

TRAFFIC SURVEY SPECIALISTS, INC.

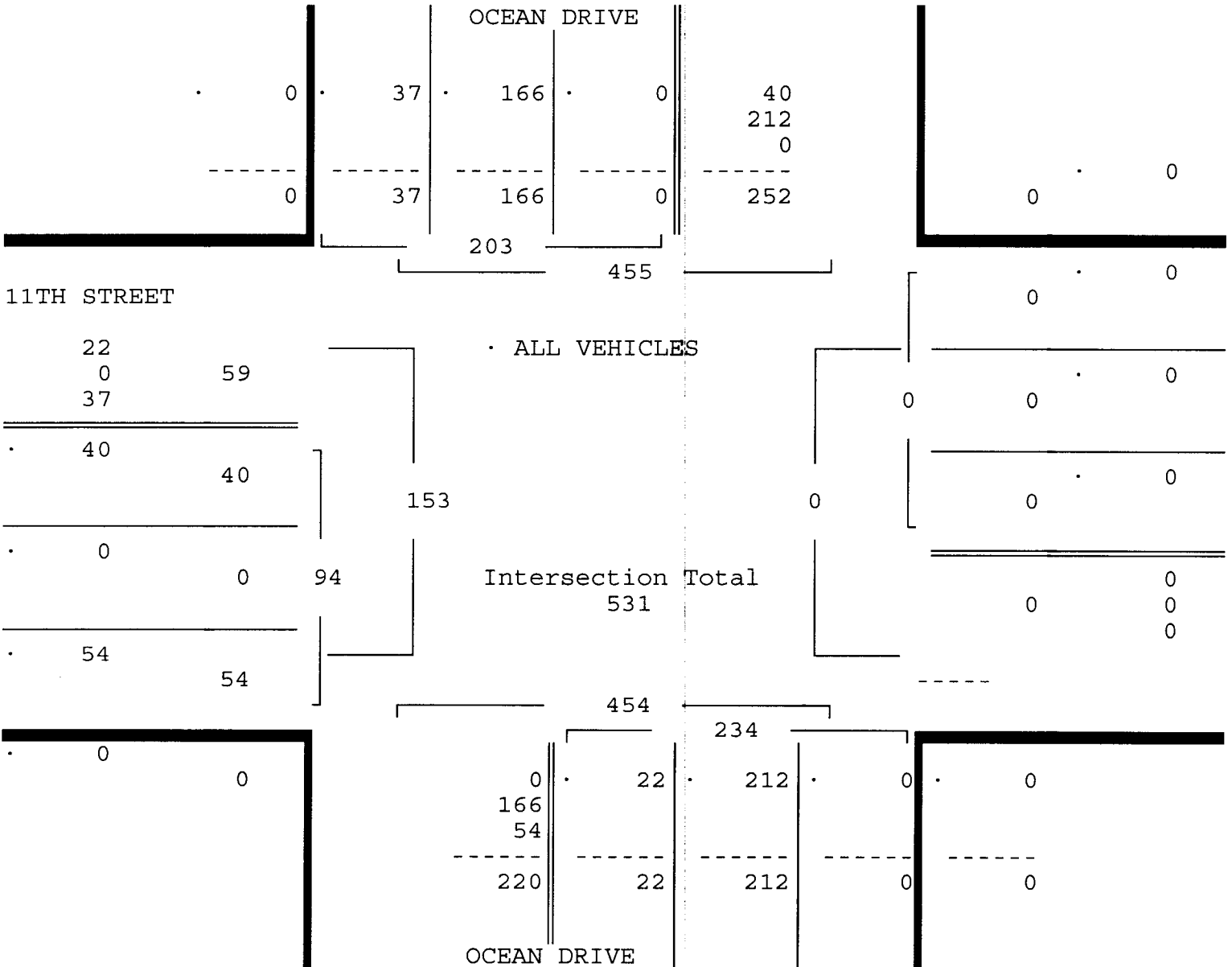
11TH STREET & OCEAN DRIVE
 MIAMI BEACH, FLORIDA
 COUNTED BY: SAMANTHA PALOMINO
 NOT SIGNALIZED

85 SE 4TH AVENUE, UNIT 109
 DELRAY BEACH, FLORIDA
 PHONE (561)272-3255

Site Code : 00170172
 Start Date: 10/20/17
 File I.D. : 11STOCEA
 Page : 2

ALL VEHICLES

OCEAN DRIVE				-----				OCEAN DRIVE				11TH STREET					
From North				From East				From South				From West					
UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	Total	
Date 10/20/17 -----																	
Peak Hour Analysis By Entire Intersection for the Period: 16:30 to 19:00 on 10/20/17																	
Peak start 18:00				18:00				18:00				18:00					
Volume	0	0	166	37	0	0	0	0	1	21	212	0	2	38	0	54	
Percent	0%	0%	82%	18%	0%	0%	0%	0%	0%	9%	91%	0%	2%	40%	0%	57%	
Pk total	203			0			234			94							
Highest	18:45			16:30			18:15			18:00							
Volume	0	0	52	14	0	0	0	0	0	6	59	0	0	13	0	13	
Hi total	66			0			65			26							
PHF	.77			.0			.90			.90							



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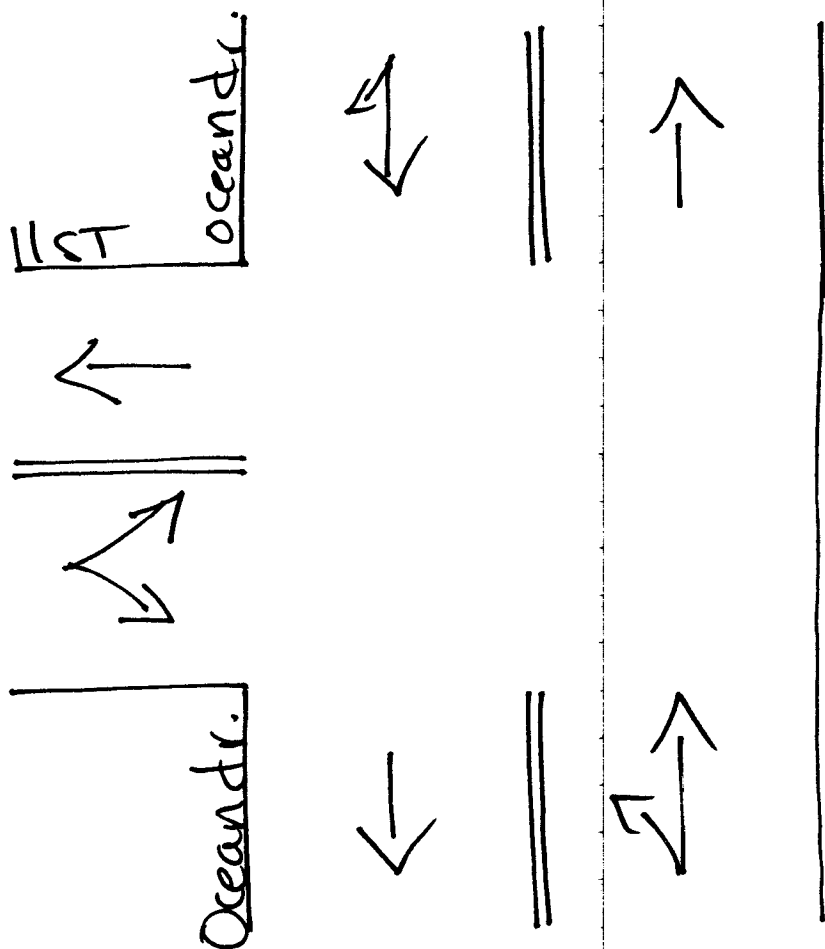
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 Page : 1

PEDESTRIANS & BIKES

OCEAN DRIVE					-----				OCEAN DRIVE				11TH STREET					
From North					From East				From South				From West					
	Left	BIKES	Right	Peds	Left	BIKES	Right	Peds	Left	BIKES	Right	Peds	Left	BIKES	Right	Peds	Total	
Date 10/20/17 -----																		
16:30	0	3	0	22	0	1	0	68	0	4	0	10	0	4	0	133	245	
16:45	0	3	0	35	0	0	0	79	0	11	0	11	0	5	0	168	312	
17:00	0	3	0	29	0	0	0	93	0	2	0	20	0	1	0	179	327	
17:15	0	5	0	20	0	0	0	65	0	11	0	20	0	0	0	115	236	
Hr Total	0	14	0	106	0	1	0	305	0	28	0	61	0	10	0	595	1120	
17:30	0	3	0	20	0	0	0	73	0	7	0	18	0	0	0	134	255	
17:45	0	1	0	22	0	0	0	54	0	6	0	11	0	0	0	147	241	
18:00	0	0	0	15	0	0	0	86	0	0	0	18	0	0	0	133	252	
18:15	0	5	0	19	0	0	0	69	0	3	0	32	0	0	0	165	293	
Hr Total	0	9	0	76	0	0	0	282	0	16	0	79	0	0	0	579	1041	
18:30	0	3	0	15	0	0	0	73	0	1	0	20	0	0	0	141	253	
18:45	0	2	0	42	0	0	0	99	0	2	0	39	0	4	0	137	325	
Hr Total	0	5	0	57	0	0	0	172	0	3	0	59	0	4	0	278	578	

TOTAL	0	28	0	239	0	1	0	759	0	47	0	199	0	14	0	1452	2739	

North



Miami Beach, Florida

October 23, 2017

Drawn by: Luis Palomino
Signalized

APPENDIX C

Peak Season Conversion Factors and Historical Traffic Data

2016 PEAK SEASON FACTOR CATEGORY REPORT - REPORT TYPE: ALL
 CATEGORY: 8700 MIAMI-DADE NORTH

WEEK	DATES	SF	MOCF: 0.98 PSCF
1	01/01/2016 - 01/02/2016	1.02	1.04
2	01/03/2016 - 01/09/2016	1.03	1.05
3	01/10/2016 - 01/16/2016	1.04	1.06
4	01/17/2016 - 01/23/2016	1.03	1.05
5	01/24/2016 - 01/30/2016	1.02	1.04
6	01/31/2016 - 02/06/2016	1.00	1.02
7	02/07/2016 - 02/13/2016	0.99	1.01
* 8	02/14/2016 - 02/20/2016	0.97	0.99
* 9	02/21/2016 - 02/27/2016	0.97	0.99
*10	02/28/2016 - 03/05/2016	0.98	1.00
*11	03/06/2016 - 03/12/2016	0.98	1.00
*12	03/13/2016 - 03/19/2016	0.98	1.00
*13	03/20/2016 - 03/26/2016	0.98	1.00
*14	03/27/2016 - 04/02/2016	0.98	1.00
*15	04/03/2016 - 04/09/2016	0.98	1.00
*16	04/10/2016 - 04/16/2016	0.98	1.00
*17	04/17/2016 - 04/23/2016	0.98	1.00
*18	04/24/2016 - 04/30/2016	0.98	1.00
*19	05/01/2016 - 05/07/2016	0.98	1.00
*20	05/08/2016 - 05/14/2016	0.99	1.01
21	05/15/2016 - 05/21/2016	0.99	1.01
22	05/22/2016 - 05/28/2016	0.99	1.01
23	05/29/2016 - 06/04/2016	1.00	1.02
24	06/05/2016 - 06/11/2016	1.00	1.02
25	06/12/2016 - 06/18/2016	1.01	1.03
26	06/19/2016 - 06/25/2016	1.02	1.04
27	06/26/2016 - 07/02/2016	1.02	1.04
28	07/03/2016 - 07/09/2016	1.03	1.05
29	07/10/2016 - 07/16/2016	1.03	1.05
30	07/17/2016 - 07/23/2016	1.03	1.05
31	07/24/2016 - 07/30/2016	1.03	1.05
32	07/31/2016 - 08/06/2016	1.02	1.04
33	08/07/2016 - 08/13/2016	1.02	1.04
34	08/14/2016 - 08/20/2016	1.02	1.04
35	08/21/2016 - 08/27/2016	1.02	1.04
36	08/28/2016 - 09/03/2016	1.02	1.04
37	09/04/2016 - 09/10/2016	1.02	1.04
38	09/11/2016 - 09/17/2016	1.01	1.03
39	09/18/2016 - 09/24/2016	1.01	1.03
40	09/25/2016 - 10/01/2016	1.00	1.02
41	10/02/2016 - 10/08/2016	1.00	1.02
42	10/09/2016 - 10/15/2016	0.99	1.01
43	10/16/2016 - 10/22/2016	1.00	1.02
44	10/23/2016 - 10/29/2016	1.00	1.02
45	10/30/2016 - 11/05/2016	1.01	1.03
46	11/06/2016 - 11/12/2016	1.01	1.03
47	11/13/2016 - 11/19/2016	1.02	1.04
48	11/20/2016 - 11/26/2016	1.02	1.04
49	11/27/2016 - 12/03/2016	1.02	1.04
50	12/04/2016 - 12/10/2016	1.02	1.04
51	12/11/2016 - 12/17/2016	1.02	1.04
52	12/18/2016 - 12/24/2016	1.03	1.05
53	12/25/2016 - 12/31/2016	1.04	1.06

* PEAK SEASON

21-FEB-2017 10:54:35

830UPD

6_8700_PKSEASON.TXT

FLORIDA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION STATISTICS OFFICE
2016 HISTORICAL AADT REPORT

COUNTY: 87 - MIAMI-DADE

SITE: 8414 - WASHINGTON AVE, 200 FT N OF 12 ST (2011 OFF SYSTEM CYCLE)

YEAR	AADT		DIRECTION 1		DIRECTION 2	*K FACTOR	D FACTOR	T FACTOR
----	-----		-----		-----	-----	-----	-----
2016	20800 C		N 9800		S 11000	9.00	56.10	1.90
2015	20300 C		N 9800		S 10500	9.00	57.40	17.50
2014	21000 C		N 10000		S 11000	9.00	59.30	13.90
2013	18700 F		N 9200		S 9500	9.00	58.90	16.20
2012	18700 C		N 9200		S 9500	9.00	59.70	16.00

AADT FLAGS: C = COMPUTED; E = MANUAL ESTIMATE; F = FIRST YEAR ESTIMATE
 S = SECOND YEAR ESTIMATE; T = THIRD YEAR ESTIMATE; R = FOURTH YEAR ESTIMATE
 V = FIFTH YEAR ESTIMATE; 6 = SIXTH YEAR ESTIMATE; X = UNKNOWN
 *K FACTOR: STARTING WITH YEAR 2011 IS STANDARDK, PRIOR YEARS ARE K30 VALUES

FLORIDA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION STATISTICS OFFICE
2016 HISTORICAL AADT REPORT

COUNTY: 87 - MIAMI-DADE

SITE: 8532 - 11TH ST, 200' EAST OF MERIDIAN CT (2011 OFF SYSTEM CYCLE)

YEAR	AADT		DIRECTION 1		DIRECTION 2	*K FACTOR	D FACTOR	T FACTOR
----	-----		-----		-----	-----	-----	-----
2016	5300 F		E 3100		W 2200	9.00	56.10	5.10
2015	5400 C		E 3200		W 2200	9.00	57.40	7.10
2014	6000 S					9.00	59.30	10.70
2013	6000 F		0		0	9.00	58.90	16.20
2012	6000 C		E 0		W 0	9.00	59.70	16.00

AADT FLAGS: C = COMPUTED; E = MANUAL ESTIMATE; F = FIRST YEAR ESTIMATE
S = SECOND YEAR ESTIMATE; T = THIRD YEAR ESTIMATE; R = FOURTH YEAR ESTIMATE
V = FIFTH YEAR ESTIMATE; 6 = SIXTH YEAR ESTIMATE; X = UNKNOWN

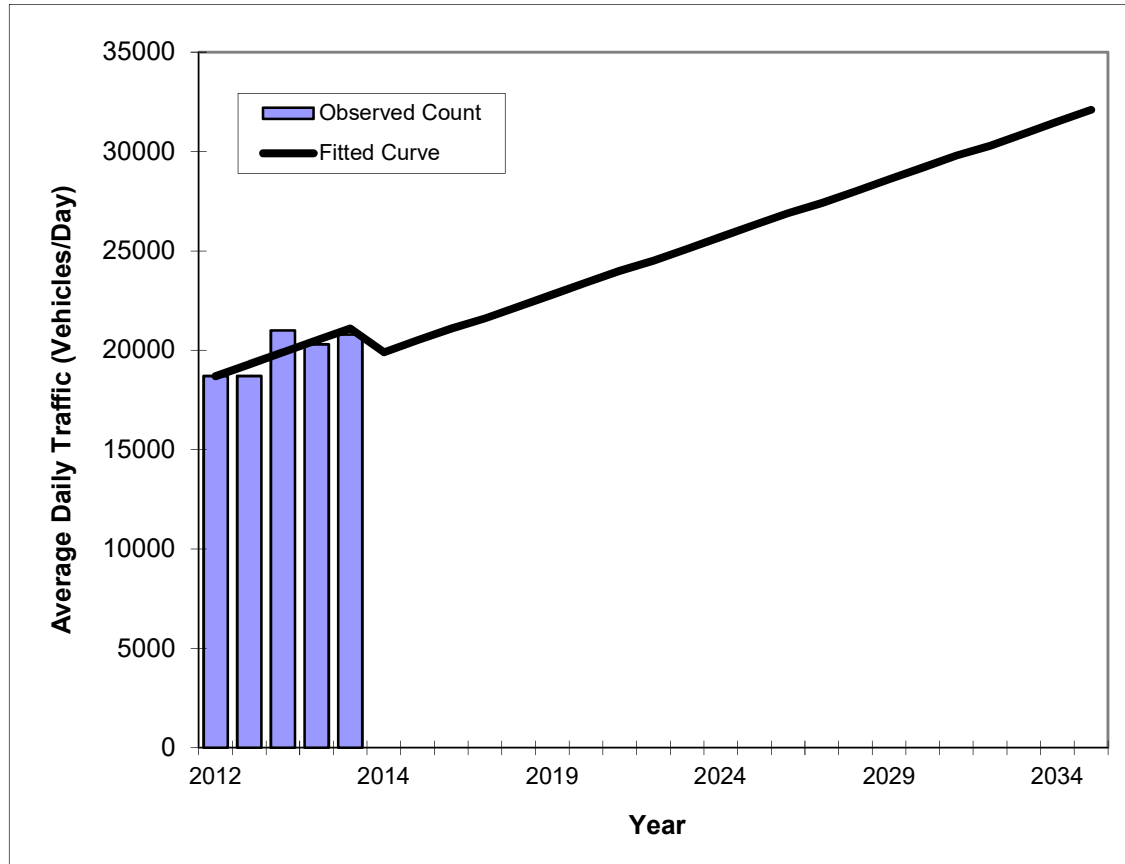
*K FACTOR: STARTING WITH YEAR 2011 IS STANDARDK, PRIOR YEARS ARE K30 VALUES

Traffic Trends - V2.0

WASHINGTON AVE -- , 200' NORTH OF 12 STREET

PIN#	0
Location	2

County:	Miami-Dade
Station #:	8414
Highway:	WASHINGTON AVE



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2012	18700	18700
2013	18700	19300
2014	21000	19900
2015	20300	20500
2016	20800	21100
2016 Opening Year Trend		
2016	N/A	21100
2017 Mid-Year Trend		
2017	N/A	21600
2018 Design Year Trend		
2018	N/A	22200
TRANPLAN Forecasts/Trends		

