WEBSTER

WEbster Based Signal Timing Evaluation Routine

For Capacity and Level of Service Analysis Using HCM 2000 Control Delay

2009 cmp dATA

Redlands Blvd @ waterman Ave | **City of SBD** | **AM Peak Hour**

Input

	Eastbound			Westbound			Northbound			Southbound		
Movement Times	*L*	T	*R*	L	T	R	L	*T*	R	*L*	T	R
Movement 1: 11 secs	X			X					X			
Movement 2: 20 secs		X	X		X	X						
Movement 3: 10 secs						X	X			X		
Movement 4: 28 secs								X	X		X	X
Movement 5: 0 secs												
Movement 6: 0 secs												
# of Lanes (#, S, P)	2	2	1	1	2	2	1	2	1	1	2	1
Unadjusted Volume	285	222	203	102	103	62	36	905	86	57	390	97
Peak Hour Factor (PHF)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (%)												
Project Trip Volume (vph)												
Sat. Flow Override (vph)												
Min. Time or Ped. Time	10	20	20	10	20	20	10	20	20	10	20	20
Permissive Veh/Cycle												
Progression Adj. Factor (PAF)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Parameter Values (using default set 'SANBAG (Existing)')

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

Output

	***		***					***		***		
Pk. Hr. Vol. (vph)	285	222	203	102	103	62	36	905	86	57	390	97
Saturation Flow (vph)	3200	3600	1800	1700	3600	3400	1700	3600	1800	1700	3600	1800
X or V/C	0.68	0.24	0.43	0.46	0.11	0.04	0.18	0.67	0.09	0.29	0.29	0.14
Effective green (sec)	9	18	18	9	18	28	8	26	37	8	26	26
Split Time (sec)	11	20	20	11	20	30	10	28	39	10	28	28
Min. Time or Ped. Time (sec)	10	20	20	10	20	20	10	20	20	10	20	20
Delay - 15 min pk (sec/veh)	37	21	24	34	20	12	30	21	8	32	16	15
Level of Service (LOS)	D+	C+	C+	C-	B	B	C	C+	A	C-	B	B
Average 'Q' (veh/ln)	2	2	3	2	1	1	1	5	1	1	2	1
Design 'Q'- ft/ln	60	60	100	60	40	40	40	160	40	40	60	40
Do Vehicles Clear?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Summary

Whole Intersection

Weighted Avg Delay (sec) = 22
Level of Service - LOS = C+

Critical Movements

Weighted Avg Delay (sec) = 25
Level of Service - LOS = C+
Intersection Capacity Utilization - ICU = 0.55

