farm road to a small, mostly two-lane, commuter and freight highway. The safety problems listed below are exacerbated by the volume of traffic now using the highway:

- Multiple uncontrolled driveways with direct access to SR 169;
- Intersections that meet the roadway at awkward angles;
- Narrow travel lanes and shoulders (in some locations shoulders are inadequate width for pedestrians);
- Sharp curves, steep roadside embankments, and foliage that obstruct drivers' and pedestrians' ability to clearly see the entire roadway;
- Large trucks that block the roadway while making left turns;
- Disabled vehicles (which block the shoulders and/or traffic lanes); and
- Lack of sidewalks in developed areas and near school zones.

These conditions listed above can reduce roadway safety and contribute to vehicle collisions. The recent history of collisions is discussed on the next page. The Corridor Working Group has developed recommendations that, when implemented, will help improve safety along SR 169 (See Chapter 5).