** Annual Trend Increase:	580
Trend R-squared:	66.48%
Trend Annual Historic Growth Rate:	3.21%
Trend Growth Rate (2016 to Design Year):	2.61%
Printed:	13-Nov-17
Straight Line Growth Option	

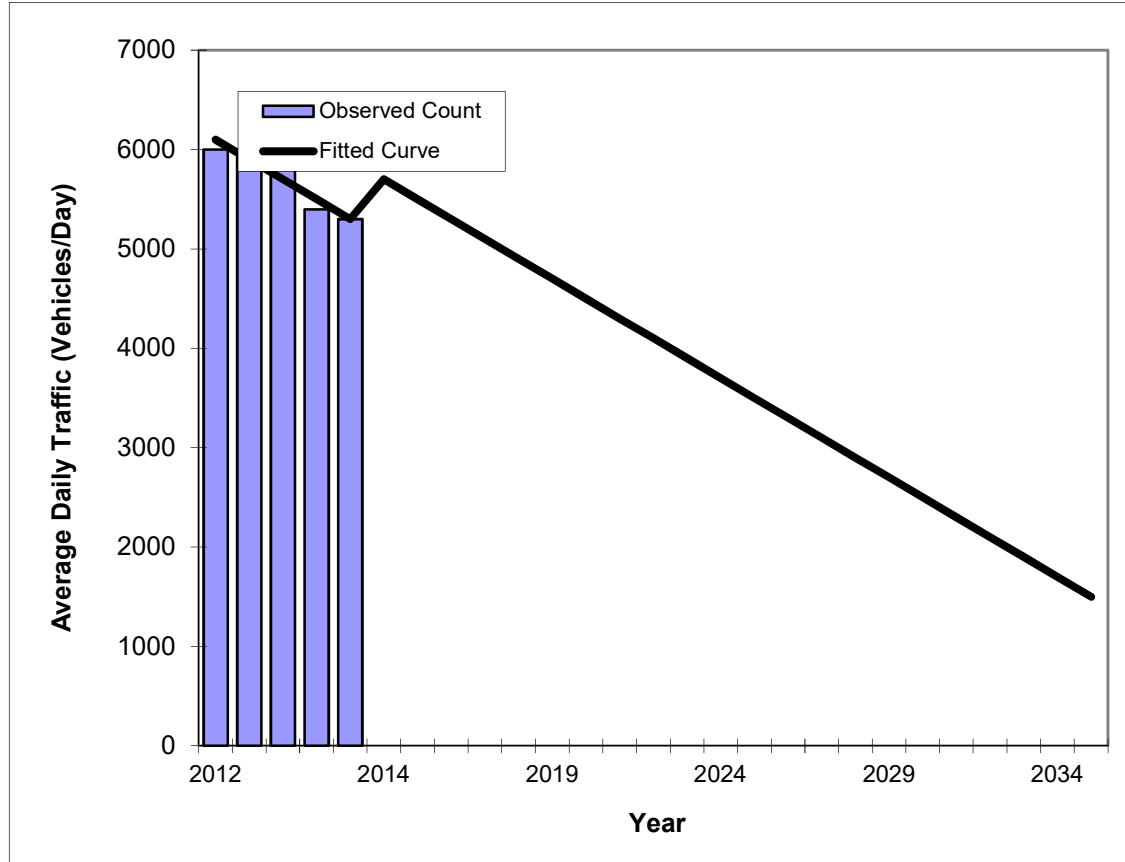
*Axle-Adjusted

Traffic Trends - V2.0

11TH ST -- , 200' EAST OF MERIDIAN CT

PIN#	0
Location	1

County:	Miami-Dade
Station #:	8532
Highway:	11TH ST



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2012	6000	6100
2013	6000	5900
2014	6000	5700
2015	5400	5500
2016	5300	5300
2016 Opening Year Trend		
2016	N/A	5300
2017 Mid-Year Trend		
2017	N/A	5100
2018 Design Year Trend		
2018	N/A	4900
TRANPLAN Forecasts/Trends		

** Annual Trend Increase:	-200
Trend R-squared:	78.13%
Trend Annual Historic Growth Rate:	-3.28%
Trend Growth Rate (2016 to Design Year):	-3.77%
Printed:	13-Nov-17
Straight Line Growth Option	

*Axle-Adjusted

Growth Rate Trend Analysis Calculations

Description	Station #		
	8532	1414	
Trend Growth Rate(1)	-3.77	2.61	
Rate used	0.50	2.61	
Average Growth Rate			1.56
Growth Rate Used			1.60

Notes:

1: Refer to Trend Analysis Chart

APPENDIX D

Future Turning Movement Volumes

FUTURE TURNING MOVEMENT VOLUME ANALYSIS

Washington Avenue and 10th Street PM Peak Hour

Description	Washington Avenue Northbound			Washington Avenue Southbound			10th Street Eastbound			10th Street Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Existing Traffic (10/20/2017)	19	442	24	30	554	30	27	70	26	33	50	19
Season Adjustment Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
2017 Peak Season Traffic	19	451	24	31	565	31	28	71	27	34	51	19
Annual Growth Rate	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%
2018 Background Traffic	20	458	25	31	574	31	28	73	27	34	52	20
1060 Ocean - Trips - Valet		1					3				1	
2018 Total Traffic	20	459	25	31	574	31	31	73	27	34	53	20

	INS	PM Peak OUT	Total
New External Trips	26	13	39

FUTURE TURNING MOVEMENT VOLUME ANALYSIS

Washington Avenue and 11th Street PM Peak Hour

Description	Washington Avenue Northbound			Washington Avenue Southbound			11th Street Eastbound			11th Street Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Existing Traffic (10/20/2017)	31	569	43	33	465	9	19	28	12	17	35	28
Season Adjustment Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
2017 Peak Season Traffic	32	580	44	34	474	9	19	29	12	17	36	29
Annual Growth Rate	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%
2018 Background Traffic	32	590	45	34	482	9	20	29	12	18	36	29
1060 Ocean - Trips - Valet			4	2				8			4	1
2018 Total Traffic	32	590	49	36	482	9	20	37	12	18	40	30

	INS	PM Peak OUT	Total
New External Trips	26	13	39

FUTURE TURNING MOVEMENT VOLUME ANALYSIS

Collins Avenue and 9th Street PM Peak Hour

Description	Collins Avenue Northbound			Collins Avenue Southbound			9th Street Eastbound			9th Street Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Existing Traffic (10/20/2017)	29	350	32	27	341	25	25	30	28	15	28	19
Season Adjustment Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
2017 Peak Season Traffic	30	357	33	28	348	26	26	31	29	15	29	19
Annual Growth Rate	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%
2018 Background Traffic	30	363	33	28	353	26	26	31	29	16	29	20
1060 Ocean - Trips - Valet		1			1		3				1	
2018 Total Traffic	30	364	33	28	354	26	29	31	29	16	30	20

	INS	PM Peak OUT	Total
New External Trips	26	13	39

FUTURE TURNING MOVEMENT VOLUME ANALYSIS

Collins Avenue and 10th Street PM Peak Hour

Description	Collins Avenue Northbound			Collins Avenue Southbound			10th Street Eastbound			10th Street Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Existing Traffic (10/20/2017)	30	336	29	22	348	33	34	47	26	22	48	24
Season Adjustment Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
2017 Peak Season Traffic	31	343	30	22	355	34	35	48	27	22	49	24
Annual Growth Rate	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%
2018 Background Traffic	31	348	30	23	361	34	35	49	27	23	50	25
1060 Ocean - Trips - Valet		4								10	1	1 26
2018 Total Traffic	31	352	30	23	361	34	35	49	27	33	51	52

	INS	PM Peak OUT	Total
New External Trips	26	13	39

FUTURE TURNING MOVEMENT VOLUME ANALYSIS

Collins Avenue and 11th Street PM Peak Hour

Description	Collins Avenue Northbound			Collins Avenue Southbound			11th Street Eastbound			11th Street Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Existing Traffic (10/20/2017)	23	342	25	22	357	27	21	38	20	14	30	22
Season Adjustment Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
2017 Peak Season Traffic	23	349	26	22	364	28	21	39	20	14	31	22
Annual Growth Rate	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%
2018 Background Traffic	24	354	26	23	370	28	22	39	21	15	31	23
1060 Ocean - Trips - Valet	5	1	8 13	2				14				
2018 Total Traffic	29	355	47	25	370	28	22	53	21	15	31	23

	INS	PM Peak OUT	Total
New External Trips	26	13	39

FUTURE TURNING MOVEMENT VOLUME ANALYSIS

Ocean Drive and 9th Street PM Peak Hour

Description	Ocean Drive Northbound			Ocean Drive Southbound			9th Street Eastbound			9th Street Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Existing Traffic (10/20/2017)	31	242	0		186	26	10		75			
Season Adjustment Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
2017 Peak Season Traffic	32	247	0	0	190	27	10	0	77	0	0	0
Annual Growth Rate	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%
2018 Background Traffic	32	251	0	0	193	27	10	0	78	0	0	0
1060 Ocean - Trips - Valet		1			1	1						
2018 Total Traffic	32	252	0	0	194	28	10	0	78	0	0	0

	INS	PM Peak OUT	Total
New External Trips	26	13	39

FUTURE TURNING MOVEMENT VOLUME ANALYSIS

Ocean Drive and 10th Street PM Peak Hour

Description	Ocean Drive Northbound			Ocean Drive Southbound			10th Street Eastbound			10th Street Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Existing Traffic (10/20/2017)	31	198			156	45	37		60			
Season Adjustment Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
2017 Peak Season Traffic	32	202	0	0	159	46	38	0	61	0	0	0
Annual Growth Rate	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%
2018 Background Traffic	32	205	0	0	162	47	38	0	62	0	0	0
1060 Ocean - Trips - Valet	1			26	2	11						
2018 Total Traffic	33	205	0	26	164	58	38	0	62	0	0	0

	INS	PM Peak OUT	Total
New External Trips	26	13	39

FUTURE TURNING MOVEMENT VOLUME ANALYSIS

Ocean Drive and 11th Street PM Peak Hour

Description	Ocean Drive Northbound			Ocean Drive Southbound			11th Street Eastbound			11th Street Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Existing Traffic (10/20/2017)	22	212			166	37	40		54			
Season Adjustment Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
2017 Peak Season Traffic	22	216	0	0	169	38	41	0	55	0	0	0
Annual Growth Rate	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%
2018 Background Traffic	23	220	0	0	172	38	41	0	56	0	0	0
1060 Ocean - Trips - Valet					5		3		21 13			
2018 Total Traffic	23	220	0	0	177	38	44	0	90	0	0	0

	INS	PM Peak OUT	Total
New External Trips	26	13	39

APPENDIX E

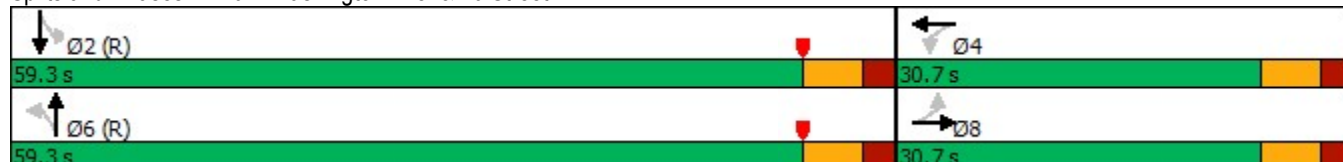
Intersection Capacity Analyses

Timings

101: Washington Ave. & 10 Street

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	28	71	34	51	19	451	31	565
Future Volume (vph)	28	71	34	51	19	451	31	565
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		8		4		6		2
Permitted Phases	8		4		6		2	
Detector Phase	8	8	4	4	6	6	2	2
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	30.3	30.3	30.3	30.3	36.0	36.0	36.0	36.0
Total Split (s)	30.7	30.7	30.7	30.7	59.3	59.3	59.3	59.3
Total Split (%)	34.1%	34.1%	34.1%	34.1%	65.9%	65.9%	65.9%	65.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.3		6.3	6.3	6.3	6.3	6.3
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
Act Effct Green (s)		17.7		17.7	59.7	59.7	59.7	59.7
Actuated g/C Ratio		0.20		0.20	0.66	0.66	0.66	0.66
v/c Ratio		0.55		0.48	0.08	0.29	0.13	0.36
Control Delay		35.9		33.2	8.9	7.9	9.4	8.6
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		35.9		33.2	8.9	7.9	9.4	8.6
LOS		D		C	A	A	A	A
Approach Delay		35.9		33.2		8.0		8.6
Approach LOS		D		C		A		A
Intersection Summary								
Cycle Length: 90								
Actuated Cycle Length: 90								
Offset: 70 (78%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow								
Natural Cycle: 70								
Control Type: Actuated-Coordinated								
Maximum v/c Ratio: 0.55								
Intersection Signal Delay: 12.8				Intersection LOS: B				
Intersection Capacity Utilization 61.7%				ICU Level of Service B				
Analysis Period (min) 15								

Splits and Phases: 101: Washington Ave. & 10 Street



Queues

101: Washington Ave. & 10 Street

	→	←	↖	↑	↘	↓
Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	129	106	19	484	32	609
v/c Ratio	0.55	0.48	0.08	0.29	0.13	0.36
Control Delay	35.9	33.2	8.9	7.9	9.4	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.9	33.2	8.9	7.9	9.4	8.6
Queue Length 50th (ft)	53	43	4	65	7	87
Queue Length 95th (ft)	107	90	15	94	22	124
Internal Link Dist (ft)	234	270		145		390
Turn Bay Length (ft)			55		55	
Base Capacity (vph)	315	303	231	1669	254	1670
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.35	0.08	0.29	0.13	0.36
Intersection Summary						

HCM 2010 Signalized Intersection Summary

101: Washington Ave. & 10 Street

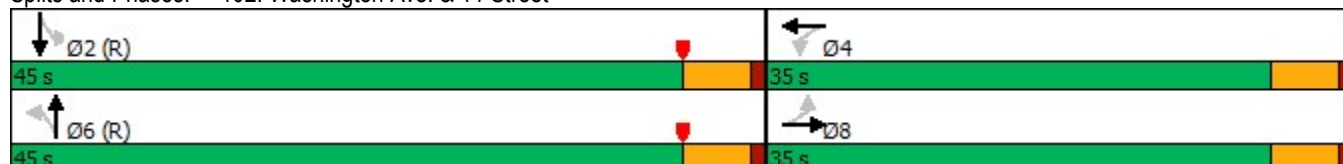
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	71	27	34	51	19	19	451	24	31	565	31
Future Volume (veh/h)	28	71	27	34	51	19	19	451	24	31	565	31
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.93		0.90	0.94		0.90	0.98		0.90	0.97		0.90
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Adj Sat Flow, veh/h/ln	1530	1500	1530	1530	1500	1530	1059	1500	1530	1059	1500	1530
Adj Flow Rate, veh/h	29	72	28	35	52	19	19	460	24	32	577	32
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	94	183	63	130	161	52	336	1606	83	381	1600	88
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.24	0.62	0.62	0.62	0.62	0.62	0.62
Sat Flow, veh/h	186	756	261	317	663	214	505	2599	135	562	2588	143
Grp Volume(v), veh/h	129	0	0	106	0	0	19	251	233	32	317	292
Grp Sat Flow(s),veh/h/ln	1203	0	0	1194	0	0	505	1425	1309	562	1425	1306
Q Serve(g_s), s	1.4	0.0	0.0	0.0	0.0	0.0	1.7	7.4	7.4	2.5	9.8	9.9
Cycle Q Clear(g_c), s	7.9	0.0	0.0	6.1	0.0	0.0	11.6	7.4	7.4	10.0	9.8	9.9
Prop In Lane	0.22		0.22	0.33		0.18	1.00		0.10	1.00		0.11
Lane Grp Cap(c), veh/h	340	0	0	342	0	0	336	881	809	381	881	807
V/C Ratio(X)	0.38	0.00	0.00	0.31	0.00	0.00	0.06	0.29	0.29	0.08	0.36	0.36
Avail Cap(c_a), veh/h	374	0	0	375	0	0	336	881	809	381	881	807
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(l)	1.00	0.00	0.00	0.90	0.00	0.00	1.00	1.00	1.00	0.92	0.92	0.92
Uniform Delay (d), s/veh	28.8	0.0	0.0	28.2	0.0	0.0	11.3	8.0	8.0	10.3	8.4	8.5
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.2	0.0	0.0	0.3	0.8	0.9	0.4	1.1	1.2
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	2.7	0.0	0.0	2.2	0.0	0.0	0.3	3.1	2.9	0.4	4.0	3.8
LnGrp Delay(d),s/veh	29.1	0.0	0.0	28.4	0.0	0.0	11.6	8.8	8.9	10.7	9.5	9.6
LnGrp LOS	C			C			B	A	A	B	A	A
Approach Vol, veh/h	129			106			503			641		
Approach Delay, s/veh	29.1			28.4			8.9			9.6		
Approach LOS	C			C			A			A		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	61.9			28.1			61.9			28.1		
Change Period (Y+Rc), s	* 6.3			* 6.3			* 6.3			* 6.3		
Max Green Setting (Gmax), s	* 53			* 24			* 53			* 24		
Max Q Clear Time (g_c+l1), s	12.0			8.1			13.6			9.9		
Green Ext Time (p_c), s	1.5			0.2			1.2			0.2		
Intersection Summary												
HCM 2010 Ctrl Delay	12.6											
HCM 2010 LOS	B											
Notes												