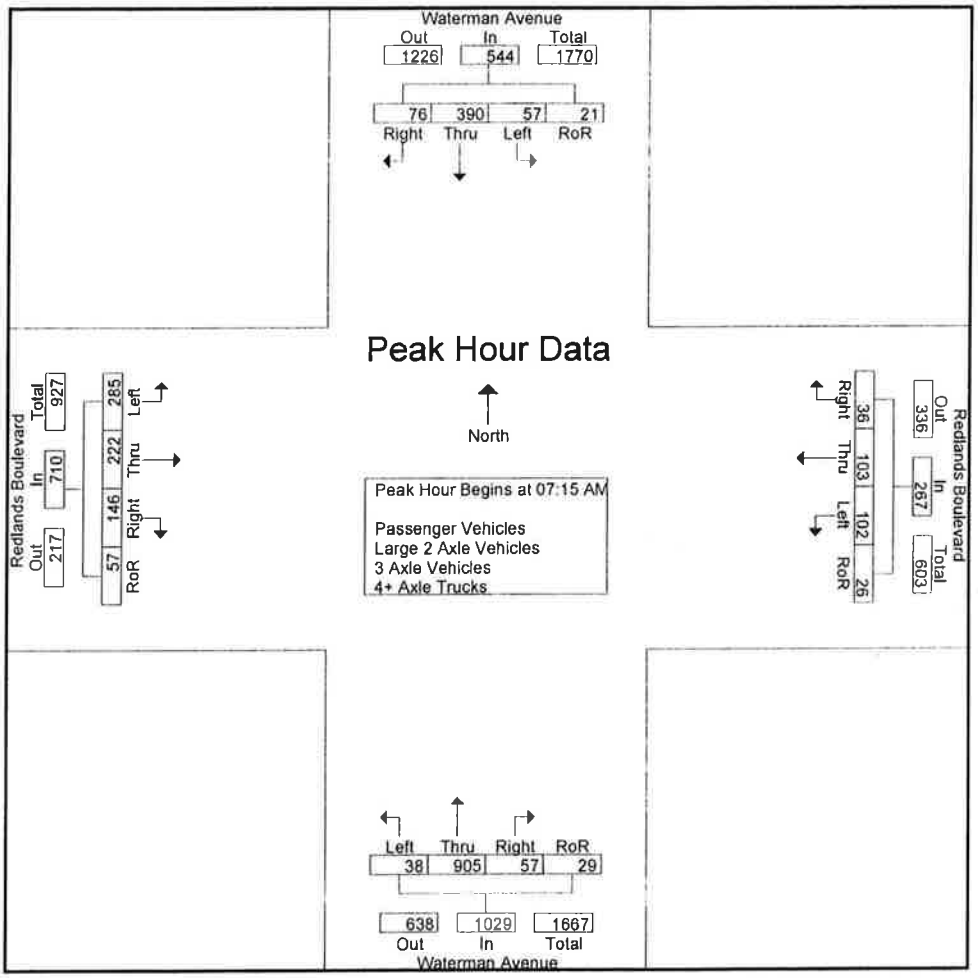
Required Cycle Length is 69 sec

Min./Ped. Times Satisfied

Counts Unlimited Inc.
25286 Jaclyn Avenue
Moreno Valley, CA 92557
951-485-7934

City of San Bernardino
N/S: Waterman Avenue
E/W: Redlands Boulevard
Weather: Sunny

File Name : SBCWAREAM
Site Code : 9153137
Start Date : 6/10/2009
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:15 AM					07:30 AM					07:00 AM					07:15 AM				
+0 mins.	9	77	16	5	107	20	24	**11**	**10**	65	**15**	198	9	7	229	49	39	40	11	139
+15 mins.	15	**115**	17	**6**	153	**38**	29	10	6	**83**	10	227	14	2	253	65	69	**41**	16	191
+30 mins.	14	86	18	5	123	26	**30**	8	1	65	13	**253**	**16**	8	**290**	**101**	**71**	40	**18**	**230**
+45 mins.	**19**	112	**25**	5	**161**	22	28	9	9	68	7	244	16	**11**	278	70	43	25	12	150
Total Volume	57	390	76	21	544	106	111	38	26	281	45	922	55	28	1050	285	222	146	57	710
% App. Total	10.5	71.7	14	3.9		37.7	39.5	13.5	9.3		4.3	87.8	5.2	2.7		40.1	31.3	20.6	8	
PHF	.750	.848	.760	.875	.845	.697	.925	.864	.650	.846	.750	.911	.859	.636	.905	.705	.782	.890	.792	.772

WEBSTER

WEbster Based Signal Timing Evaluation Routine

For Capacity and Level of Service Analysis Using HCM 2000 Control Delay

2009 CMP Data

Redlands Blvd @ waterman Ave | **City of SBD** | **PM Peak Hour**

Input

	Eastbound			Westbound			Northbound			Southbound		
Movement Times	*L*	*T*	R	L	T	R	L	*T*	R	*L*	T	R
Movement 1: 13 secs	X			X					X			
Movement 2: 20 secs		X	X		X	X						
Movement 3: 10 secs						X	X			X		
Movement 4: 29 secs								X	X		X	X
Movement 5: 0 secs												
Movement 6: 0 secs												
# of Lanes (#, S, P)	2	2	1	1	2	2	1	2	1	1	2	1
Unadjusted Volume	367	296	146	136	190	169	90	1027	91	124	683	104
Peak Hour Factor (PHF)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (%)												
Project Trip Volume (vph)												
Sat. Flow Override (vph)												
Min. Time or Ped. Time	10	20	20	10	20	20	10	20	20	10	20	20
Permissive Veh/Cycle												
Progression Adj. Factor (PAF)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Parameter Values (using default set 'SANBAG (Existing)')

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

Output

	***	***						***		***		
Pk. Hr. Vol. (vph)	367	296	146	136	190	169	90	1027	91	124	683	104
Saturation Flow (vph)	3200	3600	1800	1700	3600	3400	1700	3600	1800	1700	3600	1800
X or V/C	0.75	0.33	0.32	0.52	0.21	0.13	0.48	0.76	0.09	0.66	0.51	0.15
Effective green (sec)	11	18	18	11	18	28	8	27	40	8	27	27
Split Time (sec)	13	20	20	13	20	30	10	29	42	10	29	29
Min. Time or Ped. Time (sec)	10	20	20	10	20	20	10	20	20	10	20	20
Delay - 15 min pk (sec/veh)	39	23	24	35	22	14	38	24	8	47	19	15
Level of Service (LOS)	D+	C+	C+	D+	C+	B	D+	C+	A	D	B	B
Average 'Q' (veh/ln)	3	2	2	2	1	1	2	6	1	2	4	1
Design 'Q'- ft/ln	100	60	60	60	40	40	60	180	40	60	120	40
Do Vehicles Clear?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Summary

