

HCM Unsignalized Intersection Capacity Analysis  
 51: Old Olympic Highway & N 5th Ave

8/8/2012

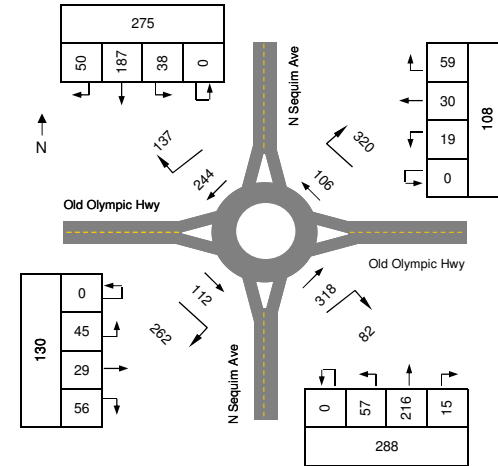


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop				Stop	
Volume (vph)	14	63	128	51	73	7	113	85	42	9	44	13
Peak Hour Factor	0.91	0.91	0.91	0.84	0.84	0.84	0.82	0.82	0.82	0.79	0.79	0.79
Hourly flow rate (vph)	15	69	141	61	87	8	138	104	51	11	56	16
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1					
Volume Total (vph)	15	210	61	95	138	155	84					
Volume Left (vph)	15	0	61	0	138	0	11					
Volume Right (vph)	0	141	0	8	0	51	16					
Hadj (s)	0.59	-0.38	0.59	0.02	0.59	-0.15	-0.01					
Departure Headway (s)	6.4	5.4	6.4	5.9	6.2	5.5	5.9					
Degree Utilization, x	0.03	0.32	0.11	0.16	0.24	0.24	0.14					
Capacity (veh/h)	531	633	524	575	551	621	563					
Control Delay (s)	8.4	9.7	9.0	8.8	10.0	9.0	9.9					
Approach Delay (s)	9.6		8.9		9.5		9.9					
Approach LOS	A		A		A		A					
Intersection Summary												
Delay			9.4									
HCM Level of Service			A									
Intersection Capacity Utilization			37.4%	ICU Level of Service								A
Analysis Period (min)			15									

**ROUNDBOUT CAPACITY ANALYSIS - HCM 2010**

Period (hr)	1	Project	Sequim TMP				E-W Street		Old Olympic Hwy					
PHF	0.9	Scenario	2012 PM				N-S Street		N Sequim Ave					
Approach		Lane	Lane Config.	Percentage			Flow (pcph)	Conflicting		Capacity (pcph)	v/c	Control Delay (sec)	LOS*	95th Queue** (ft)
Direction	Lanes			L	T	R		Flow	Lanes					
North	1	1	LTR	100%	100%	100%	288	112	1	1,010	0.32	5.5	A	35
	Bypass?													
	No													
	<b>Total</b>				100%	100%	100%	288				5.5	A	
South	1	1	LT	100%	100%	100%	275	106	1	1,016	0.30	5.4	A	32
	Bypass?													
	No													
	<b>Total</b>				100%	100%	100%	275				5.4	A	
East	1	1	L	100%	100%	100%	130	244	1	885	0.16	5.0	A	15
	Bypass?													
	No													
	<b>Total</b>				100%	100%	100%	130				5.0	A	
West	1	1	LTR	100%	100%	100%	108	318	1	822	0.15	5.3	A	13
	Bypass?													
	No													
	<b>Total</b>				100%	100%	100%	108				5.3	A	
<b>All</b>											5.4	A		

Diagram



Volumes

	Northbound				Southbound				Eastbound				Westbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Total (vph)	0	54	206	14	0	36	178	48	0	43	28	53	0	18	29	56
Trucks	0	3	10	1	0	2	9	2	0	2	1	3	0	1	1	3
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cars	0	51	196	13	0	34	169	46	0	41	27	50	0	17	28	53
f <sub>HV</sub>	1.00	0.95	0.95	0.93	1.00	0.95	0.95	0.96	1.00	0.96	0.97	0.95	1.00	0.95	0.97	0.95
Total (pcph)	0	57	216	15	0	38	187	50	0	45	29	56	0	19	30	59

	Northbound				Southbound				Eastbound				Westbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Truck %	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Trucks (vph)																

Source: NCHRP Report 672 - Roundabouts: An Informational Guide, Second Edition (TRB, 2010)

\* Does not include the effect of conflicting pedestrians

\*\* Assumes a queued vehicle length of 25 feet

HCM Unsignalized Intersection Capacity Analysis  
 53: W Hendrickson Road & N Priest Rd

8/8/2012



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	➔			➔	➔	
Sign Control	Stop			Stop	Stop	
Volume (vph)	9	7	76	14	10	71
Peak Hour Factor	0.56	0.56	0.77	0.77	0.66	0.66
Hourly flow rate (vph)	16	12	99	18	15	108
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total (vph)	29	117	123			
Volume Left (vph)	0	99	15			
Volume Right (vph)	13	0	108			
Hadj (s)	-0.18	0.25	-0.42			
Departure Headway (s)	4.1	4.4	3.8			
Degree Utilization, x	0.03	0.14	0.13			
Capacity (veh/h)	843	788	903			
Control Delay (s)	7.2	8.2	7.4			
Approach Delay (s)	7.2	8.2	7.4			
Approach LOS	A	A	A			
Intersection Summary						
Delay			7.7			
HCM Level of Service			A			
Intersection Capacity Utilization			23.9%	ICU Level of Service		A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 54: W Hendrickson Road & N Kendall Road