Timings

102: Washington Ave. & 11 Street

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	19	29	17	36	32	580	34	474
Future Volume (vph)	19	29	17	36	32	580	34	474
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		8		4		6		2
Permitted Phases	8		4		6		2	
Detector Phase	8	8	4	4	6	6	2	2
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	35.0	35.0	35.0	35.0	31.0	31.0	31.0	31.0
Total Split (s)	35.0	35.0	35.0	35.0	45.0	45.0	45.0	45.0
Total Split (%)	43.8%	43.8%	43.8%	43.8%	56.3%	56.3%	56.3%	56.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0		0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0		5.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
Act Effct Green (s)		20.8		20.8	52.6	52.6		52.6
Actuated g/C Ratio		0.26		0.26	0.66	0.66		0.66
v/c Ratio		0.23		0.30	0.15	0.42		0.40
Control Delay		17.6		15.3	12.7	11.3		11.4
Queue Delay		0.0		0.0	0.0	0.0		0.0
Total Delay		17.6		15.3	12.7	11.3		11.4
LOS		B		B	B	B		B
Approach Delay		17.6		15.3		11.3		11.4
Approach LOS		B		B		B		B
Intersection Summary								
Cycle Length: 80								
Actuated Cycle Length: 80								
Offset: 13 (16%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow								
Natural Cycle: 70								
Control Type: Actuated-Coordinated								
Maximum v/c Ratio: 0.42								
Intersection Signal Delay: 11.9				Intersection LOS: B				
Intersection Capacity Utilization 75.1%				ICU Level of Service D				
Analysis Period (min) 15								

Splits and Phases: 102: Washington Ave. & 11 Street



Queues

102: Washington Ave. & 11 Street

	→	←	↶	↑	↓
Lane Group	EBT	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	67	92	36	701	581
v/c Ratio	0.23	0.30	0.15	0.42	0.40
Control Delay	17.6	15.3	12.7	11.3	11.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	17.6	15.3	12.7	11.3	11.4
Queue Length 50th (ft)	17	19	9	118	97
Queue Length 95th (ft)	44	50	28	166	141
Internal Link Dist (ft)	134	301		390	100
Turn Bay Length (ft)			55		
Base Capacity (vph)	419	435	246	1651	1466
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.16	0.21	0.15	0.42	0.40
Intersection Summary					

HCM 2010 Signalized Intersection Summary

102: Washington Ave. & 11 Street

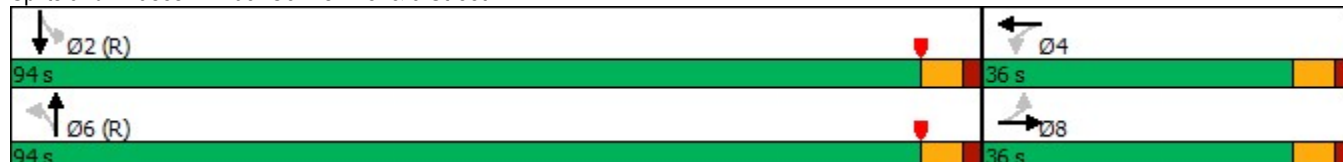
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	29	12	17	36	29	32	580	44	34	474	9
Future Volume (veh/h)	19	29	12	17	36	29	32	580	44	34	474	9
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.95		0.93	0.95		0.93	0.99		0.91	0.98		0.91
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Adj Sat Flow, veh/h/ln	1530	1500	1530	1530	1500	1530	1059	1500	1530	1080	1500	1530
Adj Flow Rate, veh/h	21	33	13	19	40	33	36	652	49	38	533	10
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	0	2	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	149	197	69	105	177	127	334	1457	109	115	1391	26
Arrive On Green	0.30	0.30	0.30	0.30	0.30	0.30	0.58	0.58	0.58	0.58	0.58	0.58
Sat Flow, veh/h	301	660	231	168	592	425	538	2529	190	112	2415	45
Grp Volume(v), veh/h	67	0	0	92	0	0	36	367	334	309	0	272
Grp Sat Flow(s),veh/h/ln	1192	0	0	1186	0	0	538	1425	1294	1356	0	1215
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	3.1	11.8	11.8	0.0	0.0	9.8
Cycle Q Clear(g_c), s	3.1	0.0	0.0	4.5	0.0	0.0	12.9	11.8	11.8	8.8	0.0	9.8
Prop In Lane	0.31		0.19	0.21		0.36	1.00		0.15	0.12		0.04
Lane Grp Cap(c), veh/h	415	0	0	409	0	0	334	821	745	832	0	700
V/C Ratio(X)	0.16	0.00	0.00	0.23	0.00	0.00	0.11	0.45	0.45	0.37	0.00	0.39
Avail Cap(c_a), veh/h	504	0	0	498	0	0	334	821	745	832	0	700
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(l)	1.00	0.00	0.00	0.96	0.00	0.00	0.97	0.97	0.97	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.7	0.0	0.0	21.3	0.0	0.0	12.8	9.7	9.7	9.1	0.0	9.3
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.1	0.0	0.0	0.6	1.7	1.9	1.3	0.0	1.6
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	1.1	0.0	0.0	1.5	0.0	0.0	0.5	5.0	4.6	3.9	0.0	3.6
LnGrp Delay(d),s/veh	20.8	0.0	0.0	21.3	0.0	0.0	13.4	11.4	11.6	10.3	0.0	10.9
LnGrp LOS	C			C			B	B	B	B		B
Approach Vol, veh/h		67			92			737			581	
Approach Delay, s/veh		20.8			21.3			11.6			10.6	
Approach LOS		C			C			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		51.1		28.9		51.1		28.9				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		40.0		30.0		40.0		30.0				
Max Q Clear Time (g_c+I1), s		11.8		6.5		14.9		5.1				
Green Ext Time (p_c), s		1.4		0.2		1.8		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay				12.2								
HCM 2010 LOS				B								

Timings

103: Collins Ave. & 9 Street

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	26	31	15	29	30	357	28	348
Future Volume (vph)	26	31	15	29	30	357	28	348
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		8		4		6		2
Permitted Phases	8		4		6		2	
Detector Phase	8	8	4	4	6	6	2	2
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	37.0	37.0	37.0	37.0	25.0	25.0	25.0	25.0
Total Split (s)	36.0	36.0	36.0	36.0	94.0	94.0	94.0	94.0
Total Split (%)	27.7%	27.7%	27.7%	27.7%	72.3%	72.3%	72.3%	72.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0		6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
Act Effct Green (s)		24.3		24.3	93.7	93.7	93.7	93.7
Actuated g/C Ratio		0.19		0.19	0.72	0.72	0.72	0.72
v/c Ratio		0.52		0.36	0.14	0.52	0.13	0.49
Control Delay		49.2		42.0	7.3	10.6	3.6	5.2
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.2
Total Delay		49.2		42.0	7.3	10.6	3.6	5.4
LOS		D		D	A	B	A	A
Approach Delay		49.2		42.0		10.4		5.3
Approach LOS		D		D		B		A
Intersection Summary								
Cycle Length: 130								
Actuated Cycle Length: 130								
Offset: 52 (40%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow								
Natural Cycle: 75								
Control Type: Actuated-Coordinated								
Maximum v/c Ratio: 0.52								
Intersection Signal Delay: 13.8					Intersection LOS: B			
Intersection Capacity Utilization 67.2%					ICU Level of Service C			
Analysis Period (min) 15								

Splits and Phases: 103: Collins Ave. & 9 Street



Queues

103: Collins Ave. & 9 Street

	→	←	↖	↑	↘	↓
Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	97	71	34	438	31	420
v/c Ratio	0.52	0.36	0.14	0.52	0.13	0.49
Control Delay	49.2	42.0	7.3	10.6	3.6	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2
Total Delay	49.2	42.0	7.3	10.6	3.6	5.4
Queue Length 50th (ft)	60	41	8	143	3	45
Queue Length 95th (ft)	118	88	21	225	m8	70
Internal Link Dist (ft)	103	275		131		370
Turn Bay Length (ft)			150		145	
Base Capacity (vph)	224	240	245	845	244	854
Starvation Cap Reductn	0	0	0	0	0	68
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.30	0.14	0.52	0.13	0.53
Intersection Summary						
m Volume for 95th percentile queue is metered by upstream signal.						

HCM 2010 Signalized Intersection Summary

103: Collins Ave. & 9 Street

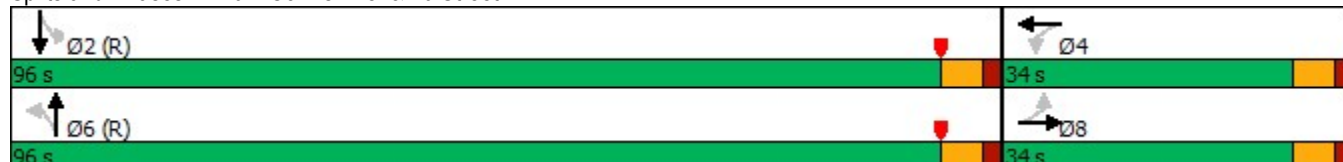
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	31	29	15	29	19	30	357	33	28	348	26
Future Volume (veh/h)	26	31	29	15	29	19	30	357	33	28	348	26
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.71		0.62	0.74		0.62	0.96		0.89	1.00		0.89
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Adj Sat Flow, veh/h/ln	1530	1500	1530	1530	1500	1530	1059	1500	1530	1059	1500	1530
Adj Flow Rate, veh/h	29	35	33	17	33	21	34	401	37	31	391	29
Adj No. of Lanes	0	1	0	0	1	0	1	1	0	1	1	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	77	74	59	67	99	55	468	870	80	408	889	66
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.18	0.72	0.72	0.72	0.96	0.96	0.96
Sat Flow, veh/h	223	401	322	178	536	300	587	1203	111	602	1229	91
Grp Volume(v), veh/h	97	0	0	71	0	0	34	0	438	31	0	420
Grp Sat Flow(s),veh/h/ln	946	0	0	1014	0	0	587	0	1314	602	0	1320
Q Serve(g_s), s	3.7	0.0	0.0	0.0	0.0	0.0	2.4	0.0	18.0	1.6	0.0	2.7
Cycle Q Clear(g_c), s	11.1	0.0	0.0	7.5	0.0	0.0	5.1	0.0	18.0	19.6	0.0	2.7
Prop In Lane	0.30		0.34	0.24		0.30	1.00		0.08	1.00		0.07
Lane Grp Cap(c), veh/h	210	0	0	221	0	0	468	0	951	408	0	955
V/C Ratio(X)	0.46	0.00	0.00	0.32	0.00	0.00	0.07	0.00	0.46	0.08	0.00	0.44
Avail Cap(c_a), veh/h	251	0	0	265	0	0	468	0	951	408	0	955
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.85	0.00	0.85
Uniform Delay (d), s/veh	47.7	0.0	0.0	46.4	0.0	0.0	6.1	0.0	7.4	3.2	0.0	0.7
Incr Delay (d2), s/veh	1.2	0.0	0.0	0.6	0.0	0.0	0.3	0.0	1.6	0.3	0.0	1.2
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	3.2	0.0	0.0	2.3	0.0	0.0	0.4	0.0	6.9	0.3	0.0	1.1
LnGrp Delay(d),s/veh	48.8	0.0	0.0	47.0	0.0	0.0	6.4	0.0	9.1	3.5	0.0	2.0
LnGrp LOS	D			D			A		A	A		A
Approach Vol, veh/h	97				71		472				451	
Approach Delay, s/veh	48.8				47.0		8.9				2.1	
Approach LOS	D				D		A				A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	100.1		29.9		100.1		29.9					
Change Period (Y+Rc), s	6.0		6.0		6.0		6.0					
Max Green Setting (Gmax), s	88.0		30.0		88.0		30.0					
Max Q Clear Time (g_c+I1), s	21.6		9.5		20.0		13.1					
Green Ext Time (p_c), s	1.1		0.3		1.2		0.4					
Intersection Summary												
HCM 2010 Ctrl Delay	12.1											
HCM 2010 LOS	B											

Timings

104: Collins Ave. & 10 Street

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	35	48	22	49	31	343	22	355
Future Volume (vph)	35	48	22	49	31	343	22	355
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		8		4		6		2
Permitted Phases	8		4		6		2	
Detector Phase	8	8	4	4	6	6	2	2
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	37.0	37.0	37.0	37.0	30.0	30.0	30.0	30.0
Total Split (s)	34.0	34.0	34.0	34.0	96.0	96.0	96.0	96.0
Total Split (%)	26.2%	26.2%	26.2%	26.2%	73.8%	73.8%	73.8%	73.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0		6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
Act Effct Green (s)		25.6		25.6	92.4	92.4	92.4	92.4
Actuated g/C Ratio		0.20		0.20	0.71	0.71	0.71	0.71
v/c Ratio		0.65		0.53	0.14	0.49	0.10	0.51
Control Delay		59.6		51.1	6.0	7.2	5.5	10.6
Queue Delay		0.0		0.0	0.0	0.2	0.0	0.3
Total Delay		59.6		51.1	6.0	7.4	5.5	10.9
LOS		E		D	A	A	A	B
Approach Delay		59.6		51.1		7.3		10.6
Approach LOS		E		D		A		B
Intersection Summary								
Cycle Length: 130								
Actuated Cycle Length: 130								
Offset: 46 (35%), Referenced to phase 2:SBTL and 6:NBT, Start of Yellow								
Natural Cycle: 70								
Control Type: Actuated-Coordinated								
Maximum v/c Ratio: 0.65								
Intersection Signal Delay: 18.4					Intersection LOS: B			
Intersection Capacity Utilization 67.2%					ICU Level of Service C			
Analysis Period (min) 15								

Splits and Phases: 104: Collins Ave. & 10 Street



Queues

104: Collins Ave. & 10 Street

	→	←	↖	↑	↘	↓
Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	121	104	34	410	24	427
v/c Ratio	0.65	0.53	0.14	0.49	0.10	0.51
Control Delay	59.6	51.1	6.0	7.2	5.5	10.6
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.3
Total Delay	59.6	51.1	6.0	7.4	5.5	10.9
Queue Length 50th (ft)	87	71	6	81	2	177
Queue Length 95th (ft)	149	126	m12	91	m18	333
Internal Link Dist (ft)	270	275		370		370
Turn Bay Length (ft)			150		120	
Base Capacity (vph)	208	219	238	840	237	838
Starvation Cap Reductn	0	0	0	70	0	97
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.47	0.14	0.53	0.10	0.58
Intersection Summary						
m Volume for 95th percentile queue is metered by upstream signal.						

HCM 2010 Signalized Intersection Summary

104: Collins Ave. & 10 Street

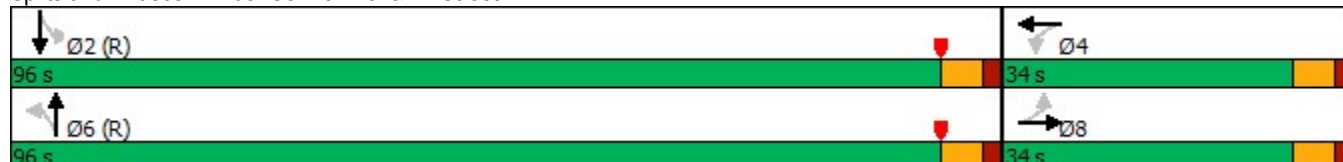
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	48	27	22	49	24	31	343	30	22	355	34
Future Volume (veh/h)	35	48	27	22	49	24	31	343	30	22	355	34
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.76		0.63	0.78		0.63	0.93		0.86	0.93		0.86
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Adj Sat Flow, veh/h/ln	1530	1500	1530	1530	1500	1530	1059	1500	1530	1059	1500	1530
Adj Flow Rate, veh/h	38	53	30	24	54	26	34	377	33	24	390	37
Adj No. of Lanes	0	1	0	0	1	0	1	1	0	1	1	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	81	90	45	65	111	48	466	872	76	472	865	82
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.18	1.00	1.00	1.00	1.00	1.00	1.00
Sat Flow, veh/h	244	491	242	170	604	258	568	1206	106	576	1195	113
Grp Volume(v), veh/h	121	0	0	104	0	0	34	0	410	24	0	427
Grp Sat Flow(s),veh/h/ln	978	0	0	1033	0	0	568	0	1311	576	0	1309
Q Serve(g_s), s	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	14.6	0.0	0.0	11.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop In Lane	0.31		0.25	0.23		0.25	1.00		0.08	1.00		0.09
Lane Grp Cap(c), veh/h	216	0	0	224	0	0	466	0	949	472	0	947
V/C Ratio(X)	0.56	0.00	0.00	0.46	0.00	0.00	0.07	0.00	0.43	0.05	0.00	0.45
Avail Cap(c_a), veh/h	246	0	0	255	0	0	466	0	949	472	0	947
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	0.88	0.00	0.00	1.00	0.00	0.00	0.84	0.00	0.84	0.88	0.00	0.88
Uniform Delay (d), s/veh	49.0	0.0	0.0	47.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	0.0	1.1	0.0	0.0	0.3	0.0	1.2	0.2	0.0	1.4
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	4.1	0.0	0.0	3.4	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.4
LnGrp Delay(d),s/veh	50.5	0.0	0.0	48.9	0.0	0.0	0.3	0.0	1.2	0.2	0.0	1.4
LnGrp LOS	D			D			A		A	A		A
Approach Vol, veh/h	121				104		444				451	
Approach Delay, s/veh	50.5				48.9		1.1				1.3	
Approach LOS	D				D		A				A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	100.1		29.9		100.1		29.9					
Change Period (Y+Rc), s	6.0		6.0		6.0		6.0					
Max Green Setting (Gmax), s	90.0		28.0		90.0		28.0					
Max Q Clear Time (g_c+I1), s	2.0		13.4		2.0		16.6					
Green Ext Time (p_c), s	1.1		0.4		1.1		0.4					
Intersection Summary												
HCM 2010 Ctrl Delay	11.0											
HCM 2010 LOS	B											

