WEBSTER

WEbster Based Signal Timing Evaluation Routine
For Capacity and Level of Service Analysis Using HCM 2000 Control Delay

SR18 @ Kasota Rd Existing AM

SR18 @ Kasota Rd | **Town of Apple Valley** | **AM Peak Hour**

Parameter Values (using default set 'Other Values')

Parameter	Other	Default	Min. Time Parameter	Other	Default	Sat. Flow Parameter	Other	Default
Duration of Peak Period (min)		15	Min. Time (Left Turns, sec)		10	Sat Flow (1 Left lane, vphg)	1700	1800
Lost Time (sec)	4	2	Min/Ped Time (Thrus, sec)	Varies	Varies	Sat Flow (2 Left lanes, vphg)	3200	3500
Vehicle Length (feet)		20				Sat Flow (1 Thru lane, vphg)	1800	1900
						Sat Flow (1 Right lane, vphg)		1800

Input Values

	Eastbound			Westbound			Northbound			Southbound		
Movement Times	"L"	T	R	L	"T"	R	L	"T"	R	L	T	R
Movement 1: 18 secs	X			X								
Movement 2: 60 secs		X	X		X	X						
Movement 3: 0 secs							X			X		
Movement 4: 25 secs								X	X		X	X
Movement 5: 0 secs												
Movement 6: 0 secs												
# of Lanes (#, S, P)	1	2	S	1	2	S	S	1	1	S	1	1
Unadjusted Volume	145	758	38	76	1166	148	46	119	112	45	37	71
Peak Hour Factor (PHF)	0.77	0.77	0.77	0.87	0.87	0.87	0.78	0.78	0.78	0.97	0.97	0.97
Min/Ped Time Override (sec)	10	22	22	10	22	22	10	25	25	10	25	25
Progression Adj. Factor (PAF)	1.00	1.00	-	1.00	1.00	-	-	1.00	1.00	-	1.00	1.00

Output

	***				***			***				
Peak Hour Volume (vph)	188	984	49	87	1340	170	59	153	144	46	38	73
Saturation Flow (vph)	1700	3600	Shrd	1700	3600	Shrd	Shrd	1800	1800	Shrd	1800	1800
X or Volume/Capacity	0.81	0.53	-	0.38	0.77	-	-	0.58	0.39	-	0.23	0.20
Effective Green (sec)	14	56	-	14	56	-	-	21	21	-	21	21
Split Time (sec)	18	60	-	18	60	-	-	25	25	-	25	25
Min. Time or Ped. Time (sec)	10	22	-	10	22	-	-	25	25	-	25	25
Delay - 15 min pk (sec/veh)	69	16	-	45	21	-	-	43	39	-	36	35
Level of Service (LOS)	E	B	-	D	C+	-	-	D	D+	-	D+	D+
Average 'Q' (veh/ln)	5	7	-	2	10	-	-	5	3	-	2	2
Design 'Q'-ft/ln (1.5*Qavg)	160	220	-	60	300	-	-	160	100	-	60	60
Do Vehicles Clear?	YES	YES	-	YES	YES	-	-	YES	YES	-	YES	YES

Summary of Results

Whole Intersection	Critical Movements
Weighted Average Delay (seconds) = 26	Weighted Average Delay (seconds) = 29
Level of Service - LOS = C	Level of Service - LOS = C
	Capacity Utilization - ICU/TCU = 0.73

Required Cycle Length is 103 sec
Min./Ped. Times Satisfied

WEBSTER

WEbster Based Signal Timing Evaluation Routine
For Capacity and Level of Service Analysis Using HCM 2000 Control Delay

SR18 @ Kasota Rd Existing PM

SR18 @ Kasota Rd | **Town of Apple Valley** | **PM Peak Hour**

Parameter Values (using default set 'Other Values')