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕						↕	
Volume (veh/h)	56	63	0	0	70	122	0	0	0	61	0	63
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.90	0.90	0.90	0.25	0.25	0.25	0.92	0.92	0.92
Hourly flow rate (vph)	64	72	0	0	78	136	0	0	0	66	0	68
Pedestrians		1										
Lane Width (ft)		13.0										
Walking Speed (ft/s)		4.0										
Percent Blockage		0										
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	213			72			414	412	72	344	344	147
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	213			72			414	412	72	344	344	147
tC, single (s)	4.1			4.1			7.2	6.6	6.2	7.2	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			100			100	100	100	89	100	92
cM capacity (veh/h)	1339			1510			483	500	982	582	546	892
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>SB 1</b>									
Volume Total	135	213	135									
Volume Left	64	0	66									
Volume Right	0	136	68									
cSH	1339	1510	707									
Volume to Capacity	0.05	0.00	0.19									
Queue Length 95th (ft)	4	0	17									
Control Delay (s)	3.9	0.0	11.3									
Lane LOS	A		B									
Approach Delay (s)	3.9	0.0	11.3									
Approach LOS			B									
<b>Intersection Summary</b>												
Average Delay			4.2									
Intersection Capacity Utilization			35.1%		ICU Level of Service				A			
Analysis Period (min)			15									

# HCM Signalized Intersection Capacity Analysis

## 55: W Hendrickson Road & N 5th Ave

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	59	40	46	17	48	28	34	222	22	23	210	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	12	12	10	12	10	13	12	10	14	12
Total Lost time (s)	4.5	4.5		4.5	4.0		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	0.94		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	1700		1719	1575		1604	1838		1604	1866	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	1700		1719	1575		1604	1838		1604	1866	
Peak-hour factor, PHF	0.84	0.84	0.84	0.80	0.80	0.80	0.83	0.83	0.83	0.91	0.91	0.91
Adj. Flow (vph)	70	48	55	21	60	35	41	267	27	25	231	55
RTOR Reduction (vph)	0	25	0	0	14	0	0	2	0	0	4	0
Lane Group Flow (vph)	70	78	0	21	81	0	41	292	0	25	282	0
Confl. Peds. (#/hr)	8		1	1		8	2		6	6		2
Confl. Bikes (#/hr)									4			
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	6.8	13.8		2.3	9.8		4.1	23.4		2.4	21.7	
Effective Green, g (s)	6.8	13.8		2.3	9.8		4.1	23.4		2.4	21.7	
Actuated g/C Ratio	0.11	0.23		0.04	0.16		0.07	0.39		0.04	0.36	
Clearance Time (s)	4.5	4.5		4.5	4.0		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	195	392		66	258		110	718		64	676	
v/s Ratio Prot	c0.04	c0.05		0.01	c0.05		c0.03	c0.16		0.02	0.15	
v/s Ratio Perm												
v/c Ratio	0.36	0.20		0.32	0.31		0.37	0.41		0.39	0.42	
Uniform Delay, d1	24.5	18.6		28.0	22.1		26.7	13.2		28.0	14.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.2		2.8	0.7		2.1	0.4		3.9	0.4	
Delay (s)	25.7	18.8		30.8	22.8		28.8	13.6		31.9	14.8	
Level of Service	C	B		C	C		C	B		C	B	
Approach Delay (s)		21.6			24.2			15.5			16.1	
Approach LOS		C			C			B			B	

### Intersection Summary

HCM Average Control Delay	17.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	59.9	Sum of lost time (s)	17.5
Intersection Capacity Utilization	40.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

# HCM Unsignalized Intersection Capacity Analysis

## 56: W Hendrickson Road & N Sequim Ave

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	34	0	109	1	2	1	70	274	1	0	262	28
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.48	0.48	0.48	0.50	0.50	0.50	0.84	0.84	0.84	0.85	0.85	0.85
Hourly flow rate (vph)	71	0	227	2	4	2	83	326	1	0	308	33
Pedestrians		5										
Lane Width (ft)		10.0										
Walking Speed (ft/s)		4.0										
Percent Blockage		0										
Right turn flare (veh)			4									
Median type							None				TWLTL	
Median storage veh											2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	827	824	330	915	840	327	346			327		
vC1, stage 1 conf vol	330	330		493	493							
vC2, stage 2 conf vol	497	494		422	346							
vCu, unblocked vol	827	824	330	915	840	327	346			327		
tC, single (s)	7.2	6.6	6.2	7.2	6.6	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.6		6.1	5.6							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	84	100	68	99	99	100	93			100		
cM capacity (veh/h)	452	450	702	297	430	708	1192			1216		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	298	8	83	327	0	341
Volume Left	71	2	83	0	0	0
Volume Right	227	2	0	1	0	33
cSH	922	424	1192	1700	1700	1700
Volume to Capacity	0.32	0.02	0.07	0.19	0.00	0.20
Queue Length 95th (ft)	35	1	6	0	0	0
Control Delay (s)	13.0	13.7	8.2	0.0	0.0	0.0
Lane LOS	B	B	A			
Approach Delay (s)	13.0	13.7	1.7		0.0	
Approach LOS	B	B				

### Intersection Summary

Average Delay		4.4				
Intersection Capacity Utilization		35.6%		ICU Level of Service		A
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