Timings

105: Collins Ave. & 11 Street

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	21	39	14	31	23	349	22	364
Future Volume (vph)	21	39	14	31	23	349	22	364
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		8		4		6		2
Permitted Phases	8		4		6		2	
Detector Phase	8	8	4	4	6	6	2	2
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	37.0	37.0	37.0	37.0	30.0	30.0	30.0	30.0
Total Split (s)	34.0	34.0	34.0	34.0	96.0	96.0	96.0	96.0
Total Split (%)	26.2%	26.2%	26.2%	26.2%	73.8%	73.8%	73.8%	73.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0		6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
Act Effct Green (s)		20.6		20.6	97.4	97.4	97.4	97.4
Actuated g/C Ratio		0.16		0.16	0.75	0.75	0.75	0.75
v/c Ratio		0.49		0.41	0.08	0.44	0.07	0.46
Control Delay		51.2		43.0	4.7	5.9	6.0	8.9
Queue Delay		0.0		0.0	0.0	0.2	0.0	0.0
Total Delay		51.2		43.0	4.7	6.1	6.0	8.9
LOS		D		D	A	A	A	A
Approach Delay		51.2		43.0		6.0		8.8
Approach LOS		D		D		A		A
Intersection Summary								
Cycle Length: 130								
Actuated Cycle Length: 130								
Offset: 33 (25%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow								
Natural Cycle: 70								
Control Type: Actuated-Coordinated								
Maximum v/c Ratio: 0.49								
Intersection Signal Delay: 13.5				Intersection LOS: B				
Intersection Capacity Utilization 62.6%				ICU Level of Service B				
Analysis Period (min) 15								

Splits and Phases: 105: Collins Ave. & 11 Street



Queues

105: Collins Ave. & 11 Street



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	84	71	24	399	23	417
v/c Ratio	0.49	0.41	0.08	0.44	0.07	0.46
Control Delay	51.2	43.0	4.7	5.9	6.0	8.9
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.0
Total Delay	51.2	43.0	4.7	6.1	6.0	8.9
Queue Length 50th (ft)	54	40	3	85	5	130
Queue Length 95th (ft)	109	89	m9	98	14	198
Internal Link Dist (ft)	301	270		370		101
Turn Bay Length (ft)			170		125	
Base Capacity (vph)	228	232	286	908	312	899
Starvation Cap Reductn	0	0	0	100	0	0
Spillback Cap Reductn	0	0	0	0	0	21
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.31	0.08	0.49	0.07	0.47

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM 2010 Signalized Intersection Summary

105: Collins Ave. & 11 Street

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	39	20	14	31	22	23	349	26	22	364	28
Future Volume (veh/h)	21	39	20	14	31	22	23	349	26	22	364	28
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.83		0.77	0.84		0.79	0.99		0.89	0.95		0.89
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Adj Sat Flow, veh/h/ln	1530	1500	1530	1530	1500	1530	1059	1500	1530	1059	1500	1530
Adj Flow Rate, veh/h	22	41	21	15	33	23	24	371	28	23	387	30
Adj No. of Lanes	0	1	0	0	1	0	1	1	0	1	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	74	110	50	62	105	64	422	896	68	488	894	69
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.18	1.00	1.00	1.00	0.73	0.73	0.73
Sat Flow, veh/h	217	616	278	160	589	359	606	1228	93	593	1225	95
Grp Volume(v), veh/h	84	0	0	71	0	0	24	0	399	23	0	417
Grp Sat Flow(s),veh/h/ln	1112	0	0	1108	0	0	606	0	1321	593	0	1320
Q Serve(g_s), s	1.2	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	1.4	0.0	16.2
Cycle Q Clear(g_c), s	8.1	0.0	0.0	6.9	0.0	0.0	17.2	0.0	0.0	1.4	0.0	16.2
Prop In Lane	0.26		0.25	0.21		0.32	1.00		0.07	1.00		0.07
Lane Grp Cap(c), veh/h	233	0	0	231	0	0	422	0	964	488	0	963
V/C Ratio(X)	0.36	0.00	0.00	0.31	0.00	0.00	0.06	0.00	0.41	0.05	0.00	0.43
Avail Cap(c_a), veh/h	273	0	0	271	0	0	422	0	964	488	0	963
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	0.98	0.00	0.00	1.00	0.00	0.00	0.86	0.00	0.86	1.00	0.00	1.00
Uniform Delay (d), s/veh	47.2	0.0	0.0	46.7	0.0	0.0	1.5	0.0	0.0	4.9	0.0	7.0
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.3	0.0	0.0	0.2	0.0	1.1	0.2	0.0	1.4
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	2.7	0.0	0.0	2.2	0.0	0.0	0.2	0.0	0.3	0.3	0.0	6.2
LnGrp Delay(d),s/veh	47.6	0.0	0.0	47.0	0.0	0.0	1.7	0.0	1.1	5.1	0.0	8.4
LnGrp LOS	D			D			A		A	A		A
Approach Vol, veh/h	84				71		423				440	
Approach Delay, s/veh	47.6				47.0		1.2				8.2	
Approach LOS	D				D		A				A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	100.8		29.2		100.8		29.2					
Change Period (Y+Rc), s	6.0		6.0		6.0		6.0					
Max Green Setting (Gmax), s	90.0		28.0		90.0		28.0					
Max Q Clear Time (g_c+I1), s	18.2		8.9		19.2		10.1					
Green Ext Time (p_c), s	1.1		0.2		1.0		0.3					
Intersection Summary												
HCM 2010 Ctrl Delay	11.2											
HCM 2010 LOS	B											

HCM Unsignalized Intersection Capacity Analysis

106: Ocean Dr. & 9 Street

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	77	32	247	190	27
Future Volume (Veh/h)	10	77	32	247	190	27
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	11	88	36	281	216	31
Pedestrians	529			97	76	
Lane Width (ft)	11.0			11.0	11.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	40			7	6	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)					456	
pX, platoon unblocked						
vC, conflicting volume	1190	858	776			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1190	858	776			
tC, single (s)	*5.5	*4.5	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	70	93			
cM capacity (veh/h)	146	297	501			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	99	317	247			
Volume Left	11	36	0			
Volume Right	88	0	31			
cSH	266	501	1700			
Volume to Capacity	0.37	0.07	0.15			
Queue Length 95th (ft)	41	6	0			
Control Delay (s)	26.3	2.4	0.0			
Lane LOS	D	A				
Approach Delay (s)	26.3	2.4	0.0			
Approach LOS	D					
Intersection Summary						
Average Delay		5.1				
Intersection Capacity Utilization		57.3%		ICU Level of Service		B
Analysis Period (min)		15				
* User Entered Value						

Timings

107: Ocean Dr. & 10 Street



Lane Group	EBL	NBL	NBT	SBT
Lane Configurations	W		W	W
Traffic Volume (vph)	38	32	202	159
Future Volume (vph)	38	32	202	159
Turn Type	Perm	Perm	NA	NA
Protected Phases			6	2
Permitted Phases	8	6		
Detector Phase	8	6	6	2
Switch Phase				
Minimum Initial (s)	6.7	16.0	16.0	15.7
Minimum Split (s)	13.3	22.3	22.3	22.3
Total Split (s)	26.3	31.3	31.3	31.3
Total Split (%)	45.7%	54.3%	54.3%	54.3%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	2.0	2.0	2.3
Lost Time Adjust (s)	0.0		0.0	0.0
Total Lost Time (s)	6.3		6.0	6.3
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	Min	Min	Min
Act Effect Green (s)	8.8		25.9	25.7
Actuated g/C Ratio	0.23		0.66	0.66
v/c Ratio	0.43		0.34	0.31
Control Delay	15.9		9.2	8.2
Queue Delay	0.0		0.0	0.0
Total Delay	15.9		9.2	8.2
LOS	B		A	A
Approach Delay	15.9		9.2	8.2
Approach LOS	B		A	A

Intersection Summary

Cycle Length: 57.6

Actuated Cycle Length: 39.1

Natural Cycle: 40

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.43

Intersection Signal Delay: 10.1

Intersection LOS: B

Intersection Capacity Utilization 57.3%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 107: Ocean Dr. & 10 Street



Queues

107: Ocean Dr. & 10 Street



Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	107	251	220
v/c Ratio	0.43	0.34	0.31
Control Delay	15.9	9.2	8.2
Queue Delay	0.0	0.0	0.0
Total Delay	15.9	9.2	8.2
Queue Length 50th (ft)	13	32	23
Queue Length 95th (ft)	47	99	79
Internal Link Dist (ft)	275	376	365
Turn Bay Length (ft)			
Base Capacity (vph)	529	867	833
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.20	0.29	0.26
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

107: Ocean Dr. & 10 Street

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Traffic Volume (vph)	38	61	32	202	159	46
Future Volume (vph)	38	61	32	202	159	46
Ideal Flow (vphpl)	1700	1700	1200	1700	1700	1700
Lane Width	11	11	11	11	11	11
Total Lost time (s)	6.3			6.0	6.3	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	0.81			1.00	0.90	
Flpb, ped/bikes	0.83			0.96	1.00	
Frt	0.92			1.00	0.97	
Flt Protected	0.98			0.99	1.00	
Satd. Flow (prot)	794			1180	1082	
Flt Permitted	0.98			0.94	1.00	
Satd. Flow (perm)	794			1120	1082	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	41	66	34	217	171	49
RTOR Reduction (vph)	25	0	0	0	14	0
Lane Group Flow (vph)	82	0	0	251	206	0
Confl. Peds. (#/hr)	128	71	496			496
Confl. Bikes (#/hr)		20				6
Bus Blockages (#/hr)	0	0	0	5	5	0
Parking (#/hr)	0	0	0	5	5	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				6	2	
Permitted Phases	8		6			
Actuated Green, G (s)	6.0			23.3	23.0	
Effective Green, g (s)	6.0			23.3	23.0	
Actuated g/C Ratio	0.14			0.56	0.55	
Clearance Time (s)	6.3			6.0	6.3	
Vehicle Extension (s)	2.5			1.0	1.0	
Lane Grp Cap (vph)	114			627	598	
v/s Ratio Prot					0.19	
v/s Ratio Perm	c0.10			c0.22		
v/c Ratio	0.72			0.40	0.34	
Uniform Delay, d1	17.0			5.2	5.1	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	18.9			0.2	0.1	
Delay (s)	35.9			5.3	5.3	
Level of Service	D			A	A	
Approach Delay (s)	35.9			5.3	5.3	
Approach LOS	D			A	A	
Intersection Summary						
HCM 2000 Control Delay			11.0		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.47			
Actuated Cycle Length (s)			41.6		Sum of lost time (s)	12.6
Intersection Capacity Utilization			57.3%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Timings

108: Ocean Dr. & 11 Street



Lane Group	EBL	NBL	NBT	SBT
Lane Configurations	W		W	W
Traffic Volume (vph)	41	22	216	169
Future Volume (vph)	41	22	216	169
Turn Type	Perm	Perm	NA	NA
Protected Phases			6	2
Permitted Phases	8	6		
Detector Phase	8	6	6	2
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	22.0	27.0	27.0	27.0
Total Split (s)	31.0	31.0	31.0	31.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Min	Min	Min	Min
Act Effect Green (s)	10.5		12.6	12.6
Actuated g/C Ratio	0.29		0.35	0.35
v/c Ratio	0.35		0.62	0.55
Control Delay	14.5		17.7	14.6
Queue Delay	0.0		0.0	0.0
Total Delay	14.5		17.7	14.6
LOS	B		B	B
Approach Delay	14.5		17.7	14.6
Approach LOS	B		B	B

Intersection Summary

Cycle Length: 62

Actuated Cycle Length: 36.1

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 16.0

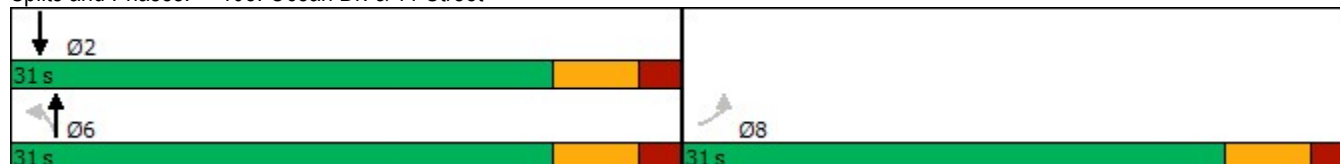
Intersection LOS: B

Intersection Capacity Utilization 60.1%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 108: Ocean Dr. & 11 Street



Queues

108: Ocean Dr. & 11 Street



Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	100	248	216
v/c Ratio	0.35	0.62	0.55
Control Delay	14.5	17.7	14.6
Queue Delay	0.0	0.0	0.0
Total Delay	14.5	17.7	14.6
Queue Length 50th (ft)	11	31	23
Queue Length 95th (ft)	49	103	83
Internal Link Dist (ft)	270	365	49
Turn Bay Length (ft)			
Base Capacity (vph)	713	854	818
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.14	0.29	0.26
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

108: Ocean Dr. & 11 Street

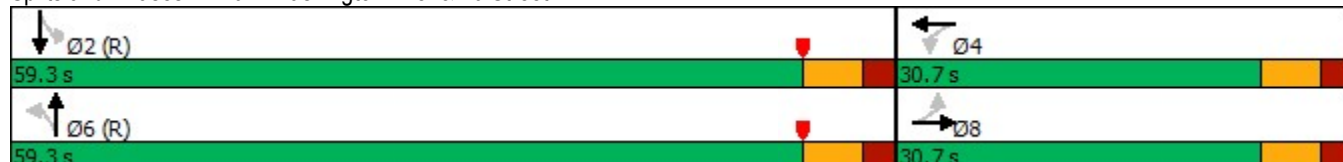
						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	41	55	22	216	169	38
Future Volume (vph)	41	55	22	216	169	38
Ideal Flow (vphpl)	1700	1700	1200	1700	1700	1700
Lane Width	11	11	11	11	11	11
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	0.92			1.00	0.91	
Flpb, ped/bikes	0.96			0.97	1.00	
Frt	0.92			1.00	0.97	
Flt Protected	0.98			1.00	1.00	
Satd. Flow (prot)	1036			1197	1101	
Flt Permitted	0.98			0.95	1.00	
Satd. Flow (perm)	1036			1144	1101	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	43	57	23	225	176	40
RTOR Reduction (vph)	8	0	0	0	14	0
Lane Group Flow (vph)	92	0	0	248	202	0
Confl. Peds. (#/hr)	91	109	576			576
Confl. Bikes (#/hr)		6				4
Bus Blockages (#/hr)	0	0	0	5	5	0
Parking (#/hr)	0	0	0	5	5	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				6	2	
Permitted Phases	8		6			
Actuated Green, G (s)	10.5			12.6	12.6	
Effective Green, g (s)	10.5			12.6	12.6	
Actuated g/C Ratio	0.30			0.36	0.36	
Clearance Time (s)	6.0			6.0	6.0	
Vehicle Extension (s)	2.5			1.0	1.0	
Lane Grp Cap (vph)	309			410	395	
v/s Ratio Prot					0.18	
v/s Ratio Perm	c0.09			c0.22		
v/c Ratio	0.30			0.60	0.51	
Uniform Delay, d1	9.5			9.2	8.8	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.4			1.7	0.5	
Delay (s)	9.9			10.9	9.3	
Level of Service	A			B	A	
Approach Delay (s)	9.9			10.9	9.3	
Approach LOS	A			B	A	
Intersection Summary						
HCM 2000 Control Delay			10.1		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.46			
Actuated Cycle Length (s)			35.1		Sum of lost time (s)	12.0
Intersection Capacity Utilization			60.1%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Timings

101: Washington Ave. & 10 Street

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	28	73	34	52	20	458	31	574
Future Volume (vph)	28	73	34	52	20	458	31	574
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		8		4		6		2
Permitted Phases	8		4		6		2	
Detector Phase	8	8	4	4	6	6	2	2
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	30.3	30.3	30.3	30.3	36.0	36.0	36.0	36.0
Total Split (s)	30.7	30.7	30.7	30.7	59.3	59.3	59.3	59.3
Total Split (%)	34.1%	34.1%	34.1%	34.1%	65.9%	65.9%	65.9%	65.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.3		6.3	6.3	6.3	6.3	6.3
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
Act Effct Green (s)		17.7		17.7	59.7	59.7	59.7	59.7
Actuated g/C Ratio		0.20		0.20	0.66	0.66	0.66	0.66
v/c Ratio		0.56		0.48	0.09	0.30	0.13	0.37
Control Delay		36.3		33.6	9.0	8.0	9.5	8.7
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		36.3		33.6	9.0	8.0	9.5	8.7
LOS		D		C	A	A	A	A
Approach Delay		36.3		33.6		8.0		8.7
Approach LOS		D		C		A		A
Intersection Summary								
Cycle Length: 90								
Actuated Cycle Length: 90								
Offset: 70 (78%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow								
Natural Cycle: 70								
Control Type: Actuated-Coordinated								
Maximum v/c Ratio: 0.56								
Intersection Signal Delay: 12.9					Intersection LOS: B			
Intersection Capacity Utilization 62.0%					ICU Level of Service B			
Analysis Period (min) 15								

Splits and Phases: 101: Washington Ave. & 10 Street



Queues

101: Washington Ave. & 10 Street

	→	←	↖	↑	↘	↓
Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	131	108	20	493	32	618
v/c Ratio	0.56	0.48	0.09	0.30	0.13	0.37
Control Delay	36.3	33.6	9.0	8.0	9.5	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.3	33.6	9.0	8.0	9.5	8.7
Queue Length 50th (ft)	54	44	5	66	7	90
Queue Length 95th (ft)	109	92	16	96	22	126
Internal Link Dist (ft)	234	270		145		390
Turn Bay Length (ft)			55		55	
Base Capacity (vph)	315	303	229	1667	252	1670
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.36	0.09	0.30	0.13	0.37
Intersection Summary						

