WEBSTER

WEbster Based Signal Timing Evaluation Routine

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

CMP 2009 AM Peak Hour

Base Line @ Waterman | **City of San Bernardino** | **AM Peak Hour**

Input

	Eastbound			Westbound			Northbound			Southbound		
Movement Times	L	T	R	*L*	*T*	R	*L*	T	R	L	*T*	R
Movement 1: 10 secs	X			X					X			X
Movement 2: 20 secs		X	X		X	X						
Movement 3: 10 secs							X			X		
Movement 4: 20 secs								X	X		X	X
Movement 5: 0 secs												
Movement 6: 0 secs												
# of Lanes (#, S, P)	1	2	1	1	2	S	1	2	1	1	2	1
Unadjusted Volume	87	323	109	122	397	43	64	303	116	36	613	127
Peak Hour Factor (PHF)	0.87	0.87	0.87	0.86	0.86	0.86	0.86	0.86	0.86	0.87	0.87	0.87
Growth Factor (%)												
Project Trip Volume (vph)												
Sat. Flow Override (vph)						Shrd						
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

Parameter Values (using default set 'Webster')

	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)		1800
Sat Flow (2 Left lanes, vphg)		3500
Sat Flow (1 Thru lane, vphg)		1900
Sat Flow (1 Right lane, vphg)		1800
Vehicle Length (feet)		20

Output

				***	***		***				***	
Pk. Hr. Vol. (vph)	100	371	125	142	462	50	74	352	135	41	705	146
Saturation Flow (vph)	1800	3800	1800	1800	3800	Shrd	1800	3800	1800	1800	3800	1800
X or V/C	0.42	0.33	0.23	0.59	0.45	-	0.31	0.31	0.16	0.17	0.62	0.17
Effective green (sec)	8	18	18	8	18	-	8	18	28	8	18	28
Split Time (sec)	10	20	20	10	20	-	10	20	30	10	20	30
Min. Time or Ped. Time (sec)	10	20	20	10	20	-	10	20	20	10	20	20
Delay - 15 min pk (sec/veh)	29	17	17	35	18	-	27	17	10	25	21	10
Level of Service (LOS)	C	B	B	C-	B	-	C	B	A	C+	C+	A
Average 'Q' (veh/ln)	1	2	1	2	3	-	1	2	1	1	4	1
Design 'Q'- ft/ln	40	60	40	60	100	-	40	60	40	40	120	40
Do Vehicles Clear?	YES	YES	YES	YES	YES	-	YES	YES	YES	YES	YES	YES

Summary

Whole Intersection

Weighted Avg Delay (sec) = 19
Level of Service - LOS = B

Critical Movements

Weighted Avg Delay (sec) = 21
Level of Service - LOS = C+
Intersection Capacity Utilization - ICU = 0.51