## 57: W Fir Street & N 5th Ave

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↗	↘		↗	↘	
Volume (veh/h)	31	38	69	9	15	12	67	295	14	14	230	46
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.94	0.94	0.94	0.97	0.97	0.97
Hourly flow rate (vph)	41	51	92	12	20	16	71	314	15	14	237	47
Pedestrians		3			7			3			4	
Lane Width (ft)		15.0			16.0			12.0			11.5	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			1			0			0	
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh											2	
Upstream signal (ft)								1302				
pX, platoon unblocked												
vC, conflicting volume	779	771	267	857	787	332	288			336		
vC1, stage 1 conf vol	293	293		471	471							
vC2, stage 2 conf vol	486	478		386	316							
vCu, unblocked vol	779	771	267	857	787	332	288			336		
tC, single (s)	7.2	6.6	6.2	7.2	6.6	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.6		6.1	5.6							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	91	89	88	97	96	98	94			99		
cM capacity (veh/h)	439	456	760	373	448	695	1254			1198		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	184	48	71	329	14	285
Volume Left	41	12	71	0	14	0
Volume Right	92	16	0	15	0	47
cSH	564	481	1254	1700	1198	1700
Volume to Capacity	0.33	0.10	0.06	0.19	0.01	0.17
Queue Length 95th (ft)	35	8	5	0	1	0
Control Delay (s)	14.4	13.3	8.0	0.0	8.0	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	14.4	13.3	1.4		0.4	
Approach LOS	B	B				

### Intersection Summary

Average Delay	4.3
Intersection Capacity Utilization	40.4%
ICU Level of Service	A
Analysis Period (min)	15

# HCM Unsignalized Intersection Capacity Analysis

## 58: W Fir Street & N Sequim Ave

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔		↔	↔	
Volume (veh/h)	19	12	17	9	17	40	19	232	17	28	317	20
Sign Control		Stop			Stop			Free			Free	
Grade		-1%			0%			0%			0%	
Peak Hour Factor	0.75	0.75	0.75	0.92	0.92	0.92	0.78	0.78	0.78	0.91	0.91	0.91
Hourly flow rate (vph)	25	16	23	10	18	43	24	297	22	31	348	22
Pedestrians		2			3			1			3	
Lane Width (ft)		14.0			14.0			10.5			11.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh											2	
Upstream signal (ft)								1317				
pX, platoon unblocked												
vC, conflicting volume	825	794	362	802	794	314	372			322		
vC1, stage 1 conf vol	423	423		360	360							
vC2, stage 2 conf vol	402	371		442	434							
vCu, unblocked vol	825	794	362	802	794	314	372			322		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	97	97	98	96	94	98			98		
cM capacity (veh/h)	447	475	685	455	469	720	1173			1234		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	64	72	24	319	31	370
Volume Left	25	10	24	0	31	0
Volume Right	23	43	0	22	0	22
cSH	518	592	1173	1700	1234	1700
Volume to Capacity	0.12	0.12	0.02	0.19	0.02	0.22
Queue Length 95th (ft)	10	10	2	0	2	0
Control Delay (s)	12.9	11.9	8.1	0.0	8.0	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	12.9	11.9	0.6		0.6	
Approach LOS	B	B				

### Intersection Summary

Average Delay	2.4
Intersection Capacity Utilization	36.4%
ICU Level of Service	A
Analysis Period (min)	15



# HCM Unsignalized Intersection Capacity Analysis

## 59: E Fir Street & N Brown Rd

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Volume (veh/h)	18	34	35	4	12	10	28	74	2	10	57	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.94	0.94	0.94	0.89	0.89	0.89	0.87	0.87	0.87
Hourly flow rate (vph)	22	42	43	4	13	11	31	83	2	11	66	11
Pedestrians		7			2			3			1	
Lane Width (ft)		15.0			15.0			12.0			16.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		1			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	266	252	81	311	256	87	84			87		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	266	252	81	311	256	87	84			87		
tC, single (s)	7.2	6.6	6.2	7.2	6.6	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	93	96	99	98	99	98			99		
cM capacity (veh/h)	637	622	961	557	618	960	1483			1487		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	107	28	117	89
Volume Left	22	4	31	11
Volume Right	43	11	2	11
cSH	729	703	1483	1487
Volume to Capacity	0.15	0.04	0.02	0.01
Queue Length 95th (ft)	13	3	2	1
Control Delay (s)	10.8	10.3	2.1	1.0
Lane LOS	B	B	A	A
Approach Delay (s)	10.8	10.3	2.1	1.0
Approach LOS	B	B		

Intersection Summary			
Average Delay		5.2	
Intersection Capacity Utilization	25.0%		ICU Level of Service A
Analysis Period (min)		15	

# HCM Unsignalized Intersection Capacity Analysis

## 60: W Spruce St & N Sequim Ave

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↖	↗		↖	↗			↕	
Volume (veh/h)	16	42	21	8	26	27	27	261	9	21	331	29
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.73	0.73	0.73	0.88	0.88	0.88	0.96	0.96	0.96
Hourly flow rate (vph)	20	51	26	11	36	37	31	297	10	22	345	30
Pedestrians		3			3			3			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								702				
pX, platoon unblocked	0.98	0.98		0.98	0.98	0.98				0.98		
vC, conflicting volume	821	778	366	824	788	307	378			310		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	809	765	366	812	775	285	378			288		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	92	84	96	95	88	95	97			98		
cM capacity (veh/h)	243	311	674	234	305	733	1178			1248		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	96	11	73	31	307	397
Volume Left	20	11	0	31	0	22
Volume Right	26	0	37	0	10	30
cSH	340	234	435	1178	1700	1248
Volume to Capacity	0.28	0.05	0.17	0.03	0.18	0.02
Queue Length 95th (ft)	29	4	15	2	0	1
Control Delay (s)	19.7	21.1	14.9	8.1	0.0	0.6
Lane LOS	C	C	B	A		A
Approach Delay (s)	19.7	15.8		0.7		0.6
Approach LOS	C	C				