HCM 2010 Signalized Intersection Summary

101: Washington Ave. & 10 Street

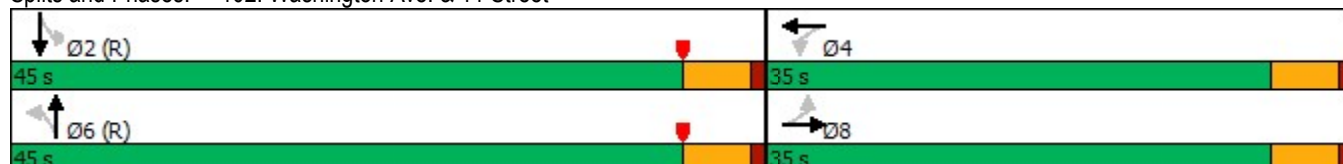
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	73	27	34	52	20	20	458	25	31	574	31
Future Volume (veh/h)	28	73	27	34	52	20	20	458	25	31	574	31
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.93		0.90	0.94		0.90	0.98		0.90	0.98		0.90
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Adj Sat Flow, veh/h/ln	1530	1500	1530	1530	1500	1530	1059	1500	1530	1059	1500	1530
Adj Flow Rate, veh/h	29	74	28	35	53	20	20	467	26	32	586	32
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	93	185	62	128	161	54	333	1599	89	377	1601	87
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.24	0.62	0.62	0.62	0.62	0.62	0.62
Sat Flow, veh/h	182	765	258	309	664	221	501	2588	143	558	2591	141
Grp Volume(v), veh/h	131	0	0	108	0	0	20	256	237	32	322	296
Grp Sat Flow(s),veh/h/ln	1205	0	0	1194	0	0	501	1425	1306	558	1425	1307
Q Serve(g_s), s	1.4	0.0	0.0	0.0	0.0	0.0	1.9	7.5	7.6	2.6	10.0	10.1
Cycle Q Clear(g_c), s	8.0	0.0	0.0	6.3	0.0	0.0	11.9	7.5	7.6	10.2	10.0	10.1
Prop In Lane	0.22		0.21	0.32		0.19	1.00		0.11	1.00		0.11
Lane Grp Cap(c), veh/h	341	0	0	342	0	0	333	880	807	377	880	807
V/C Ratio(X)	0.38	0.00	0.00	0.32	0.00	0.00	0.06	0.29	0.29	0.08	0.37	0.37
Avail Cap(c_a), veh/h	375	0	0	375	0	0	333	880	807	377	880	807
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(l)	1.00	0.00	0.00	0.90	0.00	0.00	1.00	1.00	1.00	0.92	0.92	0.92
Uniform Delay (d), s/veh	28.8	0.0	0.0	28.2	0.0	0.0	11.4	8.0	8.0	10.4	8.5	8.5
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.2	0.0	0.0	0.3	0.8	0.9	0.4	1.1	1.2
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	2.8	0.0	0.0	2.2	0.0	0.0	0.3	3.1	2.9	0.4	4.2	3.9
LnGrp Delay(d),s/veh	29.1	0.0	0.0	28.4	0.0	0.0	11.8	8.9	9.0	10.8	9.6	9.7
LnGrp LOS	C			C			B	A	A	B	A	A
Approach Vol, veh/h		131			108			513			650	
Approach Delay, s/veh		29.1			28.4			9.0			9.7	
Approach LOS		C			C			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		61.9		28.1		61.9		28.1				
Change Period (Y+Rc), s		* 6.3		* 6.3		* 6.3		* 6.3				
Max Green Setting (Gmax), s		* 53		* 24		* 53		* 24				
Max Q Clear Time (g_c+l1), s		12.2		8.3		13.9		10.0				
Green Ext Time (p_c), s		1.5		0.2		1.2		0.2				
Intersection Summary												
HCM 2010 Ctrl Delay				12.7								
HCM 2010 LOS				B								
Notes												

Timings

102: Washington Ave. & 11 Street

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	20	29	18	36	32	590	34	482
Future Volume (vph)	20	29	18	36	32	590	34	482
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		8		4		6		2
Permitted Phases	8		4		6		2	
Detector Phase	8	8	4	4	6	6	2	2
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	35.0	35.0	35.0	35.0	31.0	31.0	31.0	31.0
Total Split (s)	35.0	35.0	35.0	35.0	45.0	45.0	45.0	45.0
Total Split (%)	43.8%	43.8%	43.8%	43.8%	56.3%	56.3%	56.3%	56.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0		0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0		5.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
Act Effct Green (s)		20.8		20.8	52.6	52.6		52.6
Actuated g/C Ratio		0.26		0.26	0.66	0.66		0.66
v/c Ratio		0.23		0.30	0.15	0.43		0.40
Control Delay		17.7		15.5	12.8	11.4		11.5
Queue Delay		0.0		0.0	0.0	0.0		0.0
Total Delay		17.7		15.5	12.8	11.4		11.5
LOS		B		B	B	B		B
Approach Delay		17.7		15.5		11.4		11.5
Approach LOS		B		B		B		B
Intersection Summary								
Cycle Length: 80								
Actuated Cycle Length: 80								
Offset: 13 (16%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow								
Natural Cycle: 70								
Control Type: Actuated-Coordinated								
Maximum v/c Ratio: 0.43								
Intersection Signal Delay: 12.0				Intersection LOS: B				
Intersection Capacity Utilization 75.8%				ICU Level of Service D				
Analysis Period (min) 15								

Splits and Phases: 102: Washington Ave. & 11 Street



Queues

102: Washington Ave. & 11 Street

	→	←	↶	↑	↓
Lane Group	EBT	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	68	93	36	714	590
v/c Ratio	0.23	0.30	0.15	0.43	0.40
Control Delay	17.7	15.5	12.8	11.4	11.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	17.7	15.5	12.8	11.4	11.5
Queue Length 50th (ft)	18	19	9	121	100
Queue Length 95th (ft)	45	51	28	171	144
Internal Link Dist (ft)	134	301		390	100
Turn Bay Length (ft)			55		
Base Capacity (vph)	416	433	244	1650	1465
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.16	0.21	0.15	0.43	0.40
Intersection Summary					

HCM 2010 Signalized Intersection Summary

102: Washington Ave. & 11 Street

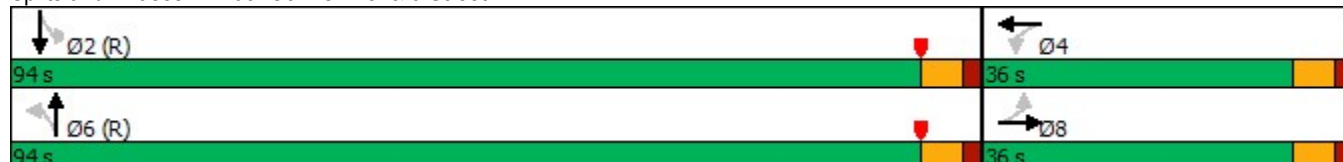
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	29	12	18	36	29	32	590	45	34	482	9
Future Volume (veh/h)	20	29	12	18	36	29	32	590	45	34	482	9
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.95		0.93	0.95		0.93	0.99		0.91	0.98		0.91
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Adj Sat Flow, veh/h/ln	1530	1500	1530	1530	1500	1530	1059	1500	1530	1080	1500	1530
Adj Flow Rate, veh/h	22	33	13	20	40	33	36	663	51	38	542	10
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	0	2	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	153	194	68	108	175	126	331	1454	112	114	1393	25
Arrive On Green	0.30	0.30	0.30	0.30	0.30	0.30	0.58	0.58	0.58	0.58	0.58	0.58
Sat Flow, veh/h	313	650	228	178	586	420	534	2524	194	110	2418	44
Grp Volume(v), veh/h	68	0	0	93	0	0	36	374	340	314	0	276
Grp Sat Flow(s),veh/h/ln	1190	0	0	1185	0	0	534	1425	1292	1357	0	1215
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	3.2	12.1	12.1	0.0	0.0	10.0
Cycle Q Clear(g_c), s	3.1	0.0	0.0	4.6	0.0	0.0	13.1	12.1	12.1	9.0	0.0	10.0
Prop In Lane	0.32		0.19	0.22		0.35	1.00		0.15	0.12		0.04
Lane Grp Cap(c), veh/h	415	0	0	409	0	0	331	821	745	832	0	700
V/C Ratio(X)	0.16	0.00	0.00	0.23	0.00	0.00	0.11	0.46	0.46	0.38	0.00	0.39
Avail Cap(c_a), veh/h	504	0	0	497	0	0	331	821	745	832	0	700
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(l)	1.00	0.00	0.00	0.95	0.00	0.00	0.97	0.97	0.97	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.8	0.0	0.0	21.3	0.0	0.0	12.9	9.7	9.8	9.1	0.0	9.3
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.1	0.0	0.0	0.6	1.8	1.9	1.3	0.0	1.7
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	1.1	0.0	0.0	1.6	0.0	0.0	0.5	5.1	4.7	4.0	0.0	3.6
LnGrp Delay(d),s/veh	20.8	0.0	0.0	21.4	0.0	0.0	13.5	11.5	11.7	10.4	0.0	11.0
LnGrp LOS	C			C			B	B	B	B		B
Approach Vol, veh/h		68			93			750			590	
Approach Delay, s/veh		20.8			21.4			11.7			10.7	
Approach LOS		C			C			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		51.1		28.9		51.1		28.9				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		40.0		30.0		40.0		30.0				
Max Q Clear Time (g_c+I1), s		12.0		6.6		15.1		5.1				
Green Ext Time (p_c), s		1.4		0.2		1.8		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay				12.3								
HCM 2010 LOS				B								

Timings

103: Collins Ave. & 9 Street

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	26	31	16	29	30	363	28	353
Future Volume (vph)	26	31	16	29	30	363	28	353
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		8		4		6		2
Permitted Phases	8		4		6		2	
Detector Phase	8	8	4	4	6	6	2	2
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	37.0	37.0	37.0	37.0	25.0	25.0	25.0	25.0
Total Split (s)	36.0	36.0	36.0	36.0	94.0	94.0	94.0	94.0
Total Split (%)	27.7%	27.7%	27.7%	27.7%	72.3%	72.3%	72.3%	72.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0		6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
Act Effct Green (s)		24.3		24.3	93.7	93.7	93.7	93.7
Actuated g/C Ratio		0.19		0.19	0.72	0.72	0.72	0.72
v/c Ratio		0.52		0.37	0.14	0.53	0.13	0.50
Control Delay		49.2		41.9	7.3	10.8	3.6	5.2
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.2
Total Delay		49.2		41.9	7.3	10.8	3.6	5.3
LOS		D		D	A	B	A	A
Approach Delay		49.2		41.9		10.5		5.2
Approach LOS		D		D		B		A
Intersection Summary								
Cycle Length: 130								
Actuated Cycle Length: 130								
Offset: 52 (40%), Referenced to phase 2:SBTL and 6:NBT, Start of Yellow								
Natural Cycle: 75								
Control Type: Actuated-Coordinated								
Maximum v/c Ratio: 0.53								
Intersection Signal Delay: 13.8					Intersection LOS: B			
Intersection Capacity Utilization 67.6%					ICU Level of Service C			
Analysis Period (min) 15								

Splits and Phases: 103: Collins Ave. & 9 Street



Queues

103: Collins Ave. & 9 Street



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	97	73	34	445	31	426
v/c Ratio	0.52	0.37	0.14	0.53	0.13	0.50
Control Delay	49.2	41.9	7.3	10.8	3.6	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2
Total Delay	49.2	41.9	7.3	10.8	3.6	5.3
Queue Length 50th (ft)	60	42	8	147	3	45
Queue Length 95th (ft)	118	90	21	230	m7	72
Internal Link Dist (ft)	103	275		131		370
Turn Bay Length (ft)			150		145	
Base Capacity (vph)	224	239	245	846	244	854
Starvation Cap Reductn	0	0	0	0	0	68
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.31	0.14	0.53	0.13	0.54

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM 2010 Signalized Intersection Summary

103: Collins Ave. & 9 Street

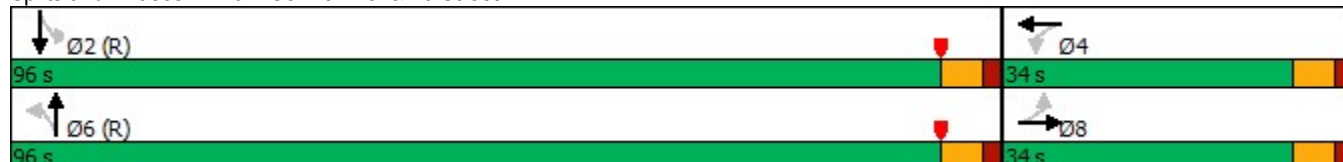
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	31	29	16	29	20	30	363	33	28	353	26
Future Volume (veh/h)	26	31	29	16	29	20	30	363	33	28	353	26
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.71		0.62	0.74		0.62	0.95		0.89	1.00		0.89
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Adj Sat Flow, veh/h/ln	1530	1500	1530	1530	1500	1530	1059	1500	1530	1059	1500	1530
Adj Flow Rate, veh/h	29	35	33	18	33	22	34	408	37	31	397	29
Adj No. of Lanes	0	1	0	0	1	0	1	1	0	1	1	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	77	74	59	68	96	56	473	872	79	403	890	65
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.18	0.72	0.72	0.72	1.00	1.00	1.00
Sat Flow, veh/h	224	402	323	184	519	303	577	1205	109	598	1231	90
Grp Volume(v), veh/h	97	0	0	73	0	0	34	0	445	31	0	426
Grp Sat Flow(s),veh/h/ln	950	0	0	1007	0	0	577	0	1314	598	0	1320
Q Serve(g_s), s	3.3	0.0	0.0	0.0	0.0	0.0	2.3	0.0	18.4	1.4	0.0	0.0
Cycle Q Clear(g_c), s	11.0	0.0	0.0	7.7	0.0	0.0	2.3	0.0	18.4	19.8	0.0	0.0
Prop In Lane	0.30		0.34	0.25		0.30	1.00		0.08	1.00		0.07
Lane Grp Cap(c), veh/h	211	0	0	220	0	0	473	0	951	403	0	955
V/C Ratio(X)	0.46	0.00	0.00	0.33	0.00	0.00	0.07	0.00	0.47	0.08	0.00	0.45
Avail Cap(c_a), veh/h	252	0	0	263	0	0	473	0	951	403	0	955
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.84	0.00	0.84
Uniform Delay (d), s/veh	47.6	0.0	0.0	46.5	0.0	0.0	5.3	0.0	7.5	1.9	0.0	0.0
Incr Delay (d2), s/veh	1.2	0.0	0.0	0.7	0.0	0.0	0.3	0.0	1.7	0.3	0.0	1.3
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	3.2	0.0	0.0	2.3	0.0	0.0	0.4	0.0	7.0	0.3	0.0	0.3
LnGrp Delay(d),s/veh	48.8	0.0	0.0	47.1	0.0	0.0	5.6	0.0	9.2	2.2	0.0	1.3
LnGrp LOS	D			D			A		A	A		A
Approach Vol, veh/h	97				73		479				457	
Approach Delay, s/veh	48.8				47.1		8.9				1.3	
Approach LOS	D				D		A				A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	100.1		29.9		100.1		29.9					
Change Period (Y+Rc), s	6.0		6.0		6.0		6.0					
Max Green Setting (Gmax), s	88.0		30.0		88.0		30.0					
Max Q Clear Time (g_c+I1), s	21.8		9.7		20.4		13.0					
Green Ext Time (p_c), s	1.1		0.3		1.2		0.4					
Intersection Summary												
HCM 2010 Ctrl Delay	11.8											
HCM 2010 LOS	B											

Timings

104: Collins Ave. & 10 Street

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	35	49	23	50	31	348	23	361
Future Volume (vph)	35	49	23	50	31	348	23	361
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		8		4		6		2
Permitted Phases	8		4		6		2	
Detector Phase	8	8	4	4	6	6	2	2
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	37.0	37.0	37.0	37.0	30.0	30.0	30.0	30.0
Total Split (s)	34.0	34.0	34.0	34.0	96.0	96.0	96.0	96.0
Total Split (%)	26.2%	26.2%	26.2%	26.2%	73.8%	73.8%	73.8%	73.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0		6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
Act Effct Green (s)		25.6		25.6	92.4	92.4	92.4	92.4
Actuated g/C Ratio		0.20		0.20	0.71	0.71	0.71	0.71
v/c Ratio		0.65		0.54	0.14	0.50	0.11	0.52
Control Delay		59.7		51.8	6.0	7.3	5.7	10.9
Queue Delay		0.0		0.0	0.0	0.2	0.0	0.3
Total Delay		59.7		51.8	6.0	7.5	5.7	11.2
LOS		E		D	A	A	A	B
Approach Delay		59.7		51.8		7.4		10.9
Approach LOS		E		D		A		B
Intersection Summary								
Cycle Length: 130								
Actuated Cycle Length: 130								
Offset: 46 (35%), Referenced to phase 2:SBTL and 6:NBT, Start of Yellow								
Natural Cycle: 70								
Control Type: Actuated-Coordinated								
Maximum v/c Ratio: 0.65								
Intersection Signal Delay: 18.6				Intersection LOS: B				
Intersection Capacity Utilization 67.5%				ICU Level of Service C				
Analysis Period (min) 15								

Splits and Phases: 104: Collins Ave. & 10 Street



Queues

104: Collins Ave. & 10 Street



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	122	107	34	415	25	434
v/c Ratio	0.65	0.54	0.14	0.50	0.11	0.52
Control Delay	59.7	51.8	6.0	7.3	5.7	10.9
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.3
Total Delay	59.7	51.8	6.0	7.5	5.7	11.2
Queue Length 50th (ft)	88	74	6	82	2	184
Queue Length 95th (ft)	151	130	m11	90	m20	346
Internal Link Dist (ft)	270	275		370		370
Turn Bay Length (ft)			150		120	
Base Capacity (vph)	208	220	237	841	235	839
Starvation Cap Reductn	0	0	0	71	0	93
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.49	0.14	0.54	0.11	0.58

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM 2010 Signalized Intersection Summary