Whole Intersection

Weighted Avg Delay (sec) = 25
Level of Service - LOS = C+

Critical Movements

Weighted Avg Delay (sec) = 28
Level of Service - LOS = C
Intersection Capacity Utilization - ICU = 0.62

Required Cycle Length is 72 sec

Min./Ped. Times Satisfied

Counts Unlimited Inc.
25286 Jaclyn Avenue
Moreno Valley, CA 92557
951-485-7934

City of San Bernardino
N/S: Waterman Avenue
E/W: Redlands Boulevard
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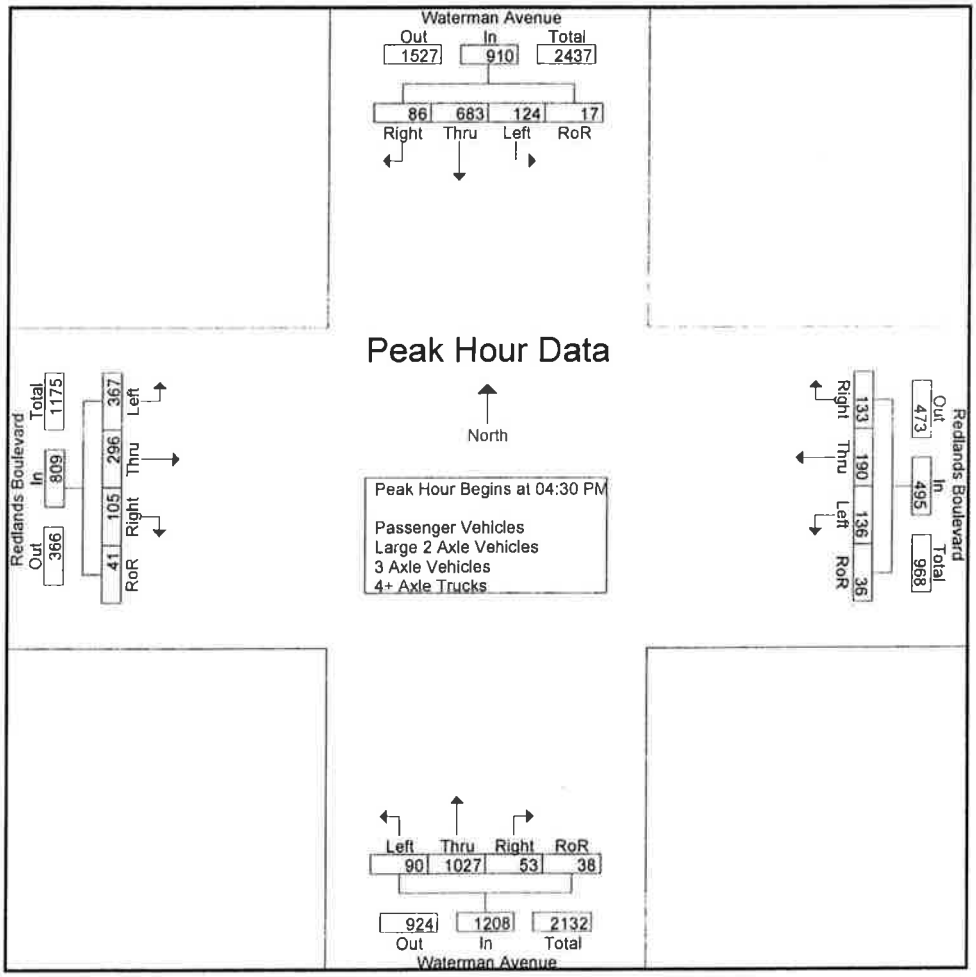

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:30 PM					04:45 PM					04:30 PM					04:45 PM				
+0 mins.	27	163	19	**5**	214	28	**55**	28	**12**	123	23	**276**	14	**13**	**326**	78	76	26	**9**	189
+15 mins.	27	162	21	5	215	31	42	36	5	114	**28**	251	7	10	296	95	82	**32**	8	217
+30 mins.	29	**188**	20	4	**241**	43	49	35	8	135	25	238	**22**	11	296	97	**87**	28	9	**221**
+45 mins.	**41**	170	**26**	3	240	**50**	40	**38**	12	**140**	14	262	10	4	290	**101**	62	23	5	191
Total Volume	124	683	86	17	910	152	186	137	37	512	90	1027	53	38	1208	371	307	109	31	818
% App. Total	13.6	75.1	9.5	1.9		29.7	36.3	26.8	7.2		7.5	85	4.4	3.1		45.4	37.5	13.3	3.8	
PHF	.756	.908	.827	.850	.944	.760	.845	.901	.771	.914	.804	.930	.602	.731	.926	.918	.882	.852	.861	.925