Parameter	Other	Default	Min. Time Parameter	Other	Default	Sat. Flow Parameter	Other	Default
Duration of Peak Period (min)		15	Min. Time (Left Turns, sec)		10	Sat Flow (1 Left lane, vphg)	1700	1800
Lost Time (sec)	4	2	Min/Ped Time (Thrus, sec)	Varies	Varies	Sat Flow (2 Left lanes, vphg)	3200	3500
Vehicle Length (feet)		20				Sat Flow (1 Thru lane, vphg)	1800	1900
						Sat Flow (1 Right lane, vphg)		1800

Input Values

	Eastbound			Westbound			Northbound			Southbound		
Movement Times	*L*	*T*	R	L	T	R	L	T	R	L	T	R
Movement 1: 10 secs	X			X								
Movement 2: 53 secs		X	X		X	X						
Movement 3: 0 secs							X			X		
Movement 4: 25 secs								X	X		X	X
Movement 5: 0 secs												
Movement 6: 0 secs												
# of Lanes (#, S, P)	1	2	S	1	2	S	S	1	1	S	1	1
Unadjusted Volume	79	1234	67	52	951	84	59	71	36	116	99	150
Peak Hour Factor (PHF)	1.00	1.00	1.00	0.88	0.88	0.88	0.83	0.83	0.83	1.00	1.00	1.00
Min/Ped Time Override (sec)	10	22	22	10	22	22	10	25	25	10	25	25
Progression Adj. Factor (PAF)	1.00	1.00	-	1.00	1.00	-	-	1.00	1.00	-	1.00	1.00

Output

	***	***									***	
Peak Hour Volume (vph)	79	1234	67	59	1081	95	71	86	43	116	99	150
Saturation Flow (vph)	1700	3800	Shrd	1700	3600	Shrd	Shrd	1800	1800	Shrd	1800	1800
X or Volume/Capacity	0.68	0.65	-	0.51	0.59	-	-	0.37	0.10	-	0.50	0.35
Effective Green (sec)	6	49	-	6	49	-	-	21	21	-	21	21
Split Time (sec)	10	53	-	10	53	-	-	25	25	-	25	25
Min. Time or Ped. Time (sec)	10	22	-	10	22	-	-	25	25	-	25	25
Delay - 15 min pk (sec/veh)	68	15	-	55	14	-	-	30	27	-	33	30
Level of Service (LOS)	E	B	-	D-	B	-	-	C-	C	-	C-	C-
Average 'Q' (veh/ln)	2	7	-	1	6	-	-	3	1	-	4	3
Design 'Q'-ft/ln (1.5*Qavg)	60	220	-	40	180	-	-	100	40	-	120	100
Do Vehicles Clear?	YES	YES	-	YES	YES	-	-	YES	YES	-	YES	YES

Summary of Results

Whole Intersection	Critical Movements
Weighted Average Delay (seconds) = 20 Level of Service - LOS = B	Weighted Average Delay (seconds) = 21 Level of Service - LOS = C+ Capacity Utilization - ICU/TCU = 0.61

Required Cycle Length is 88 sec
Min./Ped. Times Satisfied

AM

SR18 @ Kosota Rd

	EB			WB			NB			SB			
	Lt	Th	Rt	Lt	Th	Rt	Lt	Th	Rt	Lt	Th	Rt	Total
7:30	31	168	5	10	269	31	17	18	11	15	6	19	600
7:45	52	234	9	20	325	42	10	48	30	10	12	16	808
8:00	29	172	15	24	287	40	9	24	56	12	12	17	697
8:15	31	152	9	21	241	33	10	28	15	6	6	17	569
Veh/Trucks	143	726	38	75	1122	146	46	118	112	43	36	69	
	PHF	0.768644		PHF	0.867571		PHF	0.784091		PHF	0.973684		
2 axle	1	1	0	1	11	0	0	0	0	0	1	1	
PCE	0.5	0.5	0	0.5	5.5	0	0	0	0	0	0.5	0.5	
3 axle	1	3	0	0	4	0	0	1	0	0	0	1	
PCE	1	3	0	0	4	0	0	1	0	0	0	1	
4+ axle	0	14	0	0	17	1	0	0	0	1	0	0	
PCE	0	28	0	0	34	2	0	0	0	2	0	0	
Total (PCE)	145	758	38	76	1166	148	46	119	112	45	37	71	