104: Collins Ave. & 10 Street

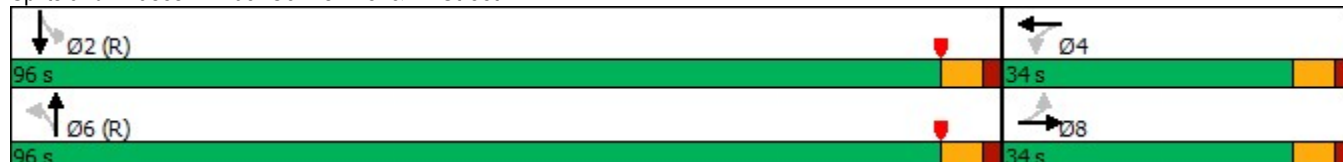
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	49	27	23	50	25	31	348	30	23	361	34
Future Volume (veh/h)	35	49	27	23	50	25	31	348	30	23	361	34
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.76		0.63	0.78		0.63	0.93		0.86	0.93		0.86
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Adj Sat Flow, veh/h/ln	1530	1500	1530	1530	1500	1530	1059	1500	1530	1059	1500	1530
Adj Flow Rate, veh/h	38	54	30	25	55	27	34	382	33	25	397	37
Adj No. of Lanes	0	1	0	0	1	0	1	1	0	1	1	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	81	91	44	66	110	48	464	874	75	470	866	81
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.18	1.00	1.00	1.00	1.00	1.00	1.00
Sat Flow, veh/h	241	495	240	172	596	259	564	1208	104	573	1198	112
Grp Volume(v), veh/h	122	0	0	107	0	0	34	0	415	25	0	434
Grp Sat Flow(s),veh/h/ln	975	0	0	1027	0	0	564	0	1312	573	0	1309
Q Serve(g_s), s	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	14.9	0.0	0.0	11.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop In Lane	0.31		0.25	0.23		0.25	1.00		0.08	1.00		0.09
Lane Grp Cap(c), veh/h	216	0	0	223	0	0	464	0	949	470	0	947
V/C Ratio(X)	0.56	0.00	0.00	0.48	0.00	0.00	0.07	0.00	0.44	0.05	0.00	0.46
Avail Cap(c_a), veh/h	245	0	0	254	0	0	464	0	949	470	0	947
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	0.87	0.00	0.00	1.00	0.00	0.00	0.84	0.00	0.84	0.88	0.00	0.88
Uniform Delay (d), s/veh	49.1	0.0	0.0	48.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	0.0	1.2	0.0	0.0	0.3	0.0	1.2	0.2	0.0	1.4
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	4.2	0.0	0.0	3.6	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.4
LnGrp Delay(d),s/veh	50.6	0.0	0.0	49.2	0.0	0.0	0.3	0.0	1.2	0.2	0.0	1.4
LnGrp LOS	D			D			A		A	A		A
Approach Vol, veh/h		122			107			449			459	
Approach Delay, s/veh		50.6			49.2			1.2			1.3	
Approach LOS		D			D			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		100.1		29.9		100.1		29.9				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		90.0		28.0		90.0		28.0				
Max Q Clear Time (g_c+I1), s		2.0		13.9		2.0		16.9				
Green Ext Time (p_c), s		1.2		0.4		1.2		0.4				
Intersection Summary												
HCM 2010 Ctrl Delay				11.1								
HCM 2010 LOS				B								

Timings

105: Collins Ave. & 11 Street

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	22	39	15	31	24	354	23	370
Future Volume (vph)	22	39	15	31	24	354	23	370
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		8		4		6		2
Permitted Phases	8		4		6		2	
Detector Phase	8	8	4	4	6	6	2	2
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	37.0	37.0	37.0	37.0	30.0	30.0	30.0	30.0
Total Split (s)	34.0	34.0	34.0	34.0	96.0	96.0	96.0	96.0
Total Split (%)	26.2%	26.2%	26.2%	26.2%	73.8%	73.8%	73.8%	73.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0		6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
Act Effct Green (s)		20.6		20.6	97.4	97.4	97.4	97.4
Actuated g/C Ratio		0.16		0.16	0.75	0.75	0.75	0.75
v/c Ratio		0.51		0.42	0.09	0.45	0.08	0.47
Control Delay		52.1		43.8	4.7	5.9	6.0	9.0
Queue Delay		0.0		0.0	0.0	0.2	0.0	0.1
Total Delay		52.1		43.8	4.7	6.1	6.0	9.1
LOS		D		D	A	A	A	A
Approach Delay		52.1		43.8		6.0		8.9
Approach LOS		D		D		A		A
Intersection Summary								
Cycle Length: 130								
Actuated Cycle Length: 130								
Offset: 33 (25%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow								
Natural Cycle: 70								
Control Type: Actuated-Coordinated								
Maximum v/c Ratio: 0.51								
Intersection Signal Delay: 13.7				Intersection LOS: B				
Intersection Capacity Utilization 64.1%				ICU Level of Service C				
Analysis Period (min) 15								

Splits and Phases: 105: Collins Ave. & 11 Street



Queues

105: Collins Ave. & 11 Street

	→	←	↖	↑	↘	↓
Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	86	73	26	405	24	424
v/c Ratio	0.51	0.42	0.09	0.45	0.08	0.47
Control Delay	52.1	43.8	4.7	5.9	6.0	9.0
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.1
Total Delay	52.1	43.8	4.7	6.1	6.0	9.1
Queue Length 50th (ft)	56	41	4	87	5	134
Queue Length 95th (ft)	111	91	m9	100	14	203
Internal Link Dist (ft)	301	270		370		101
Turn Bay Length (ft)			170		125	
Base Capacity (vph)	226	231	284	909	310	899
Starvation Cap Reductn	0	0	0	97	0	0
Spillback Cap Reductn	0	0	0	0	0	27
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.32	0.09	0.50	0.08	0.49
Intersection Summary						
m Volume for 95th percentile queue is metered by upstream signal.						

HCM 2010 Signalized Intersection Summary

105: Collins Ave. & 11 Street

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	39	21	15	31	23	24	354	26	23	370	28
Future Volume (veh/h)	22	39	21	15	31	23	24	354	26	23	370	28
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.83		0.77	0.84		0.79	0.99		0.89	0.95		0.89
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Adj Sat Flow, veh/h/ln	1530	1500	1530	1530	1500	1530	1059	1500	1530	1059	1500	1530
Adj Flow Rate, veh/h	23	41	22	16	33	24	26	377	28	24	394	30
Adj No. of Lanes	0	1	0	0	1	0	1	1	0	1	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	75	107	51	64	102	65	418	897	67	485	895	68
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.18	1.00	1.00	1.00	0.73	0.73	0.73
Sat Flow, veh/h	224	602	284	169	574	364	602	1230	91	590	1227	93
Grp Volume(v), veh/h	86	0	0	73	0	0	26	0	405	24	0	424
Grp Sat Flow(s),veh/h/ln	1109	0	0	1107	0	0	602	0	1321	590	0	1321
Q Serve(g_s), s	1.2	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.5	0.0	16.6
Cycle Q Clear(g_c), s	8.3	0.0	0.0	7.1	0.0	0.0	17.7	0.0	0.0	1.5	0.0	16.6
Prop In Lane	0.27		0.26	0.22		0.33	1.00		0.07	1.00		0.07
Lane Grp Cap(c), veh/h	233	0	0	231	0	0	418	0	964	485	0	963
V/C Ratio(X)	0.37	0.00	0.00	0.32	0.00	0.00	0.06	0.00	0.42	0.05	0.00	0.44
Avail Cap(c_a), veh/h	272	0	0	271	0	0	418	0	964	485	0	963
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	0.98	0.00	0.00	1.00	0.00	0.00	0.86	0.00	0.86	1.00	0.00	1.00
Uniform Delay (d), s/veh	47.3	0.0	0.0	46.8	0.0	0.0	1.6	0.0	0.0	5.0	0.0	7.0
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.3	0.0	0.0	0.2	0.0	1.2	0.2	0.0	1.5
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	2.8	0.0	0.0	2.3	0.0	0.0	0.2	0.0	0.3	0.3	0.0	6.4
LnGrp Delay(d),s/veh	47.6	0.0	0.0	47.1	0.0	0.0	1.8	0.0	1.2	5.2	0.0	8.5
LnGrp LOS	D			D			A		A	A		A
Approach Vol, veh/h	86				73		431				448	
Approach Delay, s/veh	47.6				47.1		1.2				8.3	
Approach LOS	D				D		A				A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	100.8		29.2		100.8		29.2					
Change Period (Y+Rc), s	6.0		6.0		6.0		6.0					
Max Green Setting (Gmax), s	90.0		28.0		90.0		28.0					
Max Q Clear Time (g_c+l1), s	18.6		9.1		19.7		10.3					
Green Ext Time (p_c), s	1.1		0.2		1.1		0.3					
Intersection Summary												
HCM 2010 Ctrl Delay			11.3									
HCM 2010 LOS			B									

HCM Unsignalized Intersection Capacity Analysis

106: Ocean Dr. & 9 Street

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	78	32	251	193	27
Future Volume (Veh/h)	10	78	32	251	193	27
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	11	89	36	285	219	31
Pedestrians	529			97	76	
Lane Width (ft)	11.0			11.0	11.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	40			7	6	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)					456	
pX, platoon unblocked						
vC, conflicting volume	1196	860	779			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1196	860	779			
tC, single (s)	*5.5	*4.5	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	70	93			
cM capacity (veh/h)	145	296	499			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	100	321	250			
Volume Left	11	36	0			
Volume Right	89	0	31			
cSH	266	499	1700			
Volume to Capacity	0.38	0.07	0.15			
Queue Length 95th (ft)	42	6	0			
Control Delay (s)	26.5	2.4	0.0			
Lane LOS	D	A				
Approach Delay (s)	26.5	2.4	0.0			
Approach LOS	D					
Intersection Summary						
Average Delay		5.1				
Intersection Capacity Utilization		57.8%		ICU Level of Service		B
Analysis Period (min)		15				
* User Entered Value						

Timings

107: Ocean Dr. & 10 Street



Lane Group	EBL	NBL	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	38	32	205	162
Future Volume (vph)	38	32	205	162
Turn Type	Perm	Perm	NA	NA
Protected Phases			6	2
Permitted Phases	8	6		
Detector Phase	8	6	6	2
Switch Phase				
Minimum Initial (s)	6.7	16.0	16.0	15.7
Minimum Split (s)	13.3	22.3	22.3	22.3
Total Split (s)	26.3	31.3	31.3	31.3
Total Split (%)	45.7%	54.3%	54.3%	54.3%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	2.0	2.0	2.3
Lost Time Adjust (s)	0.0		0.0	0.0
Total Lost Time (s)	6.3		6.0	6.3
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	Min	Min	Min
Act Effect Green (s)	8.8		25.9	25.7
Actuated g/C Ratio	0.23		0.66	0.66
v/c Ratio	0.44		0.35	0.32
Control Delay	16.1		9.3	8.3
Queue Delay	0.0		0.0	0.0
Total Delay	16.1		9.3	8.3
LOS	B		A	A
Approach Delay	16.1		9.3	8.3
Approach LOS	B		A	A

Intersection Summary

Cycle Length: 57.6

Actuated Cycle Length: 39.1

Natural Cycle: 40

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.44

Intersection Signal Delay: 10.2

Intersection LOS: B

Intersection Capacity Utilization 57.9%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 107: Ocean Dr. & 10 Street



Queues

107: Ocean Dr. & 10 Street



Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	108	254	225
v/c Ratio	0.44	0.35	0.32
Control Delay	16.1	9.3	8.3
Queue Delay	0.0	0.0	0.0
Total Delay	16.1	9.3	8.3
Queue Length 50th (ft)	13	32	23
Queue Length 95th (ft)	48	101	82
Internal Link Dist (ft)	275	376	365
Turn Bay Length (ft)			
Base Capacity (vph)	528	867	829
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.20	0.29	0.27
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

107: Ocean Dr. & 10 Street

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Traffic Volume (vph)	38	62	32	205	162	47
Future Volume (vph)	38	62	32	205	162	47
Ideal Flow (vphpl)	1700	1700	1200	1700	1700	1700
Lane Width	11	11	11	11	11	11
Total Lost time (s)	6.3			6.0	6.3	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	0.81			1.00	0.90	
Flpb, ped/bikes	0.83			0.96	1.00	
Frt	0.92			1.00	0.97	
Flt Protected	0.98			0.99	1.00	
Satd. Flow (prot)	793			1182	1079	
Flt Permitted	0.98			0.94	1.00	
Satd. Flow (perm)	793			1121	1079	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	41	67	34	220	174	51
RTOR Reduction (vph)	25	0	0	0	14	0
Lane Group Flow (vph)	83	0	0	254	211	0
Confl. Peds. (#/hr)	128	71	496			496
Confl. Bikes (#/hr)		20				6
Bus Blockages (#/hr)	0	0	0	5	5	0
Parking (#/hr)	0	0	0	5	5	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				6	2	
Permitted Phases	8		6			
Actuated Green, G (s)	6.0			23.4	23.1	
Effective Green, g (s)	6.0			23.4	23.1	
Actuated g/C Ratio	0.14			0.56	0.55	
Clearance Time (s)	6.3			6.0	6.3	
Vehicle Extension (s)	2.5			1.0	1.0	
Lane Grp Cap (vph)	114			629	597	
v/s Ratio Prot					0.20	
v/s Ratio Perm	c0.10			c0.23		
v/c Ratio	0.73			0.40	0.35	
Uniform Delay, d1	17.1			5.2	5.2	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	19.5			0.2	0.1	
Delay (s)	36.6			5.3	5.3	
Level of Service	D			A	A	
Approach Delay (s)	36.6			5.3	5.3	
Approach LOS	D			A	A	
Intersection Summary						
HCM 2000 Control Delay			11.1		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.47			
Actuated Cycle Length (s)			41.7		Sum of lost time (s)	12.6
Intersection Capacity Utilization			57.9%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Timings

108: Ocean Dr. & 11 Street



Lane Group	EBL	NBL	NBT	SBT
Lane Configurations	WT		RT	RT
Traffic Volume (vph)	41	23	220	172
Future Volume (vph)	41	23	220	172
Turn Type	Perm	Perm	NA	NA
Protected Phases			6	2
Permitted Phases	8	6		
Detector Phase	8	6	6	2
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	22.0	27.0	27.0	27.0
Total Split (s)	31.0	31.0	31.0	31.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Min	Min	Min	Min
Act Effect Green (s)	10.5		12.7	12.7
Actuated g/C Ratio	0.29		0.35	0.35
v/c Ratio	0.36		0.64	0.56
Control Delay	14.6		18.2	14.8
Queue Delay	0.0		0.0	0.0
Total Delay	14.6		18.2	14.8
LOS	B		B	B
Approach Delay	14.6		18.2	14.8
Approach LOS	B		B	B

Intersection Summary

Cycle Length: 62

Actuated Cycle Length: 36.2

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 16.2

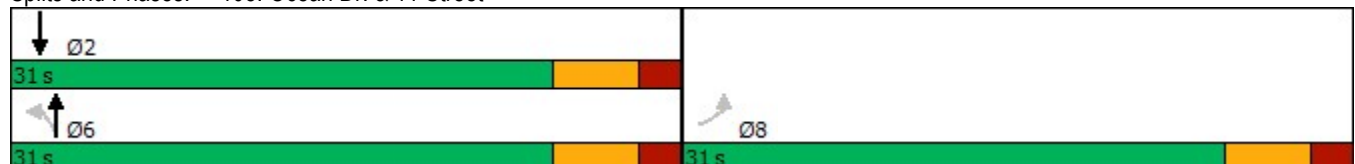
Intersection LOS: B

Intersection Capacity Utilization 61.4%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 108: Ocean Dr. & 11 Street



Queues

108: Ocean Dr. & 11 Street



Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	101	253	219
v/c Ratio	0.36	0.64	0.56
Control Delay	14.6	18.2	14.8
Queue Delay	0.0	0.0	0.0
Total Delay	14.6	18.2	14.8
Queue Length 50th (ft)	11	32	24
Queue Length 95th (ft)	50	106	85
Internal Link Dist (ft)	270	365	49
Turn Bay Length (ft)			
Base Capacity (vph)	711	850	818
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.14	0.30	0.27
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

108: Ocean Dr. & 11 Street

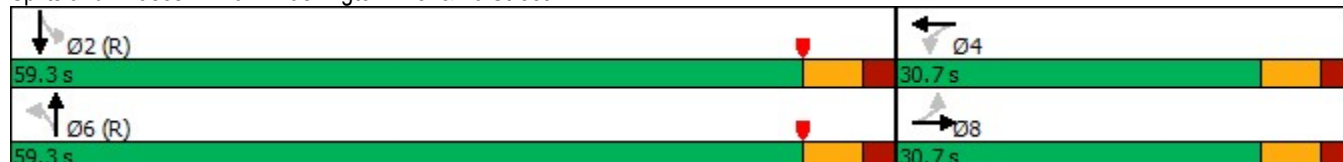
						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Traffic Volume (vph)	41	56	23	220	172	38
Future Volume (vph)	41	56	23	220	172	38
Ideal Flow (vphpl)	1700	1700	1200	1700	1700	1700
Lane Width	11	11	11	11	11	11
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	0.92			1.00	0.91	
Flpb, ped/bikes	0.96			0.97	1.00	
Frt	0.92			1.00	0.98	
Flt Protected	0.98			1.00	1.00	
Satd. Flow (prot)	1035			1196	1103	
Flt Permitted	0.98			0.95	1.00	
Satd. Flow (perm)	1035			1142	1103	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	43	58	24	229	179	40
RTOR Reduction (vph)	8	0	0	0	14	0
Lane Group Flow (vph)	93	0	0	253	205	0
Confl. Peds. (#/hr)	91	109	576			576
Confl. Bikes (#/hr)		6				4
Bus Blockages (#/hr)	0	0	0	5	5	0
Parking (#/hr)	0	0	0	5	5	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				6	2	
Permitted Phases	8		6			
Actuated Green, G (s)	10.5			12.7	12.7	
Effective Green, g (s)	10.5			12.7	12.7	
Actuated g/C Ratio	0.30			0.36	0.36	
Clearance Time (s)	6.0			6.0	6.0	
Vehicle Extension (s)	2.5			1.0	1.0	
Lane Grp Cap (vph)	308			412	397	
v/s Ratio Prot					0.19	
v/s Ratio Perm	c0.09			c0.22		
v/c Ratio	0.30			0.61	0.52	
Uniform Delay, d1	9.5			9.2	8.8	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.4			1.9	0.5	
Delay (s)	9.9			11.1	9.3	
Level of Service	A			B	A	
Approach Delay (s)	9.9			11.1	9.3	
Approach LOS	A			B	A	
Intersection Summary						
HCM 2000 Control Delay			10.2		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.47			
Actuated Cycle Length (s)			35.2		Sum of lost time (s)	12.0
Intersection Capacity Utilization			61.4%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Timings

101: Washington Ave. & 10 Street

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	31	73	34	53	20	459	31	574
Future Volume (vph)	31	73	34	53	20	459	31	574
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		8		4		6		2
Permitted Phases	8		4		6		2	
Detector Phase	8	8	4	4	6	6	2	2
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	30.3	30.3	30.3	30.3	36.0	36.0	36.0	36.0
Total Split (s)	30.7	30.7	30.7	30.7	59.3	59.3	59.3	59.3
Total Split (%)	34.1%	34.1%	34.1%	34.1%	65.9%	65.9%	65.9%	65.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.3		6.3	6.3	6.3	6.3	6.3
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
Act Effct Green (s)		17.8		17.8	59.6	59.6	59.6	59.6
Actuated g/C Ratio		0.20		0.20	0.66	0.66	0.66	0.66
v/c Ratio		0.58		0.49	0.09	0.30	0.13	0.37
Control Delay		37.5		33.6	9.0	8.0	9.5	8.7
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		37.5		33.6	9.0	8.0	9.5	8.7
LOS		D		C	A	A	A	A
Approach Delay		37.5		33.6		8.0		8.7
Approach LOS		D		C		A		A
Intersection Summary								
Cycle Length: 90								
Actuated Cycle Length: 90								
Offset: 70 (78%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow								
Natural Cycle: 70								
Control Type: Actuated-Coordinated								
Maximum v/c Ratio: 0.58								
Intersection Signal Delay: 13.1					Intersection LOS: B			
Intersection Capacity Utilization 62.0%					ICU Level of Service B			
Analysis Period (min) 15								