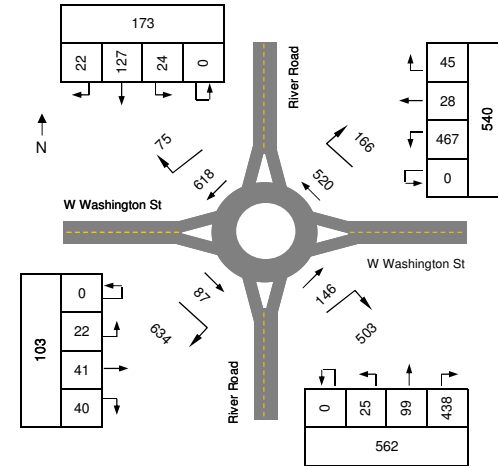
### Intersection Summary

Average Delay	4.1
Intersection Capacity Utilization	54.6%
ICU Level of Service	A
Analysis Period (min)	15

**ROUNDBABOUT CAPACITY ANALYSIS - HCM 2010**

Period (hr)	1	Project	Sequim TMP						E-W Street		W Washington St				
PHF	0.96	Scenario	2012 PM						N-S Street		River Road				
Approach		Lane	Lane Config.	Percentage			Flow (pcph)	Conflicting		Capacity (pcph)	v/c	Control Delay (sec)	LOS*	95th Queue** (ft)	
Direction	Lanes			L	T	R		Flow	Lanes						
North	1	1	LTR	100%	100%	40%	299	87	1	1,036	0.30	5.3	A	32	
	Bypass?														
	Free	Bypass	R	0%	0%	60%	263					0.0	A		
	<b>Total</b>			<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>562</b>					<b>2.8</b>	<b>A</b>		
South	1	1	LT	100%	100%	100%	173	520	1	672	0.27	7.6	A	27	
	Bypass?														
	No														
	<b>Total</b>			<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>173</b>					<b>7.6</b>	<b>A</b>		
East	1	1	L	100%	100%	100%	103	618	1	609	0.18	7.3	A	16	
	Bypass?														
	No														
	<b>Total</b>			<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>103</b>					<b>7.3</b>	<b>A</b>		
West	1	1	LTR	100%	100%	40%	513	146	1	976	0.55	8.7	A	89	
	Bypass?														
	Free	Bypass	R	0%	0%	60%	27					0.0	A		
	<b>Total</b>			<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>540</b>					<b>8.2</b>	<b>A</b>		
<b>All</b>						<b>1,378</b>					<b>5.9</b>	<b>A</b>			

**Diagram**



**Volumes**

	Northbound				Southbound				Eastbound				Westbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Total (vph)	0	25	97	431	0	24	126	22	0	22	41	40	0	459	28	44
Trucks	0	0	2	7	0	0	1	0	0	0	0	0	0	8	0	1
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cars	0	25	95	424	0	24	125	22	0	22	41	40	0	451	28	43
f <sub>HV</sub>	1.00	1.00	0.98	0.98	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.98
Total (pcph)	0	25	99	438	0	24	127	22	0	22	41	40	0	467	28	45

	Northbound				Southbound				Eastbound				Westbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Truck %	1.6	1.6	1.6	1.6	0.7	0.7	0.7	0.7	0	0	0	0	1.7	1.7	1.7	1.7
Trucks (vph)																

Source: NCHRP Report 672 - Roundabouts: An Informational Guide, Second Edition (TRB, 2010)

\* Does not include the effect of conflicting pedestrians

\*\* Assumes a queued vehicle length of 25 feet

# HCM Signalized Intersection Capacity Analysis

## 62: W Washington St & N Priest Rd

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↗	↖	↗		↖	↗	
Volume (vph)	65	399	27	42	403	89	77	48	58	121	59	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	16	11	12	12	13	12	11	12	13	11	12
Grade (%)		0%			0%			3%				0%
Total Lost time (s)	4.5	5.0		4.5	5.0	5.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.92		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1711	3957		1787	1866	1612	1778	1639		1829	1636	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1711	3957		1787	1866	1612	1778	1639		1829	1636	
Peak-hour factor, PHF	0.93	0.93	0.93	0.90	0.90	0.90	0.93	0.93	0.93	0.85	0.85	0.85
Adj. Flow (vph)	70	429	29	47	448	99	83	52	62	142	69	86
RTOR Reduction (vph)	0	3	0	0	0	26	0	35	0	0	33	0
Lane Group Flow (vph)	70	455	0	47	448	73	83	79	0	142	122	0
Confl. Peds. (#/hr)						2			3			3
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	0%	0%	0%	2%	2%	2%
Bus Blockages (#/hr)	0	2	0	0	2	0	0	0	0	0	0	0
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6						
Actuated Green, G (s)	7.0	29.5		4.5	27.0	27.0	7.4	8.2		13.0	13.8	
Effective Green, g (s)	7.0	29.5		4.5	27.0	27.0	7.4	8.2		13.0	13.8	
Actuated g/C Ratio	0.10	0.41		0.06	0.37	0.37	0.10	0.11		0.18	0.19	
Clearance Time (s)	4.5	5.0		4.5	5.0	5.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	165	1606		111	693	599	181	185		327	311	
v/s Ratio Prot	c0.04	0.11		0.03	c0.24		0.05	0.05		c0.08	c0.07	
v/s Ratio Perm						0.05						
v/c Ratio	0.42	0.28		0.42	0.65	0.12	0.46	0.43		0.43	0.39	
Uniform Delay, d1	31.0	14.5		32.9	18.9	15.0	30.8	30.1		26.6	25.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.8	0.1		2.6	2.1	0.1	1.8	1.6		0.9	0.8	
Delay (s)	32.7	14.6		35.4	21.0	15.1	32.6	31.7		27.5	26.6	
Level of Service	C	B		D	C	B	C	C		C	C	
Approach Delay (s)		17.0			21.2			32.1			27.0	
Approach LOS		B			C			C			C	

