

2019 Skagit County Road Segment & Intersection Concurrency



INTRODUCTION

In conformance with Growth Management, RCW 36.70A, Skagit County Code 14.28.110 “Annual Concurrency Assessment” requires that the County Engineer annually produce this report to update the status of County road concurrency. The following is produced to meet said requirement.

REQUIREMENTS

The concurrency assessment requires that “*The County Engineer must evaluate the high traffic County road segments (any County road segment on which there are at least 8,000 average daily trips) and high traffic County road intersections (any County road intersection into which the total approach volume is at least 7,000 average daily trips and the approach volume from all of the minor legs totals at least 1,000 average daily trips) using a Highway Capacity Manual type method (as selected by the County Engineer) to determine whether these road segments and intersections comply with the level of service standards adopted in the Comprehensive Plan.*” The Levels of Service (LOS) are described as follows in Skagit County’s Comprehensive Plan.

- Policy 8A-2.1** Level of Service Standards – The Level of Service (LOS) standard for County roads is C. LOS D is acceptable for all road segments that:
- a) *Have Annualized Average Daily Traffic (AADT) greater than 7,000 vehicles;*
 - and*
 - b) *Are NOT federally functionally classified as a Local Access Road; and*
 - c) *Are designated as a County Freight and Goods Transportation Systems Route (FGTS).*

The LOS standard for County road intersections is LOS D.

LEVEL OF SERVICE DATA

Road Segments

The methodology used to acquire the LOS of County road segments is outlined in Appendix C (Transportation Element Technical Appendix) of the Skagit County Comprehensive Plan.

“The Skagit County Public Works Traffic Engineering Unit has selected an LOS study volume unit threshold of 7,000 AADT. This threshold is an indicator that a road segment may be approaching the LOS C/D threshold and should be studied in depth.”

Table 1 shows the current County roads that meet the criteria for further study and the current LOS as determined using the Transportation Research Board’s Highway Capacity Manual and Highway Capacity Software developed for this use by the University of Florida. Also shown is

the projected 5-year LOS. This projected LOS was determined using a 2 percent yearly growth factor for each road segment. Projects along these roadways that are scheduled to be completed within this 5-year period were not significant enough to include as separate items. As one can see from Table 1, all the criteria for LOS concurrency have been met.

Table 1 – Road Segments

Skagit County Roads with Over 7,000 ADT														
Road #	Road Name	FFC	Truck Rt	Beg MP	End MP	Length	2019 ADT	2020 ADT	2021 ADT	2022 ADT	2023 ADT	2024 ADT	2019 LOS	2024 LOS
63000	COOK ROAD	07	T2	1.750	1.800	0.050	16111	16433	16762	17097	17439	17788	These two segments are in WSDOT ROW	
63000	COOK ROAD	07	T2	1.800	1.860	0.060	16111	16433	16762	17097	17439	17788		
63000	COOK ROAD	07	T2	1.860	1.970	0.110	15101	15403	15711	16025	16346	16673	D	D
63000	COOK ROAD	07	T2	1.970	3.080	1.110	15101	15403	15711	16025	16346	16673	D	D
63000	COOK ROAD	07	T2	3.080	3.360	0.280	15101	15403	15711	16025	16346	16673	D	D
63000	COOK ROAD	07	T2	3.360	3.820	0.460	14040	14321	14607	14899	15197	15501	D	D
63000	COOK ROAD	07	T2	3.820	4.100	0.280	14040	14321	14607	14899	15197	15501	D	D
63000	COOK ROAD	07	T2	4.100	4.320	0.220	14040	14321	14607	14899	15197	15501	D	D
63000	COOK ROAD	07	T2	4.320	4.600	0.280	14040	14321	14607	14899	15197	15501	D	D
63000	COOK ROAD	07	T2	4.600	5.000	0.400	14215	14499	14789	15085	15387	15695	D	D
63000	COOK ROAD	07	T2	5.000	5.260	0.260	14215	14499	14789	15085	15387	15695	D	D
63000	COOK ROAD	07	T2	5.260	5.320	0.060	14215	14499	14789	15085	15387	15695	D	D
63000	COOK ROAD	07	T2	5.320	5.390	0.070	14215	14499	14789	15085	15387	15695	D	D
63000	COOK ROAD	16	T2	5.390	5.510	0.120	14215	14499	14789	15085	15387	15695	D	D
63000	COOK ROAD	16	T2	5.510	5.620	0.110	14215	14499	14789	15085	15387	15695	D	D
71500	SOUTH LAVENTURE	14	Non	0.000	0.063	0.063	8214	8378	8546	8717	8891	9069	C	C
71500	SOUTH LAVENTURE	14	Non	0.063	0.274	0.211	8214	8378	8546	8717	8891	9069	C	C
71500	SOUTH LAVENTURE	14	Non	0.545	0.553	0.008	8284	8450	8619	8791	8967	9146	C	C
71500	SOUTH LAVENTURE	14	Non	0.553	0.701	0.148	8284	8450	8619	8791	8967	9146	C	C
71500	SOUTH LAVENTURE	14	Non	0.701	0.715	0.014	8284	8450	8619	8791	8967	9146	C	C
71500	SOUTH LAVENTURE	14	Non	0.715	0.730	0.015	8284	8450	8619	8791	8967	9146	C	C
71500	SOUTH LAVENTURE	14	Non	0.730	0.773	0.043	8284	8450	8619	8791	8967	9146	C	C
80090	PIONEER HIGHWAY	07	T3	0.000	0.883	0.883	9442	9631	9823	10020	10220	10425	C	C
80090	PIONEER HIGHWAY	07	T3	0.883	1.418	0.535	9516	9706	9900	10098	10300	10506	C	C
80090	PIONEER HIGHWAY	07	T3	1.418	1.748	0.330	9516	9706	9900	10098	10300	10506	C	C
80090	PIONEER HIGHWAY	07	T3	1.748	3.065	1.317	9389	9577	9768	9964	10163	10366	C	C
80090	PIONEER HIGHWAY	07	T3	3.065	3.089	0.024	12302	12548	12799	13055	13316	13582	D	D