Splits and Phases: 101: Washington Ave. & 10 Street



Queues

101: Washington Ave. & 10 Street

	→	←	↖	↑	↘	↓
Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	134	109	20	494	32	618
v/c Ratio	0.58	0.49	0.09	0.30	0.13	0.37
Control Delay	37.5	33.6	9.0	8.0	9.5	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.5	33.6	9.0	8.0	9.5	8.7
Queue Length 50th (ft)	56	44	5	66	7	90
Queue Length 95th (ft)	112	93	16	96	22	126
Internal Link Dist (ft)	234	270		145		390
Turn Bay Length (ft)			55		55	
Base Capacity (vph)	312	303	229	1664	251	1668
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.36	0.09	0.30	0.13	0.37
Intersection Summary						

HCM 2010 Signalized Intersection Summary 101: Washington Ave. & 10 Street

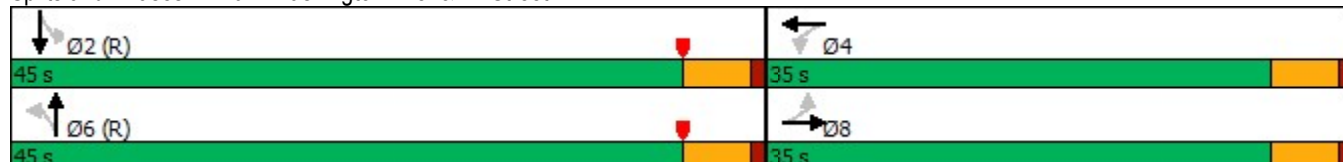
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	73	27	34	53	20	20	459	25	31	574	31
Future Volume (veh/h)	31	73	27	34	53	20	20	459	25	31	574	31
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.93		0.90	0.94		0.90	0.98		0.90	0.98		0.90
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Adj Sat Flow, veh/h/ln	1530	1500	1530	1530	1500	1530	1059	1500	1530	1059	1500	1530
Adj Flow Rate, veh/h	32	74	28	35	54	20	20	468	26	32	586	32
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	99	181	61	127	162	53	333	1598	88	377	1600	87
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.24	0.62	0.62	0.62	0.62	0.62	0.62
Sat Flow, veh/h	203	748	251	305	670	219	501	2588	143	557	2591	141
Grp Volume(v), veh/h	134	0	0	109	0	0	20	257	237	32	322	296
Grp Sat Flow(s),veh/h/ln	1202	0	0	1194	0	0	501	1425	1306	557	1425	1307
Q Serve(g_s), s	1.8	0.0	0.0	0.0	0.0	0.0	1.9	7.6	7.6	2.6	10.0	10.1
Cycle Q Clear(g_c), s	8.2	0.0	0.0	6.4	0.0	0.0	11.9	7.6	7.6	10.2	10.0	10.1
Prop In Lane	0.24		0.21	0.32		0.18	1.00		0.11	1.00		0.11
Lane Grp Cap(c), veh/h	341	0	0	342	0	0	333	880	807	377	880	807
V/C Ratio(X)	0.39	0.00	0.00	0.32	0.00	0.00	0.06	0.29	0.29	0.08	0.37	0.37
Avail Cap(c_a), veh/h	375	0	0	375	0	0	333	880	807	377	880	807
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	0.00	0.74	0.00	0.00	1.00	1.00	1.00	0.92	0.92	0.92
Uniform Delay (d), s/veh	28.9	0.0	0.0	28.2	0.0	0.0	11.5	8.0	8.0	10.4	8.5	8.5
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.1	0.0	0.0	0.3	0.8	0.9	0.4	1.1	1.2
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	2.9	0.0	0.0	2.3	0.0	0.0	0.3	3.1	2.9	0.4	4.2	3.9
LnGrp Delay(d),s/veh	29.2	0.0	0.0	28.4	0.0	0.0	11.8	8.9	9.0	10.8	9.6	9.7
LnGrp LOS	C			C			B	A	A	B	A	A
Approach Vol, veh/h	134			109			514			650		
Approach Delay, s/veh	29.2			28.4			9.0			9.7		
Approach LOS	C			C			A			A		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	61.9			28.1			61.9			28.1		
Change Period (Y+Rc), s	* 6.3			* 6.3			* 6.3			* 6.3		
Max Green Setting (Gmax), s	* 53			* 24			* 53			* 24		
Max Q Clear Time (g_c+l1), s	12.2			8.4			13.9			10.2		
Green Ext Time (p_c), s	1.5			0.2			1.2			0.2		
Intersection Summary												
HCM 2010 Ctrl Delay	12.8											
HCM 2010 LOS	B											
Notes												

Timings

102: Washington Ave. & 11 Street

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	20	37	18	40	32	590	36	482
Future Volume (vph)	20	37	18	40	32	590	36	482
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		8		4		6		2
Permitted Phases	8		4		6		2	
Detector Phase	8	8	4	4	6	6	2	2
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	35.0	35.0	35.0	35.0	31.0	31.0	31.0	31.0
Total Split (s)	35.0	35.0	35.0	35.0	45.0	45.0	45.0	45.0
Total Split (%)	43.8%	43.8%	43.8%	43.8%	56.3%	56.3%	56.3%	56.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0		0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0		5.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
Act Effct Green (s)		20.8		20.8	52.6	52.6		52.6
Actuated g/C Ratio		0.26		0.26	0.66	0.66		0.66
v/c Ratio		0.26		0.32	0.15	0.44		0.41
Control Delay		18.5		15.9	12.8	11.4		11.5
Queue Delay		0.0		0.0	0.0	0.0		0.0
Total Delay		18.5		15.9	12.8	11.4		11.5
LOS		B		B	B	B		B
Approach Delay		18.5		15.9		11.5		11.5
Approach LOS		B		B		B		B
Intersection Summary								
Cycle Length: 80								
Actuated Cycle Length: 80								
Offset: 13 (16%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow								
Natural Cycle: 70								
Control Type: Actuated-Coordinated								
Maximum v/c Ratio: 0.44								
Intersection Signal Delay: 12.1					Intersection LOS: B			
Intersection Capacity Utilization 76.1%					ICU Level of Service D			
Analysis Period (min) 15								

Splits and Phases: 102: Washington Ave. & 11 Street



Queues

102: Washington Ave. & 11 Street

	→	←	↶	↑	↓
Lane Group	EBT	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	77	99	36	718	592
v/c Ratio	0.26	0.32	0.15	0.44	0.41
Control Delay	18.5	15.9	12.8	11.4	11.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	18.5	15.9	12.8	11.4	11.5
Queue Length 50th (ft)	21	21	9	122	100
Queue Length 95th (ft)	50	54	29	172	145
Internal Link Dist (ft)	134	301		390	100
Turn Bay Length (ft)			55		
Base Capacity (vph)	423	436	244	1648	1456
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.18	0.23	0.15	0.44	0.41
Intersection Summary					

HCM 2010 Signalized Intersection Summary 102: Washington Ave. & 11 Street

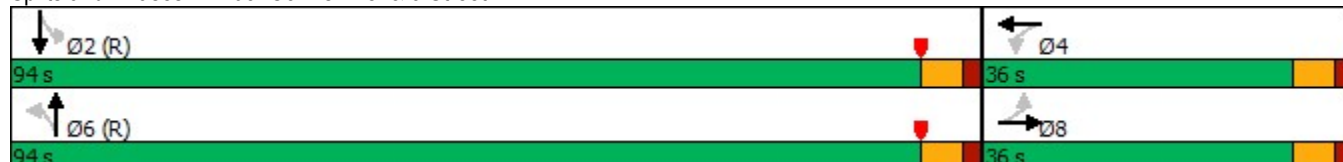
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	37	12	18	40	30	32	590	49	36	482	9
Future Volume (veh/h)	20	37	12	18	40	30	32	590	49	36	482	9
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.95		0.93	0.95		0.93	0.99		0.91	0.99		0.91
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Adj Sat Flow, veh/h/ln	1530	1500	1530	1530	1500	1530	1059	1500	1530	1080	1500	1530
Adj Flow Rate, veh/h	22	42	13	20	45	34	36	663	55	40	542	10
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	0	2	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	138	220	61	103	185	122	330	1443	119	118	1382	25
Arrive On Green	0.30	0.30	0.30	0.30	0.30	0.30	0.58	0.58	0.58	0.58	0.58	0.58
Sat Flow, veh/h	269	734	204	164	618	409	534	2506	207	117	2401	44
Grp Volume(v), veh/h	77	0	0	99	0	0	36	377	341	314	0	278
Grp Sat Flow(s),veh/h/ln	1207	0	0	1191	0	0	534	1425	1288	1346	0	1216
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	3.2	12.2	12.2	0.0	0.0	10.1
Cycle Q Clear(g_c), s	3.6	0.0	0.0	4.9	0.0	0.0	13.2	12.2	12.2	9.0	0.0	10.1
Prop In Lane	0.29		0.17	0.20		0.34	1.00		0.16	0.13		0.04
Lane Grp Cap(c), veh/h	419	0	0	410	0	0	330	820	742	826	0	700
V/C Ratio(X)	0.18	0.00	0.00	0.24	0.00	0.00	0.11	0.46	0.46	0.38	0.00	0.40
Avail Cap(c_a), veh/h	509	0	0	499	0	0	330	820	742	826	0	700
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(l)	1.00	0.00	0.00	0.95	0.00	0.00	0.96	0.96	0.96	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.9	0.0	0.0	21.3	0.0	0.0	13.0	9.8	9.8	9.1	0.0	9.3
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.1	0.0	0.0	0.6	1.8	2.0	1.3	0.0	1.7
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	1.3	0.0	0.0	1.7	0.0	0.0	0.5	5.1	4.7	4.0	0.0	3.6
LnGrp Delay(d),s/veh	21.0	0.0	0.0	21.5	0.0	0.0	13.6	11.6	11.8	10.4	0.0	11.0
LnGrp LOS	C			C			B	B	B	B		B
Approach Vol, veh/h	77				99		754				592	
Approach Delay, s/veh	21.0				21.5		11.8				10.7	
Approach LOS	C				C		B				B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	51.1		28.9		51.1		28.9					
Change Period (Y+Rc), s	5.0		5.0		5.0		5.0					
Max Green Setting (Gmax), s	40.0		30.0		40.0		30.0					
Max Q Clear Time (g_c+I1), s	12.1		6.9		15.2		5.6					
Green Ext Time (p_c), s	1.4		0.2		1.8		0.1					
Intersection Summary												
HCM 2010 Ctrl Delay			12.4									
HCM 2010 LOS			B									

Timings

103: Collins Ave. & 9 Street

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	29	31	16	30	30	364	28	354
Future Volume (vph)	29	31	16	30	30	364	28	354
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		8		4		6		2
Permitted Phases	8		4		6		2	
Detector Phase	8	8	4	4	6	6	2	2
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	37.0	37.0	37.0	37.0	25.0	25.0	25.0	25.0
Total Split (s)	36.0	36.0	36.0	36.0	94.0	94.0	94.0	94.0
Total Split (%)	27.7%	27.7%	27.7%	27.7%	72.3%	72.3%	72.3%	72.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0		6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
Act Effct Green (s)		24.6		24.6	93.4	93.4	93.4	93.4
Actuated g/C Ratio		0.19		0.19	0.72	0.72	0.72	0.72
v/c Ratio		0.55		0.37	0.14	0.53	0.13	0.50
Control Delay		51.6		42.2	7.6	11.0	3.8	5.4
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.2
Total Delay		51.6		42.2	7.6	11.1	3.8	5.6
LOS		D		D	A	B	A	A
Approach Delay		51.6		42.2		10.8		5.5
Approach LOS		D		D		B		A
Intersection Summary								
Cycle Length: 130								
Actuated Cycle Length: 130								
Offset: 52 (40%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow								
Natural Cycle: 75								
Control Type: Actuated-Coordinated								
Maximum v/c Ratio: 0.55								
Intersection Signal Delay: 14.4				Intersection LOS: B				
Intersection Capacity Utilization 67.6%				ICU Level of Service C				
Analysis Period (min) 15								

Splits and Phases: 103: Collins Ave. & 9 Street



Queues

103: Collins Ave. & 9 Street

	→	←	↖	↑	↘	↓
Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	101	74	34	446	31	427
v/c Ratio	0.55	0.37	0.14	0.53	0.13	0.50
Control Delay	51.6	42.2	7.6	11.0	3.8	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2
Total Delay	51.6	42.2	7.6	11.1	3.8	5.6
Queue Length 50th (ft)	65	44	8	147	4	51
Queue Length 95th (ft)	123	90	22	241	m7	79
Internal Link Dist (ft)	103	275		131		370
Turn Bay Length (ft)			150		145	
Base Capacity (vph)	221	240	244	844	242	852
Starvation Cap Reductn	0	0	0	0	0	73
Spillback Cap Reductn	0	0	0	12	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.31	0.14	0.54	0.13	0.55
Intersection Summary						
m Volume for 95th percentile queue is metered by upstream signal.						

HCM 2010 Signalized Intersection Summary

103: Collins Ave. & 9 Street

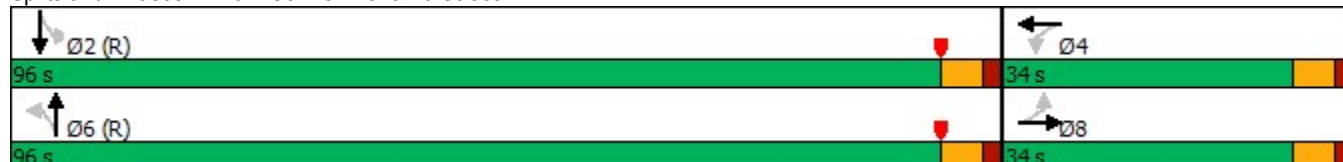
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	31	29	16	30	20	30	364	33	28	354	26
Future Volume (veh/h)	29	31	29	16	30	20	30	364	33	28	354	26
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.71		0.62	0.74		0.62	0.95		0.89	1.00		0.89
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Adj Sat Flow, veh/h/ln	1530	1500	1530	1530	1500	1530	1059	1500	1530	1059	1500	1530
Adj Flow Rate, veh/h	33	35	33	18	34	22	34	409	37	31	398	29
Adj No. of Lanes	0	1	0	0	1	0	1	1	0	1	1	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	83	71	57	68	97	55	472	872	79	403	891	65
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.18	0.72	0.72	0.72	1.00	1.00	1.00
Sat Flow, veh/h	253	388	311	181	529	300	576	1205	109	597	1231	90
Grp Volume(v), veh/h	101	0	0	74	0	0	34	0	446	31	0	427
Grp Sat Flow(s),veh/h/ln	952	0	0	1010	0	0	576	0	1314	597	0	1320
Q Serve(g_s), s	3.7	0.0	0.0	0.0	0.0	0.0	2.3	0.0	18.5	1.4	0.0	0.0
Cycle Q Clear(g_c), s	11.5	0.0	0.0	7.8	0.0	0.0	2.3	0.0	18.5	19.9	0.0	0.0
Prop In Lane	0.33		0.33	0.24		0.30	1.00		0.08	1.00		0.07
Lane Grp Cap(c), veh/h	212	0	0	220	0	0	472	0	951	403	0	955
V/C Ratio(X)	0.48	0.00	0.00	0.34	0.00	0.00	0.07	0.00	0.47	0.08	0.00	0.45
Avail Cap(c_a), veh/h	253	0	0	264	0	0	472	0	951	403	0	955
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.83	0.00	0.83
Uniform Delay (d), s/veh	47.8	0.0	0.0	46.5	0.0	0.0	5.3	0.0	7.5	2.0	0.0	0.0
Incr Delay (d2), s/veh	1.2	0.0	0.0	0.7	0.0	0.0	0.3	0.0	1.7	0.3	0.0	1.3
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	3.4	0.0	0.0	2.4	0.0	0.0	0.4	0.0	7.0	0.3	0.0	0.3
LnGrp Delay(d),s/veh	49.0	0.0	0.0	47.2	0.0	0.0	5.6	0.0	9.2	2.3	0.0	1.3
LnGrp LOS	D			D			A		A	A		A
Approach Vol, veh/h		101			74			480			458	
Approach Delay, s/veh		49.0			47.2			8.9			1.3	
Approach LOS		D			D			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		100.1		29.9		100.1		29.9				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		88.0		30.0		88.0		30.0				
Max Q Clear Time (g_c+I1), s		21.9		9.8		20.5		13.5				
Green Ext Time (p_c), s		1.1		0.3		1.2		0.5				
Intersection Summary												
HCM 2010 Ctrl Delay				12.0								
HCM 2010 LOS				B								

Timings

104: Collins Ave. & 10 Street

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	35	49	33	51	31	352	23	361
Future Volume (vph)	35	49	33	51	31	352	23	361
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		8		4		6		2
Permitted Phases	8		4		6		2	
Detector Phase	8	8	4	4	6	6	2	2
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	37.0	37.0	37.0	37.0	30.0	30.0	30.0	30.0
Total Split (s)	34.0	34.0	34.0	34.0	96.0	96.0	96.0	96.0
Total Split (%)	26.2%	26.2%	26.2%	26.2%	73.8%	73.8%	73.8%	73.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0		6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
Act Effct Green (s)		27.6		27.6	90.4	90.4	90.4	90.4
Actuated g/C Ratio		0.21		0.21	0.70	0.70	0.70	0.70
v/c Ratio		0.62		0.73	0.15	0.51	0.11	0.53
Control Delay		55.2		61.1	6.5	8.5	8.2	13.4
Queue Delay		0.0		0.0	0.0	0.2	0.0	0.4
Total Delay		55.2		61.1	6.5	8.7	8.2	13.8
LOS		E		E	A	A	A	B
Approach Delay		55.2		61.1		8.6		13.5
Approach LOS		E		E		A		B
Intersection Summary								
Cycle Length: 130								
Actuated Cycle Length: 130								
Offset: 46 (35%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow								
Natural Cycle: 70								
Control Type: Actuated-Coordinated								
Maximum v/c Ratio: 0.73								
Intersection Signal Delay: 21.9				Intersection LOS: C				
Intersection Capacity Utilization 67.6%				ICU Level of Service C				
Analysis Period (min) 15								