### Intersection Summary

HCM Average Control Delay	22.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	72.7	Sum of lost time (s)	13.5
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
63: W Washington St & N 7th Ave

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	110	320	54	72	441	59	91	58	31	62	58	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	13	15	10	16	12	13	12	12	11	13	12
Grade (%)		-1%			0%			-2%				0%
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.95		1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1612	1879	1657	1602	2008		1792	1707		1645	1659	
Flt Permitted	0.26	1.00	1.00	0.46	1.00		0.64	1.00		0.69	1.00	
Satd. Flow (perm)	447	1879	1657	768	2008		1209	1707		1188	1659	
Peak-hour factor, PHF	0.85	0.85	0.85	0.93	0.93	0.93	0.81	0.81	0.81	0.91	0.91	0.91
Adj. Flow (vph)	129	376	64	77	474	63	112	72	38	68	64	121
RTOR Reduction (vph)	0	0	29	0	4	0	0	20	0	0	71	0
Lane Group Flow (vph)	129	376	35	77	533	0	112	90	0	68	114	0
Confl. Peds. (#/hr)	5		4	4		5	1		9	9		1
Confl. Bikes (#/hr)						2			7			2
Turn Type	pm+pt		Perm	pm+pt		Perm		Perm		Perm		
Protected Phases	1	6		5	2			4				8
Permitted Phases	6		6	2		4				8		
Actuated Green, G (s)	27.6	21.6	21.6	27.0	21.3		12.5	12.5		12.5	12.5	
Effective Green, g (s)	26.6	21.1	21.1	26.0	20.8		12.0	12.0		12.0	12.0	
Actuated g/C Ratio	0.50	0.40	0.40	0.49	0.39		0.23	0.23		0.23	0.23	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	343	744	656	456	784		272	384		267	374	
v/s Ratio Prot	c0.04	0.20		0.02	c0.27			0.05			0.07	
v/s Ratio Perm	0.15		0.02	0.07		c0.09				0.06		
v/c Ratio	0.38	0.51	0.05	0.17	0.68		0.41	0.23		0.25	0.30	
Uniform Delay, d1	8.2	12.2	9.9	7.4	13.5		17.6	16.9		17.0	17.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.5	0.0	0.2	2.4		1.0	0.3		0.5	0.5	
Delay (s)	8.9	12.7	10.0	7.6	15.8		18.7	17.2		17.5	17.6	
Level of Service	A	B	A	A	B		B	B		B	B	
Approach Delay (s)		11.5			14.8			17.9			17.6	
Approach LOS		B			B			B			B	

Intersection Summary

HCM Average Control Delay	14.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	53.3	Sum of lost time (s)	15.0
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

# HCM Signalized Intersection Capacity Analysis

## 64: W Washington St & N 5th Ave

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	152	397	20	23	471	55	64	79	18	85	67	249
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	16	12	10	16	12	10	13	12	10	12	12
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.97		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1668	2098		1668	2075		1660	1881		1642	1602	
Flt Permitted	0.95	1.00		0.95	1.00		0.25	1.00		0.68	1.00	
Satd. Flow (perm)	1668	2098		1668	2075		429	1881		1169	1602	
Peak-hour factor, PHF	0.91	0.91	0.91	0.92	0.92	0.92	0.77	0.77	0.77	0.86	0.86	0.86
Adj. Flow (vph)	167	436	22	25	512	60	83	103	23	99	78	290
RTOR Reduction (vph)	0	1	0	0	5	0	0	9	0	0	159	0
Lane Group Flow (vph)	167	457	0	25	567	0	83	117	0	99	209	0
Confl. Peds. (#/hr)			1			6	5		3	3		5
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Bus Blockages (#/hr)	0	2	0	0	2	0	0	0	0	0	0	0
Turn Type	Prot		Prot		Perm			Perm				
Protected Phases	1	6		5	2			4				8
Permitted Phases							4					8
Actuated Green, G (s)	12.0	37.9		2.5	28.4		16.8	16.8		16.8	16.8	
Effective Green, g (s)	11.5	37.4		2.0	27.9		16.3	16.3		16.3	16.3	
Actuated g/C Ratio	0.16	0.53		0.03	0.39		0.23	0.23		0.23	0.23	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	271	1110		47	819		99	434		270	369	
v/s Ratio Prot	c0.10	0.22		0.01	c0.27			0.06			0.13	
v/s Ratio Perm							c0.19			0.08		
v/c Ratio	0.62	0.41		0.53	0.69		0.84	0.27		0.37	0.57	
Uniform Delay, d1	27.5	10.0		33.9	17.8		25.9	22.3		22.9	24.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.1	0.2		11.1	2.5		43.1	0.3		0.8	2.0	
Delay (s)	31.7	10.3		45.0	20.4		69.1	22.6		23.7	26.1	
Level of Service	C	B		D	C		E	C		C	C	
Approach Delay (s)		16.0			21.4			41.1			25.6	
Approach LOS		B			C			D			C	

### Intersection Summary

HCM Average Control Delay	22.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	70.7	Sum of lost time (s)	15.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