There were a number of road segments that did not meet the 7,000 ADT threshold this year that had in 2018 and therefore, are not represented in Table 1. These include segments on Bow Hill Road and Fir Island Road.

Road Intersections

As with Road Segment LOS, Intersection LOS methodology is outlined in the Transportation Element Technical Appendix (TETA) Appendix C of the Comprehensive Plan. Intersection LOS, according to the Highway Capacity Manual, cannot be determined at stop-controlled intersections. The individual stop-controlled leg LOS can be determined, but the overall intersection LOS cannot be determined. With regard to stop-controlled intersections, the TETA states that:

“Intersection LOS will be calculated using Traffic Signal Warrants in conjunction with LOS methods. The analysis will use real time data, which focuses on turn movements and volumes of the entire intersection. This type of analysis can be made on any intersection in the County Road System.”

Table 2 shows the intersection on which Skagit County is collecting LOS data on a regular basis. In recent years, other intersections have fallen off this list due to intersection improvement projects, namely roundabouts. These include the intersections at Best and McLean Roads in 2008 and Pioneer Hwy at Fir Island Road in 2014.

Table 2 – Intersections

Intersection Name	Intersection Type	NB Approach LOS	SB Approach LOS	EB Approach LOS	WB Approach LOS	Overall LOS
2019						
Cook Road / Old Hwy 99 N	Signalized	B	B	B	A	B
2024						
Cook Road / Old Hwy 99 N	Signalized	B	B	B	B	B

The full Highway Capacity Reports on the intersection of Cook Road and Old Hwy 99 N for the current year and 5-year estimate are included in this Assessment as Appendix A and Appendix B respectively. This 5-year projected LOS was determined using a 2 percent yearly growth factor for each approach volume. This is by far the busiest intersection under Skagit County jurisdiction.

A turn movement study at this intersection was not conducted in the years 2017-2019 as the Burlington Northern Overpass Replacement Project directly north of the intersection that closed Old Hwy 99 North beginning May 1, 2017 drastically affected the traffic at this intersection. The turn movement study used for this assessment was actually conducted in June of 2020. As such, the traffic volumes may be affected by the COVID-19 Pandemic. Turn movement studies in subsequent years may give a better long-term picture of LOS as traffic levels have decreased during the Pandemic.

It should also be noted that this intersection was studied during the Peak PM hour for the Highway Capacity report as per industry standards and Concurrency requirements. However, during the Peak AM hour the LOS from the Westbound (WB) and Eastbound (EB) approaches would differ due to the prevailing traffic patterns for work-bound and home-bound trips. There are also two to three AM peak hour trains that travel through the at-grade rail crossing just east of the intersection that directly affect LOS during the morning commute.

SUMMARY
























As of December 31, 2019 all Skagit County road segments and signalized intersections meet the current LOS standards as adopted in the Comprehensive Plan of Skagit County. Therefore, all Skagit County road segments and intersections are concurrent.

Skagit County Public Works has used the Highway Capacity Manual, Sixth Edition of 2016 and its associated software to determine all Level of Service calculations in this report.

HCM 6th Signalized Intersection Summary

3:

06/15/2020

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	98	526	60	57	395	47	94	156	168	44	68	102	
Future Volume (veh/h)	98	526	60	57	395	47	94	156	168	44	68	102	
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach		No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	
Adj Flow Rate, veh/h	107	572	65	62	429	51	102	170	183	48	74	111	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2	
Cap, veh/h	440	795	90	331	791	94	486	243	262	282	552	468	
Arrive On Green	0.48	0.48	0.48	0.48	0.48	0.48	0.29	0.29	0.29	0.29	0.29	0.29	
Sat Flow, veh/h	915	1649	187	791	1640	195	1199	824	887	1028	1870	1585	
Grp Volume(v), veh/h	107	0	637	62	0	480	102	0	353	48	74	111	
Grp Sat Flow(s),veh/h/ln	915	0	1837	791	0	1835	1199	0	1711	1028	1870	1585	
Q Serve(g_s), s	4.0	0.0	11.8	2.9	0.0	7.9	2.9	0.0	7.9	1.9	1.2	2.3	
Cycle Q Clear(g_c), s	11.9	0.0	11.8	14.7	0.0	7.9	4.2	0.0	7.9	9.8	1.2	2.3	
Prop In Lane	1.00		0.10	1.00		0.11	1.00		0.52	1.00		1.00	
Lane Grp Cap(c), veh/h	440	0	885	331	0	884	486	0	505	282	552	468	
V/C Ratio(X)	0.24	0.00	0.72	0.19	0.00	0.54	0.21	0.00	0.70	0.17	0.13	0.24	
Avail Cap(c_a), veh/h	1156	0	2322	961	0	2345	871	0	1053	825	1538	1304	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	12.0	0.0	8.8	14.7	0.0	7.8	12.7	0.0	13.5	17.8	11.1	11.5	
Incr Delay (d2), s/veh	0.3	0.0	1.1	0.3	0.0	0.5	0.2	0.0	1.8	0.3	0.1	0.3	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	0.7	0.0	3.5	0.5	0.0	2.3	0.7	0.0	2.7	0.4	0.4	0.7	
Unsig. Movement Delay, s/veh													
LnGrp Delay(d),s/veh	12.3	0.0	10.0	15.0	0.0	8.3	12.9	0.0	15.2	18.1	11.2	11.8	
LnGrp LOS	B	A	A	B	A	A	B	A	B	B	B	B	
Approach Vol, veh/h		744			542			455			233		
Approach Delay, s/veh		10.3			9.1			14.7			12.9		
Approach LOS		B			A			B			B		
Timer - Assigned Phs		2		4		6		8					
Phs Duration (G+Y+Rc), s		17.3		25.7		17.3		25.7					
Change Period (Y+Rc), s		* 4.6		* 5		4.6		5.0					
Max Green Setting (Gmax), s		* 27		* 54		35.4		55.0					
Max Q Clear Time (g_c+I1), s		9.9		13.9		11.8		16.7					
Green Ext Time (p_c), s		2.4		5.9		0.9		4.0					
Intersection Summary													
HCM 6th Ctrl Delay				11.3									
HCM 6th LOS				B									
Notes													
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.													

HCM 6th Signalized Intersection Summary

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06/15/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	108	581	66	63	436	52	104	172	185	49	75	113
Future Volume (veh/h)	108	581	66	63	436	52	104	172	185	49	75	113
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	117	632	72	68	474	57	113	187	201	53	82	123
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	406	839	96	287	833	100	463	255	274	243	579	491
Arrive On Green	0.51	0.51	0.51	0.51	0.51	0.51	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	873	1649	188	743	1638	197	1177	825	886	996	1870	1585
Grp Volume(v), veh/h	117	0	704	68	0	531	113	0	388	53	82	123
Grp Sat Flow(s),veh/h/ln	873	0	1837	743	0	1835	1177	0	1711	996	1870	1585
Q Serve(g_s), s	5.7	0.0	16.1	4.2	0.0	10.6	4.1	0.0	10.7	2.7	1.7	3.1
Cycle Q Clear(g_c), s	16.2	0.0	16.1	20.4	0.0	10.6	5.7	0.0	10.7	13.4	1.7	3.1
Prop In Lane	1.00		0.10	1.00		0.11	1.00		0.52	1.00		1.00
Lane Grp Cap(c), veh/h	406	0	934	287	0	934	463	0	530	243	579	491
V/C Ratio(X)	0.29	0.00	0.75	0.24	0.00	0.57	0.24	0.00	0.73	0.22	0.14	0.25
Avail Cap(c_a), veh/h	859	0	1889	682	0	1908	689	0	857	601	1252	1061
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.6	0.0	10.3	18.5	0.0	9.0	15.2	0.0	16.3	22.3	13.2	13.7
Incr Delay (d2), s/veh	0.4	0.0	1.3	0.4	0.0	0.5	0.3	0.0	2.0	0.4	0.1	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	5.3	0.7	0.0	3.4	1.0	0.0	3.9	0.6	0.6	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.0	0.0	11.6	18.9	0.0	9.5	15.5	0.0	18.3	22.7	13.3	13.9
LnGrp LOS	B	A	B	B	A	A	B	A	B	C	B	B
Approach Vol, veh/h		821			599			501			258	
Approach Delay, s/veh		12.1			10.6			17.7			15.5	
Approach LOS		B			B			B			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		21.0		31.9		21.0		31.9				
Change Period (Y+Rc), s		* 4.6		* 5		4.6		5.0				
Max Green Setting (Gmax), s		* 27		* 54		35.4		55.0				
Max Q Clear Time (g_c+I1), s		12.7		18.2		15.4		22.4				
Green Ext Time (p_c), s		2.5		6.8		1.0		4.5				
Intersection Summary												
HCM 6th Ctrl Delay				13.4								
HCM 6th LOS				B								
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												