PM

SR18 @ Kosota Rd

	EB			WB			NB			SB			
	Lt	Th	Rt	Lt	Th	Rt	Lt	Th	Rt	Lt	Th	Rt	Total
4:30	21	275	21	13	215	21	11	24	9	29	26	46	711
4:45	18	293	21	10	212	29	14	16	9	28	21	45	716
5:00	20	305	12	19	265	17	23	17	10	35	24	32	779
5:15	20	330	12	8	232	16	11	14	8	24	28	26	729
Veh/Trucks	79	1203	66	50	924	83	59	71	36	116	99	149	
	PHF	1		PHF	0.877907		PHF	0.83		PHF	1		
2 axle	0	3	2	3	5	1	0	0	0	0	0	1	
PCE	0	1.5	1	1.5	2.5	0.5	0	0	0	0	0	0.5	
3 axle	0	1	0	0	4	0	0	0	0	0	0	0	
PCE	0	1	0	0	4	0	0	0	0	0	0	0	
4+ axle	0	14	0	0	10	0	0	0	0	0	0	0	
PCE	0	28	0	0	20	0	0	0	0	0	0	0	
Total (PCE)	79	1234	67	52	951	84	59	71	36	116	99	150	

KASOTA RD. @ SH18
SAN BERNARDINO COUNTY
PUBLIC WORKS
TRAFFIC DIVISION

CARS & TRUCKS

File Name : KASOTA RD @ SH18
Site Code : 00000000
Start Date : 05/18/2010
Page No : 1

Groups Printed- Unshifted

	SH 18 Eastbound				SH 18 Westbound				KASOTA Northbound				KASOTA Southbound				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
07:00 AM	4	88	28	0	16	234	5	0	3	18	8	1	11	5	3	1	425
07:15 AM	5	118	25	0	11	250	1	0	5	14	7	2	17	11	8	0	474
07:30 AM	5	168	31	0	31	269	10	1	11	18	17	0	19	6	15	0	601
07:45 AM	9	234	52	0	42	325	20	0	30	48	10	0	16	12	10	0	808
Total	23	608	136	0	100	1078	36	1	49	98	42	3	63	34	36	1	2308
08:00 AM	15	172	29	0	40	287	24	0	56	24	9	1	17	12	12	0	698
08:15 AM	9	152	31	0	33	241	21	0	15	28	10	1	17	6	6	0	570
08:30 AM	15	147	38	0	27	220	8	0	8	17	5	1	18	5	9	0	518
08:45 AM	25	177	40	0	33	239	6	1	9	14	13	1	6	17	12	0	593
Total	64	648	138	0	133	987	59	1	88	83	37	4	58	40	39	0	2379
09:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00 PM	15	315	34	0	25	249	26	0	4	12	10	0	34	22	27	0	773
:15 PM	12	281	26	0	32	207	16	0	6	11	16	0	30	17	17	0	671
:30 PM	21	275	21	0	21	215	13	1	9	24	11	2	46	26	29	0	714
04:45 PM	21	293	18	0	29	212	10	0	9	16	14	0	45	21	28	0	716
Total	69	1164	99	0	107	883	65	1	28	63	51	2	155	86	101	0	2874

KASOTA RD. @ SH18
SAN BERNARDINO COUNTY
PUBLIC WORKS
TRAFFIC DIVISION

File Name : KASOTA RD @ SH18
Site Code : 00000000
Start Date : 05/18/2010
Page No : 2