# HCM Signalized Intersection Capacity Analysis

## 65: W Washington St & N 3rd Ave

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	17	416	42	41	412	9	76	41	38	11	52	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	14	12	10	13	12	12	13	12	12	13	12
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00			0.98			0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.97			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1604	1898		1604	1676			1559			1566	
Flt Permitted	0.95	1.00		0.95	1.00			0.81			0.96	
Satd. Flow (perm)	1604	1898		1604	1676			1299			1510	
Peak-hour factor, PHF	0.87	0.87	0.87	0.93	0.93	0.93	0.81	0.81	0.81	0.73	0.73	0.73
Adj. Flow (vph)	20	478	48	44	443	10	94	51	47	15	71	48
RTOR Reduction (vph)	0	5	0	0	1	0	0	10	0	0	16	0
Lane Group Flow (vph)	20	521	0	44	452	0	0	182	0	0	118	0
Confl. Peds. (#/hr)			8			17			28			12
Confl. Bikes (#/hr)			1						1			3
Parking (#/hr)					0	0		0	0		0	0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	1.2	24.4		4.1	27.3			17.5			17.5	
Effective Green, g (s)	0.7	23.9		3.6	26.8			17.0			17.0	
Actuated g/C Ratio	0.01	0.40		0.06	0.45			0.29			0.29	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	19	762		97	755			371			431	
v/s Ratio Prot	0.01	c0.27		c0.03	c0.27							
v/s Ratio Perm								c0.14			0.08	
v/c Ratio	1.05	0.68		0.45	0.60			0.49			0.27	
Uniform Delay, d1	29.4	14.7		27.0	12.3			17.7			16.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	224.0	2.6		3.3	1.3			1.0			0.3	
Delay (s)	253.4	17.2		30.3	13.6			18.7			16.8	
Level of Service	F	B		C	B			B			B	
Approach Delay (s)		25.9			15.1			18.7			16.8	
Approach LOS		C			B			B			B	

### Intersection Summary

HCM Average Control Delay	20.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	59.5	Sum of lost time (s)	20.0
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

# HCM Signalized Intersection Capacity Analysis

## 66: W Washington St & N Sequim Ave

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	54	302	66	81	289	65	133	184	85	158	128	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	12	12	10	15	12	14	14	12
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.97		1.00	0.95		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1685	1664		1636	1600		1652	1913		1888	1863	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1685	1664		1636	1600		1652	1913		1888	1863	
Peak-hour factor, PHF	0.89	0.89	0.89	0.88	0.88	0.88	0.84	0.84	0.84	0.85	0.85	0.85
Adj. Flow (vph)	61	339	74	92	328	74	158	219	101	186	151	86
RTOR Reduction (vph)	0	6	0	0	6	0	0	13	0	0	15	0
Lane Group Flow (vph)	61	407	0	92	396	0	158	307	0	186	222	0
Confl. Peds. (#/hr)						9			12			1
Heavy Vehicles (%)	0%	0%	0%	3%	3%	3%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		0	0		0	0						
Turn Type	Prot			Prot			Split			Split		
Protected Phases	1	6		5	2		4	4		3	3	
Permitted Phases												
Actuated Green, G (s)	7.8	32.9		9.2	34.3		23.2	23.2		25.3	25.3	
Effective Green, g (s)	7.3	32.4		8.7	33.8		22.7	22.7		24.8	24.8	
Actuated g/C Ratio	0.07	0.30		0.08	0.31		0.21	0.21		0.23	0.23	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	113	496		131	498		345	400		431	425	
v/s Ratio Prot	0.04	0.24		c0.06	c0.25		0.10	c0.16		0.10	c0.12	
v/s Ratio Perm												
v/c Ratio	0.54	0.82		0.70	0.79		0.46	0.77		0.43	0.52	
Uniform Delay, d1	49.0	35.4		48.7	34.2		37.6	40.5		35.9	36.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.9	10.2		15.7	8.5		1.0	8.6		0.7	1.2	
Delay (s)	53.9	45.6		64.4	42.8		38.5	49.1		36.6	37.9	
Level of Service	D	D		E	D		D	D		D	D	
Approach Delay (s)		46.7			46.8			45.6			37.3	
Approach LOS		D			D			D			D	

### Intersection Summary

HCM Average Control Delay	44.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	108.6	Sum of lost time (s)	15.0
Intersection Capacity Utilization	65.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



# HCM Unsignalized Intersection Capacity Analysis

## 67: E Washington St & N Brown Rd

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	30	375	21	1	377	60	4	1	4	33	8	43
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			-1%	
Peak Hour Factor	0.93	0.93	0.93	0.97	0.97	0.97	0.75	0.75	0.75	0.84	0.84	0.84
Hourly flow rate (vph)	32	403	23	1	389	62	5	1	5	39	10	51
Pedestrians												5
Lane Width (ft)												13.0
Walking Speed (ft/s)												4.0
Percent Blockage												0
Right turn flare (veh)												2
Median type		TWLTL			None							
Median storage veh		2										
Upstream signal (ft)					901							
pX, platoon unblocked	0.98						0.98	0.98		0.98	0.98	0.98
vC, conflicting volume	456			426			900	937	415	869	886	394
vC1, stage 1 conf vol							479	479		396	396	
vC2, stage 2 conf vol							421	458		474	490	
vCu, unblocked vol	434			426			888	925	415	856	873	371
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			99	100	99	92	98	92
cM capacity (veh/h)	1103			1134			427	434	642	466	456	661

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	32	426	1	389	62	12	100
Volume Left	32	0	1	0	0	5	39
Volume Right	0	23	0	0	62	5	51
cSH	1103	1700	1134	1700	1700	503	950
Volume to Capacity	0.03	0.25	0.00	0.23	0.04	0.02	0.11
Queue Length 95th (ft)	2	0	0	0	0	2	9
Control Delay (s)	8.4	0.0	8.2	0.0	0.0	12.3	12.3
Lane LOS	A		A			B	B
Approach Delay (s)	0.6		0.0			12.3	12.3
Approach LOS						B	B

### Intersection Summary

Average Delay	1.6
Intersection Capacity Utilization	36.5%
ICU Level of Service	A
Analysis Period (min)	15