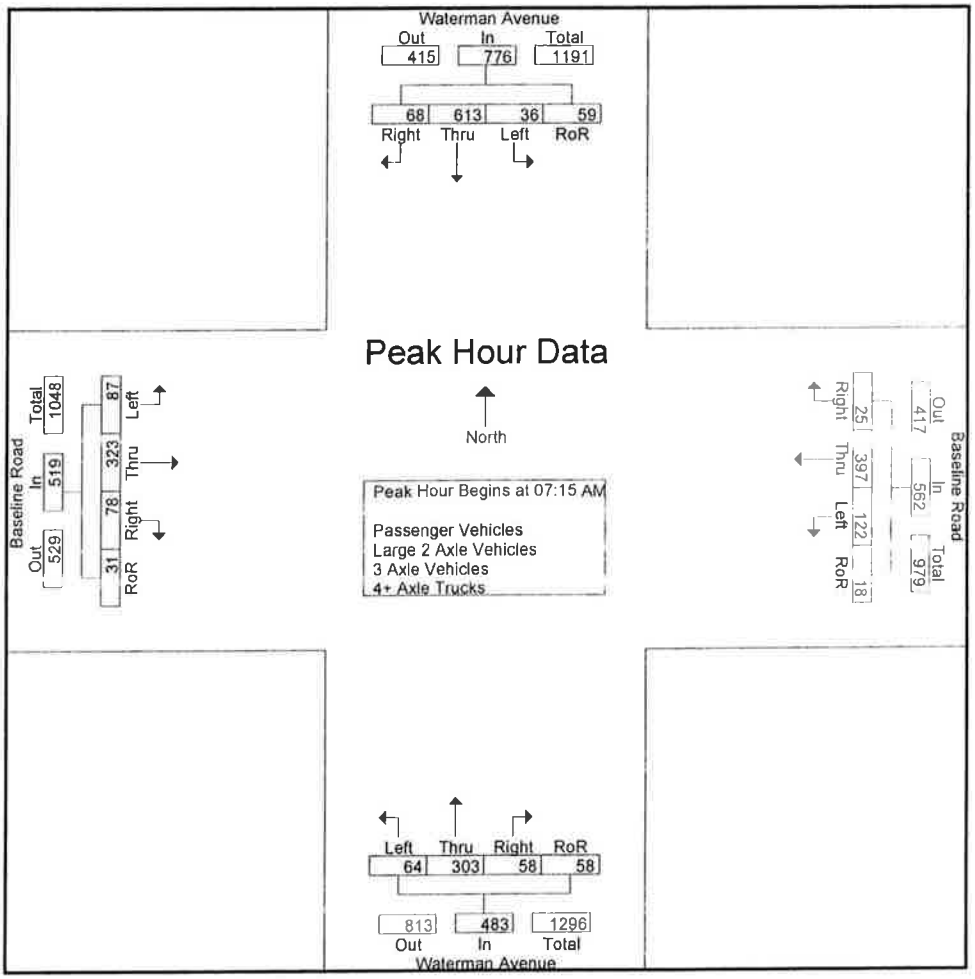
Required Cycle Length is 60 sec

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: Baseline Road
Weather: Sunny

File Name : SBCWABAAM
Site Code : 9153049
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					08:00 AM					08:00 AM					07:15 AM				
+0 mins.	6	**162**	14	**21**	203	20	99	5	**6**	130	15	108	15	**13**	151	**30**	76	21	4	131
+15 mins.	7	160	**17**	15	199	28	79	13	6	126	15	96	15	5	131	18	**93**	17	6	134
+30 mins.	**13**	161	16	16	**206**	**46**	102	14	5	167	10	73	14	6	103	24	81	**27**	10	**142**
+45 mins.	10	130	**21**	7	168	45	**128**	**15**	3	**191**	**24**	**109**	**20**	6	**159**	15	73	13	**11**	112
Total Volume	36	613	68	59	776	139	408	47	20	614	64	386	64	30	544	87	323	78	31	519
% App. Total	4.6	79	8.8	7.6		22.6	66.4	7.7	3.3		11.8	71	11.8	5.5		16.8	62.2	15	6	
PHF	.692	.946	.810	.702	.942	.755	.797	.783	.833	.804	.667	.885	.800	.577	.855	.725	.868	.722	.705	.914

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WEbster Based Signal Timing Evaluation Routine

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

CMP 2009 Data

Base Line @ Waterman **City of San Bernardino** **PM Peak Hour**

Input

	Eastbound			Westbound			Northbound			Southbound		
Movement Times	L	T	R	*L*	*T*	R	*L*	*T*	R	L	T	R
Movement 1: 10 secs	X			X					X			X
Movement 2: 20 secs		X	X		X	X						
Movement 3: 11 secs							X			X		
Movement 4: 20 secs								X	X		X	X
Movement 5: 0 secs												
Movement 6: 0 secs												
# of Lanes (#, S, P)	1	2	1	1	2	S	1	2	1	1	2	1
Unadjusted Volume	150	593	143	152	564	93	175	771	199	105	593	174
Peak Hour Factor (PHF)	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor (%)												
Project Trip Volume (vph)												
Sat. Flow Override (vph)						Shrd						
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

Parameter Values (using default set 'Webster')

	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)		1800
Sat Flow (2 Left lanes, vphg)		3500
Sat Flow (1 Thru lane, vphg)		1900
Sat Flow (1 Right lane, vphg)		1800
Vehicle Length (feet)		20

Output

				***	***		***	***				
Pk. Hr. Vol. (vph)	167	659	159	169	627	103	194	857	221	117	659	193
Saturation Flow (vph)	1800	3800	1800	1800	3800	Shrd	1800	3800	1800	1800	3800	1800
X or V/C	0.71	0.59	0.30	0.72	0.65	-	0.73	0.76	0.27	0.44	0.59	0.23
Effective green (sec)	8	18	18	8	18	-	9	18	28	9	18	28
Split Time (sec)	10	20	20	10	20	-	11	20	30	11	20	30
Min. Time or Ped. Time (sec)	10	20	20	10	20	-	10	20	20	10	20	20
Delay - 15 min pk (sec/veh)	42	21	18	42	22	-	41	25	11	29	21	11
Level of Service (LOS)	D	C+	B	D	C+	-	D	C+	B	C	C+	B
Average 'Q' (veh/ln)	3	4	2	3	4	-	3	5	2	2	4	2
Design 'Q'- ft/ln	100	120	60	100	120	-	100	160	60	60	120	60
Do Vehicles Clear?	YES	YES	YES	YES	YES	-	YES	YES	YES	YES	YES	YES