Groups Printed- Unshifted

	SH 18 Eastbound				SH 18 Westbound				KASOTA Northbound				KASOTA Southbound				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
05:00 PM	12	305	20	0	17	265	19	0	10	17	23	0	32	24	35	1	780
05:15 PM	12	330	20	0	16	232	8	0	8	14	11	2	26	28	24	0	731
05:30 PM	15	298	22	0	15	196	11	2	11	12	20	0	36	20	23	0	681
05:45 PM	8	290	26	0	12	201	10	0	6	9	4	0	22	19	11	0	618
Total	47	1223	88	0	60	894	48	2	35	52	58	2	116	91	93	1	2810
Grand Total	203	3643	461	0	400	3842	208	5	200	296	188	11	392	251	269	2	10371
Apprch %	4.7	84.6	10.7	0.0	9.0	86.2	4.7	0.1	28.8	42.6	27.1	1.6	42.9	27.5	29.4	0.2	
Total %	2.0	35.1	4.4	0.0	3.9	37.0	2.0	0.0	1.9	2.9	1.8	0.1	3.8	2.4	2.6	0.0	

SAN BERNARDIN[illegible] [illegible]OUNTY
Department Of [illegible] [illegible] works
Traffic Division

COMMERCIAL TRUCK COUNT
LOCATION: KASOTA RD. @ SH18

COUNT BY: JORGE VELA
DATE: 5/18/2010

TIME	TYPE	NB LT	NB THRU	NB RT	SB LT	SB THRU	SB RT	EB LT	EB THRU	EB RT	WB LT	WB THRU	WB RT	TOTAL
7:00	2-AXLE							1				1		2
	3-AXLE													0
	4-AXLE													0
	5-AXLE +								2			6		8
7:15	2-AXLE							1	1			5	1	8
	3-AXLE								1			1		2
	4-AXLE													0
	5-AXLE +				1			1	5			6		13
7:30	2-AXLE											1		1
	3-AXLE											3		3
	4-AXLE											1		1
	5-AXLE +								4			5	1	10
7:45	2-AXLE					1	1					5		7
	3-AXLE		1					1	2					4
	4-AXLE								1					1
	5-AXLE +								2			4		6
TOTAL		0	1	0	1	1	1	4	18	0	0	38	2	
8:00	2-AXLE											2		2
	3-AXLE													0
	4-AXLE								1			1		2
	5-AXLE +				1				3			4		8
8:15	2-AXLE							1	1		1	3		6
	3-AXLE						1		1			1		3
	4-AXLE								1					1
	5-AXLE +								2			2		4
8:30	2-AXLE								2			3		5
	3-AXLE				1				1			1		3
	4-AXLE								1					1
	5-AXLE +								3			5		8
8:45	2-AXLE								1			1		2
	3-AXLE								3			2		5
	4-AXLE								2			1		3
	5-AXLE +											2		2
TOTAL		0	0	0	2	0	1	1	22	0	1	28	0	

Trucks only

TIME	TYPE	NB LT	NB THRU	NB RT	SB LT	SB THRU	SB RT	EB LT	EB THRU	EB RT	WB LT	WB THRU	WB RT	TOTAL
16:00	2-AXLE								2					2
	3-AXLE								1			1		2
	4-AXLE													0
	5-AXLE +								3			5		8
16:15	2-AXLE							1						1
	3-AXLE								1			1		2
	4-AXLE													0
	5-AXLE +								1			3		4
16:30	2-AXLE								1	1		1	1	4
	3-AXLE											2		2
	4-AXLE								1					1
	5-AXLE +								1			3		4
16:45	2-AXLE						1					1		2
	3-AXLE								1					1
	4-AXLE													0
	5-AXLE +								4			2		6
TOTAL		0	0	0	0	0	1	1	16	1	0	19	1	
17:00	2-AXLE								1		3			4
	3-AXLE											1		1
	4-AXLE													0
	5-AXLE +								5			3		8
17:15	2-AXLE								1	1		3	1	6
	3-AXLE											1		1
	4-AXLE													0
	5-AXLE +								3			2		5
17:30	2-AXLE								1			1		2
	3-AXLE							1	1			1		3
	4-AXLE													0
	5-AXLE +								3			6		9
17:45	2-AXLE											1		1
	3-AXLE													0
	4-AXLE													0
	5-AXLE +											4		4
TOTAL		0	0	0	0	0	0	1	15	1	3	23	1	