# HCM Unsignalized Intersection Capacity Analysis

## 68: E Washington St & W Sequim Bay Rd

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	103	138	14	1	182	1	12	0	1	1	0	86
Sign Control		Free			Free			Stop			Stop	
Grade		0%			-1%			0%			0%	
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
Hourly flow rate (vph)	112	150	15	1	198	1	13	0	1	1	0	93
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			TWLTL							
Median storage (veh)					2							
Upstream signal (ft)		1271										
pX, platoon unblocked												
vC, conflicting volume	199			165			675	583	158	576	590	198
vC1, stage 1 conf vol							382	382		201	201	
vC2, stage 2 conf vol							293	201		375	389	
vCu, unblocked vol	199			165			675	583	158	576	590	198
tC, single (s)	4.1			4.1			7.2	6.6	6.2	7.2	6.6	6.2
tC, 2 stage (s)							6.1	5.6		6.1	5.6	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			100			97	100	100	100	100	89
cM capacity (veh/h)	1356			1395			452	504	880	547	516	835

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	112	165	1	199	14	95
Volume Left	112	0	1	0	13	1
Volume Right	0	15	0	1	1	93
cSH	1356	1700	1395	1700	470	830
Volume to Capacity	0.08	0.10	0.00	0.12	0.03	0.11
Queue Length 95th (ft)	7	0	0	0	2	10
Control Delay (s)	7.9	0.0	7.6	0.0	12.9	9.9
Lane LOS	A		A		B	A
Approach Delay (s)	3.2		0.0		12.9	9.9
Approach LOS					B	A

### Intersection Summary

Average Delay	3.4
Intersection Capacity Utilization	32.7%
ICU Level of Service	A
Analysis Period (min)	15

# HCM Unsignalized Intersection Capacity Analysis

## 69: W Prairie St & S Sequim Ave

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Volume (veh/h)	5	27	18	44	20	12	6	331	58	2	290	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			1%	
Peak Hour Factor	0.89	0.89	0.89	0.86	0.86	0.86	0.82	0.82	0.82	0.89	0.89	0.89
Hourly flow rate (vph)	6	30	20	51	23	14	7	404	71	2	326	3
Pedestrians		1						1				
Lane Width (ft)		12.0						12.0				
Walking Speed (ft/s)		4.0						4.0				
Percent Blockage		0						0				
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh								2			2	
Upstream signal (ft)											1025	
pX, platoon unblocked												
vC, conflicting volume	777	822	330	820	788	439	330			474		
vC1, stage 1 conf vol	333	333		454	454							
vC2, stage 2 conf vol	444	489		367	335							
vCu, unblocked vol	777	822	330	820	788	439	330			474		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	94	97	89	95	98	99			100		
cM capacity (veh/h)	481	475	706	472	493	620	1228			1077		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	56	88	7	474	2	329
Volume Left	6	51	7	0	2	0
Volume Right	20	14	0	71	0	3
cSH	539	496	1228	1700	1077	1700
Volume to Capacity	0.10	0.18	0.01	0.28	0.00	0.19
Queue Length 95th (ft)	9	16	0	0	0	0
Control Delay (s)	12.4	13.8	7.9	0.0	8.3	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	12.4	13.8	0.1		0.1	
Approach LOS	B	B				

### Intersection Summary

Average Delay	2.1
Intersection Capacity Utilization	38.5%
ICU Level of Service	A
Analysis Period (min)	15

# HCM Signalized Intersection Capacity Analysis

## 70: SR 101 WB Ramps & River Road

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕	↗	↖	↑			↑	↗
Volume (vph)	0	0	0	23	0	91	56	580	0	0	174	517
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.6	4.6	4.6	4.6			4.6	4.6
Lane Util. Factor					1.00	1.00	1.00	1.00			1.00	1.00
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					1787	1599	1787	1881			1881	1599
Flt Permitted					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)					1787	1599	1787	1881			1881	1599
Peak-hour factor, PHF	0.25	0.25	0.25	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	25	0	99	61	630	0	0	181	539
RTOR Reduction (vph)	0	0	0	0	0	91	0	0	0	0	0	187
Lane Group Flow (vph)	0	0	0	0	25	8	61	630	0	0	181	352
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type				Perm		Perm	Prot					Perm
Protected Phases					8		5	2			6	
Permitted Phases				8		8						6
Actuated Green, G (s)					5.8	5.8	5.4	57.0			47.0	47.0
Effective Green, g (s)					5.8	5.8	5.4	57.0			47.0	47.0
Actuated g/C Ratio					0.08	0.08	0.08	0.79			0.65	0.65
Clearance Time (s)					4.6	4.6	4.6	4.6			4.6	4.6
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)					144	129	134	1489			1228	1044
v/s Ratio Prot							0.03	c0.33			0.10	
v/s Ratio Perm					0.01	0.00						0.22
v/c Ratio					0.17	0.06	0.46	0.42			0.15	0.34
Uniform Delay, d1					30.9	30.6	31.9	2.3			4.8	5.6
Progression Factor					1.00	1.00	1.03	0.87			1.00	1.00
Incremental Delay, d2					0.6	0.2	2.0	0.7			0.3	0.9
Delay (s)					31.4	30.8	34.9	2.7			5.1	6.4
Level of Service					C	C	C	A			A	A
Approach Delay (s)		0.0			30.9			5.6			6.1	
Approach LOS		A			C			A			A	

### Intersection Summary

HCM Average Control Delay	7.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	72.0	Sum of lost time (s)	9.2
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