Summary

Whole Intersection

Weighted Avg Delay (sec) = 23
Level of Service - LOS = C+

Critical Movements

Weighted Avg Delay (sec) = 27
Level of Service - LOS = C
Intersection Capacity Utilization - ICU = 0.71

Required Cycle Length is 61 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: Baseline Road
Weather: Sunny

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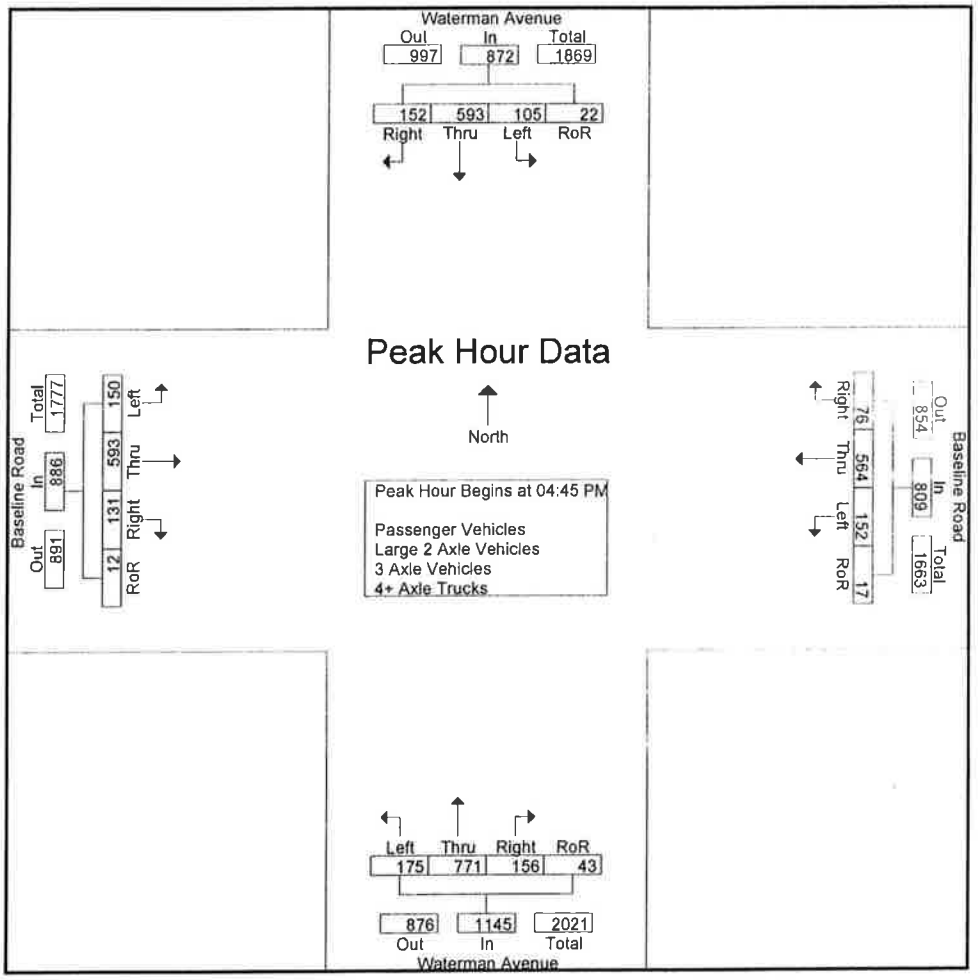

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:30 PM					04:30 PM					04:45 PM					05:00 PM				
+0 mins.	20	**163**	34	**9**	226	41	145	15	**2**	203	**58**	198	39	**12**	307	36	130	37	1	204
+15 mins.	21	159	**42**	5	227	43	126	17	**4**	190	29	173	41	11	254	**48**	160	**41**	**9**	**258**
+30 mins.	29	159	41	7	**236**	**45**	143	14	**5**	207	44	181	30	9	264	32	**168**	24	1	225
+45 mins.	**31**	150	34	7	222	41	**160**	**22**	**2**	**225**	44	**219**	**46**	11	**320**	42	152	**21**	0	215
Total Volume	101	631	151	28	911	170	574	68	13	825	175	771	156	43	1145	158	610	123	11	902
% App. Total	11.1	69.3	16.6	3.1		20.6	69.6	8.2	1.6		15.3	67.3	13.6	3.8		17.5	67.6	13.6	1.2	
PHF	.815	.968	.899	.778	.965	.944	.897	.773	.650	.917	.754	.880	.848	.896	.895	.823	.908	.750	.306	.874