# HCM Signalized Intersection Capacity Analysis

## 71: SR 101 EB Ramps & River Road

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗					↖		↘	↕	
Volume (vph)	512	0	78	0	0	0	0	128	29	92	97	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.6	4.6					4.6		4.6	4.6	
Lane Util. Factor		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.98		1.00	1.00	
Flt Protected		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1787	1599					1817		1805	1900	
Flt Permitted		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		1787	1599					1817		1805	1900	
Peak-hour factor, PHF	0.89	0.89	0.89	0.25	0.25	0.25	0.85	0.85	0.85	0.96	0.96	0.96
Adj. Flow (vph)	575	0	88	0	0	0	0	151	34	96	101	0
RTOR Reduction (vph)	0	0	53	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	0	575	35	0	0	0	0	175	0	96	101	0
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	2%	2%	2%	0%	0%	0%
Turn Type	Perm		Perm							Prot		
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)		28.3	28.3					22.8		7.1	34.5	
Effective Green, g (s)		28.3	28.3					22.8		7.1	34.5	
Actuated g/C Ratio		0.39	0.39					0.32		0.10	0.48	
Clearance Time (s)		4.6	4.6					4.6		4.6	4.6	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		702	628					575		178	910	
v/s Ratio Prot								c0.10		c0.05	0.05	
v/s Ratio Perm		0.32	0.02									
v/c Ratio		0.82	0.06					0.31		0.54	0.11	
Uniform Delay, d1		19.6	13.6					18.6		30.9	10.3	
Progression Factor		1.00	1.00					1.00		1.04	0.71	
Incremental Delay, d2		7.4	0.0					1.4		3.1	0.2	
Delay (s)		27.0	13.6					20.0		35.4	7.6	
Level of Service		C	B					B		D	A	
Approach Delay (s)		25.2			0.0			20.0			21.1	
Approach LOS		C			A			B			C	

### Intersection Summary

HCM Average Control Delay	23.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	72.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

# HCM Unsignalized Intersection Capacity Analysis

## 72: SR 101 WB Ramps & S Sequim Ave

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔		↗	↑			↖	↗
Volume (veh/h)	0	0	0	9	0	110	26	285	0	0	158	203
Sign Control		Stop			Stop			Free			Free	
Grade		0%			2%			0%			1%	
Peak Hour Factor	0.25	0.25	0.25	0.74	0.74	0.74	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	0	0	12	0	149	31	335	0	0	186	239
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type									None		TWLTL	
Median storage (veh)												2
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	731	582	186	582	821	335	425				335	
vC1, stage 1 conf vol	186	186		396	396							
vC2, stage 2 conf vol	545	396		186	425							
vCu, unblocked vol	731	582	186	582	821	335	425				335	
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.3	4.1				4.1	
tC, 2 stage (s)	6.1	5.5		6.2	5.6							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	98	100	79	97				100	
cM capacity (veh/h)	387	551	861	562	465	700	1140				1218	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	161	31	335	186	239	
Volume Left	12	31	0	0	0	
Volume Right	149	0	0	0	239	
cSH	687	1140	1700	1700	1700	
Volume to Capacity	0.23	0.03	0.20	0.11	0.14	
Queue Length 95th (ft)	23	2	0	0	0	
Control Delay (s)	11.8	8.2	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s)	11.8	0.7	0.0			
Approach LOS	B					

Intersection Summary				
Average Delay			2.3	
Intersection Capacity Utilization	34.4%		ICU Level of Service	A
Analysis Period (min)	15			

# HCM Unsignalized Intersection Capacity Analysis

## 73: SR 101 EB Ramps & S Sequim Ave

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗					↕		↖	↗	
Volume (veh/h)	223	0	36	0	0	0	0	87	10	123	62	0
Sign Control		Stop			Stop			Free			Free	
Grade		-3%			2%			3%			-2%	
Peak Hour Factor	0.84	0.84	0.84	0.25	0.25	0.25	0.87	0.87	0.87	0.78	0.78	0.78
Hourly flow rate (vph)	265	0	43	0	0	0	0	100	11	158	79	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	501	506	79	543	501	106	79			111		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	501	506	79	543	501	106	79			111		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	40	100	96	100	100	100	100			89		
cM capacity (veh/h)	442	419	981	398	424	954	1506			1485		

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total	265	43	111	158	79
Volume Left	265	0	0	158	0
Volume Right	0	43	11	0	0
cSH	442	981	1700	1485	1700
Volume to Capacity	0.60	0.04	0.07	0.11	0.05
Queue Length 95th (ft)	96	3	0	9	0
Control Delay (s)	24.7	8.8	0.0	7.7	0.0
Lane LOS	C	A		A	
Approach Delay (s)	22.5		0.0	5.1	
Approach LOS	C				

Intersection Summary		
Average Delay		12.4
Intersection Capacity Utilization	34.4%	ICU Level of Service
Analysis Period (min)		15
		A

HCM Unsignalized Intersection Capacity Analysis  
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8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗						↕			↕	
Volume (veh/h)	0	0	0	0	0	0	0	5	2	159	6	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			-2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.56	0.56	0.85	0.85	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	9	4	187	7	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	392	394	7	392	392	11	7			12		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	392	394	7	392	392	11	7			12		
tC, single (s)	7.2	6.6	6.2	7.2	6.6	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			88		
cM capacity (veh/h)	511	475	1067	511	476	1062	1594			1587		

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	0	0	12	194
Volume Left	0	0	0	187
Volume Right	0	0	4	0
cSH	1700	1700	1700	1587
Volume to Capacity	0.00	0.00	0.01	0.12
Queue Length 95th (ft)	0	0	0	10
Control Delay (s)	0.0	0.0	0.0	7.3
Lane LOS	A	A		A
Approach Delay (s)	0.0		0.0	7.3
Approach LOS	A			

Intersection Summary			
Average Delay		6.9	
Intersection Capacity Utilization	19.1%		ICU Level of Service
Analysis Period (min)		15	A