Splits and Phases: 104: Collins Ave. & 10 Street



Queues

104: Collins Ave. & 10 Street



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	122	149	34	420	25	434
v/c Ratio	0.62	0.73	0.15	0.51	0.11	0.53
Control Delay	55.2	61.1	6.5	8.5	8.2	13.4
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.4
Total Delay	55.2	61.1	6.5	8.7	8.2	13.8
Queue Length 50th (ft)	87	104	7	86	2	187
Queue Length 95th (ft)	145	172	m10	221	m26	385
Internal Link Dist (ft)	270	275		370		370
Turn Bay Length (ft)			150		120	
Base Capacity (vph)	212	218	233	834	231	832
Starvation Cap Reductn	0	0	0	68	0	101
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.68	0.15	0.55	0.11	0.59

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM 2010 Signalized Intersection Summary

104: Collins Ave. & 10 Street

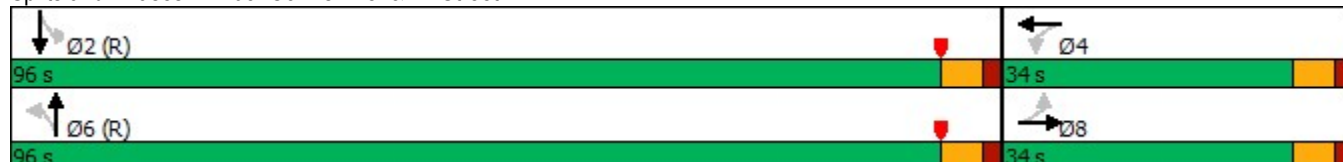
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	49	27	33	51	52	31	352	30	23	361	34
Future Volume (veh/h)	35	49	27	33	51	52	31	352	30	23	361	34
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.82		0.63	0.80		0.63	0.93		0.86	0.93		0.86
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Adj Sat Flow, veh/h/ln	1530	1500	1530	1530	1500	1530	1059	1500	1530	1059	1500	1530
Adj Flow Rate, veh/h	38	54	30	36	56	57	34	387	33	25	397	37
Adj No. of Lanes	0	1	0	0	1	0	1	1	0	1	1	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	74	82	39	65	77	67	463	875	75	468	866	81
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.18	1.00	1.00	1.00	1.00	1.00	1.00
Sat Flow, veh/h	206	445	212	168	418	363	564	1209	103	571	1198	112
Grp Volume(v), veh/h	122	0	0	149	0	0	34	0	420	25	0	434
Grp Sat Flow(s),veh/h/ln	863	0	0	949	0	0	564	0	1312	571	0	1309
Q Serve(g_s), s	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	17.8	0.0	0.0	19.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop In Lane	0.31		0.25	0.24		0.38	1.00		0.08	1.00		0.09
Lane Grp Cap(c), veh/h	196	0	0	209	0	0	463	0	949	468	0	947
V/C Ratio(X)	0.62	0.00	0.00	0.71	0.00	0.00	0.07	0.00	0.44	0.05	0.00	0.46
Avail Cap(c_a), veh/h	225	0	0	238	0	0	463	0	949	468	0	947
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	0.86	0.00	0.00	1.00	0.00	0.00	0.84	0.00	0.84	0.88	0.00	0.88
Uniform Delay (d), s/veh	49.8	0.0	0.0	51.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	3.0	0.0	0.0	7.5	0.0	0.0	0.3	0.0	1.3	0.2	0.0	1.4
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	4.3	0.0	0.0	5.6	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.4
LnGrp Delay(d),s/veh	52.8	0.0	0.0	58.5	0.0	0.0	0.3	0.0	1.3	0.2	0.0	1.4
LnGrp LOS	D			E			A		A	A		A
Approach Vol, veh/h		122			149			454			459	
Approach Delay, s/veh		52.8			58.5			1.2			1.3	
Approach LOS		D			E			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		100.0		30.0		100.0		30.0				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		90.0		28.0		90.0		28.0				
Max Q Clear Time (g_c+I1), s		2.0		21.5		2.0		19.8				
Green Ext Time (p_c), s		1.2		0.4		1.2		0.3				
Intersection Summary												
HCM 2010 Ctrl Delay				13.8								
HCM 2010 LOS				B								

Timings

105: Collins Ave. & 11 Street

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	22	53	15	31	29	355	25	370
Future Volume (vph)	22	53	15	31	29	355	25	370
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		8		4		6		2
Permitted Phases	8		4		6		2	
Detector Phase	8	8	4	4	6	6	2	2
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	37.0	37.0	37.0	37.0	30.0	30.0	30.0	30.0
Total Split (s)	34.0	34.0	34.0	34.0	96.0	96.0	96.0	96.0
Total Split (%)	26.2%	26.2%	26.2%	26.2%	73.8%	73.8%	73.8%	73.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0		6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
Act Effct Green (s)		20.7		20.7	97.3	97.3	97.3	97.3
Actuated g/C Ratio		0.16		0.16	0.75	0.75	0.75	0.75
v/c Ratio		0.58		0.42	0.11	0.48	0.09	0.47
Control Delay		58.0		43.7	5.0	6.3	6.2	9.0
Queue Delay		0.0		0.0	0.0	0.3	0.0	0.1
Total Delay		58.0		43.7	5.0	6.5	6.2	9.1
LOS		E		D	A	A	A	A
Approach Delay		58.0		43.7		6.4		8.9
Approach LOS		E		D		A		A
Intersection Summary								
Cycle Length: 130								
Actuated Cycle Length: 130								
Offset: 33 (25%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow								
Natural Cycle: 70								
Control Type: Actuated-Coordinated								
Maximum v/c Ratio: 0.58								
Intersection Signal Delay: 14.8				Intersection LOS: B				
Intersection Capacity Utilization 67.2%				ICU Level of Service C				
Analysis Period (min) 15								

Splits and Phases: 105: Collins Ave. & 11 Street



Queues

105: Collins Ave. & 11 Street



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	101	73	31	428	27	424
v/c Ratio	0.58	0.42	0.11	0.48	0.09	0.47
Control Delay	58.0	43.7	5.0	6.3	6.2	9.0
Queue Delay	0.0	0.0	0.0	0.3	0.0	0.1
Total Delay	58.0	43.7	5.0	6.5	6.2	9.1
Queue Length 50th (ft)	70	41	5	95	6	134
Queue Length 95th (ft)	131	91	m11	116	16	203
Internal Link Dist (ft)	301	270		370		101
Turn Bay Length (ft)			170		125	
Base Capacity (vph)	232	230	284	892	303	899
Starvation Cap Reductn	0	0	0	104	0	0
Spillback Cap Reductn	0	0	0	0	0	46
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.32	0.11	0.54	0.09	0.50

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM 2010 Signalized Intersection Summary 105: Collins Ave. & 11 Street

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	53	21	15	31	23	29	355	47	25	370	28
Future Volume (veh/h)	22	53	21	15	31	23	29	355	47	25	370	28
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.83		0.77	0.85		0.79	0.99		0.89	0.95		0.89
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Adj Sat Flow, veh/h/ln	1530	1500	1530	1530	1500	1530	1059	1500	1530	1059	1500	1530
Adj Flow Rate, veh/h	23	56	22	16	33	24	31	378	50	27	394	30
Adj No. of Lanes	0	1	0	0	1	0	1	1	0	1	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	67	127	44	65	104	66	417	838	111	477	894	68
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.18	1.00	1.00	1.00	0.73	0.73	0.73
Sat Flow, veh/h	182	706	247	172	581	369	602	1150	152	578	1227	93
Grp Volume(v), veh/h	101	0	0	73	0	0	31	0	428	27	0	424
Grp Sat Flow(s),veh/h/ln	1136	0	0	1122	0	0	602	0	1302	578	0	1321
Q Serve(g_s), s	2.8	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	1.7	0.0	16.7
Cycle Q Clear(g_c), s	10.0	0.0	0.0	7.1	0.0	0.0	18.0	0.0	0.0	1.7	0.0	16.7
Prop In Lane	0.23		0.22	0.22		0.33	1.00		0.12	1.00		0.07
Lane Grp Cap(c), veh/h	238	0	0	235	0	0	417	0	949	477	0	962
V/C Ratio(X)	0.43	0.00	0.00	0.31	0.00	0.00	0.07	0.00	0.45	0.06	0.00	0.44
Avail Cap(c_a), veh/h	277	0	0	273	0	0	417	0	949	477	0	962
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	0.98	0.00	0.00	1.00	0.00	0.00	0.85	0.00	0.85	1.00	0.00	1.00
Uniform Delay (d), s/veh	47.8	0.0	0.0	46.7	0.0	0.0	1.6	0.0	0.0	5.0	0.0	7.1
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.3	0.0	0.0	0.3	0.0	1.3	0.2	0.0	1.5
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	3.3	0.0	0.0	2.3	0.0	0.0	0.2	0.0	0.3	0.3	0.0	6.4
LnGrp Delay(d),s/veh	48.2	0.0	0.0	47.0	0.0	0.0	1.9	0.0	1.3	5.2	0.0	8.5
LnGrp LOS	D			D			A		A	A		A
Approach Vol, veh/h		101			73			459			451	
Approach Delay, s/veh		48.2			47.0			1.4			8.3	
Approach LOS		D			D			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		100.7		29.3		100.7		29.3				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		90.0		28.0		90.0		28.0				
Max Q Clear Time (g_c+I1), s		18.7		9.1		20.0		12.0				
Green Ext Time (p_c), s		1.1		0.2		1.2		0.3				
Intersection Summary												
HCM 2010 Ctrl Delay				11.7								
HCM 2010 LOS				B								

HCM Unsignalized Intersection Capacity Analysis

106: Ocean Dr. & 9 Street

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	78	32	252	194	28
Future Volume (Veh/h)	10	78	32	252	194	28
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	11	89	36	286	220	32
Pedestrians	529			97	76	
Lane Width (ft)	11.0			11.0	11.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	40			7	6	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)					456	
pX, platoon unblocked						
vC, conflicting volume	1199	862	781			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1199	862	781			
tC, single (s)	*5.5	*4.5	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	70	93			
cM capacity (veh/h)	145	295	498			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	100	322	252			
Volume Left	11	36	0			
Volume Right	89	0	32			
cSH	265	498	1700			
Volume to Capacity	0.38	0.07	0.15			
Queue Length 95th (ft)	42	6	0			
Control Delay (s)	26.6	2.4	0.0			
Lane LOS	D	A				
Approach Delay (s)	26.6	2.4	0.0			
Approach LOS	D					
Intersection Summary						
Average Delay		5.1				
Intersection Capacity Utilization		58.0%		ICU Level of Service		B
Analysis Period (min)		15				
* User Entered Value						

Timings

107: Ocean Dr. & 10 Street



Lane Group	EBL	NBL	NBT	SBT
Lane Configurations	W		W	W
Traffic Volume (vph)	38	33	205	164
Future Volume (vph)	38	33	205	164
Turn Type	Perm	Perm	NA	NA
Protected Phases			6	2
Permitted Phases	8	6		
Detector Phase	8	6	6	2
Switch Phase				
Minimum Initial (s)	6.7	16.0	16.0	15.7
Minimum Split (s)	13.3	22.3	22.3	22.3
Total Split (s)	26.3	31.3	31.3	31.3
Total Split (%)	45.7%	54.3%	54.3%	54.3%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	2.0	2.0	2.3
Lost Time Adjust (s)	0.0		0.0	0.0
Total Lost Time (s)	6.3		6.0	6.3
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	Min	Min	Min
Act Effect Green (s)	8.8		26.0	25.8
Actuated g/C Ratio	0.22		0.66	0.66
v/c Ratio	0.44		0.35	0.34
Control Delay	16.1		9.3	8.5
Queue Delay	0.0		0.0	0.0
Total Delay	16.1		9.3	8.5
LOS	B		A	A
Approach Delay	16.1		9.3	8.5
Approach LOS	B		A	A

Intersection Summary

Cycle Length: 57.6

Actuated Cycle Length: 39.2

Natural Cycle: 40

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.44

Intersection Signal Delay: 10.2

Intersection LOS: B

Intersection Capacity Utilization 59.3%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 107: Ocean Dr. & 10 Street



Queues

107: Ocean Dr. & 10 Street



Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	108	255	238
v/c Ratio	0.44	0.35	0.34
Control Delay	16.1	9.3	8.5
Queue Delay	0.0	0.0	0.0
Total Delay	16.1	9.3	8.5
Queue Length 50th (ft)	13	32	25
Queue Length 95th (ft)	49	102	87
Internal Link Dist (ft)	275	376	365
Turn Bay Length (ft)			
Base Capacity (vph)	528	863	810
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.20	0.30	0.29
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

107: Ocean Dr. & 10 Street

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Traffic Volume (vph)	38	62	33	205	164	58
Future Volume (vph)	38	62	33	205	164	58
Ideal Flow (vphpl)	1700	1700	1200	1700	1700	1700
Lane Width	11	11	11	11	11	11
Total Lost time (s)	6.3			6.0	6.3	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	0.81			1.00	0.88	
Flpb, ped/bikes	0.83			0.96	1.00	
Frt	0.92			1.00	0.96	
Flt Protected	0.98			0.99	1.00	
Satd. Flow (prot)	793			1181	1056	
Flt Permitted	0.98			0.94	1.00	
Satd. Flow (perm)	793			1117	1056	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	41	67	35	220	176	62
RTOR Reduction (vph)	25	0	0	0	17	0
Lane Group Flow (vph)	83	0	0	255	221	0
Confl. Peds. (#/hr)	128	71	496			496
Confl. Bikes (#/hr)		20				6
Bus Blockages (#/hr)	0	0	0	5	5	0
Parking (#/hr)	0	0	0	5	5	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				6	2	
Permitted Phases	8		6			
Actuated Green, G (s)	6.0			23.4	23.1	
Effective Green, g (s)	6.0			23.4	23.1	
Actuated g/C Ratio	0.14			0.56	0.55	
Clearance Time (s)	6.3			6.0	6.3	
Vehicle Extension (s)	2.5			1.0	1.0	
Lane Grp Cap (vph)	114			626	584	
v/s Ratio Prot					0.21	
v/s Ratio Perm	c0.10			c0.23		
v/c Ratio	0.73			0.41	0.38	
Uniform Delay, d1	17.1			5.2	5.2	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	19.5			0.2	0.1	
Delay (s)	36.6			5.4	5.4	
Level of Service	D			A	A	
Approach Delay (s)	36.6			5.4	5.4	
Approach LOS	D			A	A	
Intersection Summary						
HCM 2000 Control Delay			11.0		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.48			
Actuated Cycle Length (s)			41.7		Sum of lost time (s)	12.6
Intersection Capacity Utilization			59.3%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Timings

108: Ocean Dr. & 11 Street



Lane Group	EBL	NBL	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	44	23	220	177
Future Volume (vph)	44	23	220	177
Turn Type	Perm	Perm	NA	NA
Protected Phases			6	2
Permitted Phases	8	6		
Detector Phase	8	6	6	2
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	22.0	27.0	27.0	27.0
Total Split (s)	31.0	31.0	31.0	31.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Min	Min	Min	Min
Act Effect Green (s)	11.5		13.1	13.1
Actuated g/C Ratio	0.31		0.35	0.35
v/c Ratio	0.48		0.64	0.57
Control Delay	17.5		19.1	15.9
Queue Delay	0.0		0.0	0.0
Total Delay	17.5		19.1	15.9
LOS	B		B	B
Approach Delay	17.5		19.1	15.9
Approach LOS	B		B	B

Intersection Summary

Cycle Length: 62

Actuated Cycle Length: 37.7

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 17.6

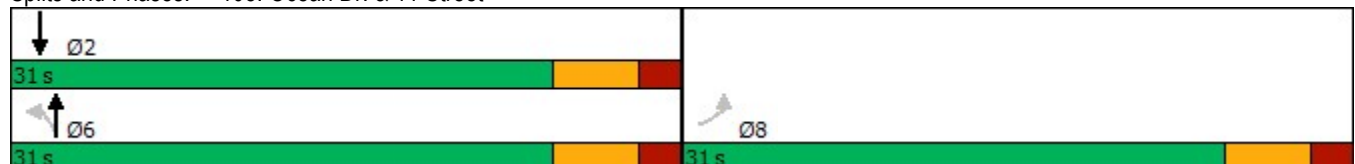
Intersection LOS: B

Intersection Capacity Utilization 62.3%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 108: Ocean Dr. & 11 Street



Queues

108: Ocean Dr. & 11 Street



Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	140	253	224
v/c Ratio	0.48	0.64	0.57
Control Delay	17.5	19.1	15.9
Queue Delay	0.0	0.0	0.0
Total Delay	17.5	19.1	15.9
Queue Length 50th (ft)	17	36	27
Queue Length 95th (ft)	71	118	97
Internal Link Dist (ft)	270	365	49
Turn Bay Length (ft)			
Base Capacity (vph)	675	820	792
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.21	0.31	0.28
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

108: Ocean Dr. & 11 Street

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Traffic Volume (vph)	44	90	23	220	177	38
Future Volume (vph)	44	90	23	220	177	38
Ideal Flow (vphpl)	1700	1700	1200	1700	1700	1700
Lane Width	11	11	11	11	11	11
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	0.90			1.00	0.91	
Flpb, ped/bikes	0.97			0.97	1.00	
Frt	0.91			1.00	0.98	
Flt Protected	0.98			1.00	1.00	
Satd. Flow (prot)	1015			1194	1102	
Flt Permitted	0.98			0.95	1.00	
Satd. Flow (perm)	1015			1141	1102	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	46	94	24	229	184	40
RTOR Reduction (vph)	8	0	0	0	13	0
Lane Group Flow (vph)	132	0	0	253	211	0
Confl. Peds. (#/hr)	91	109	576			576
Confl. Bikes (#/hr)		6				4
Bus Blockages (#/hr)	0	0	0	5	5	0
Parking (#/hr)	0	0	0	5	5	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				6	2	
Permitted Phases	8		6			
Actuated Green, G (s)	11.5			13.1	13.1	
Effective Green, g (s)	11.5			13.1	13.1	
Actuated g/C Ratio	0.31			0.36	0.36	
Clearance Time (s)	6.0			6.0	6.0	
Vehicle Extension (s)	2.5			1.0	1.0	
Lane Grp Cap (vph)	318			408	394	
v/s Ratio Prot					0.19	
v/s Ratio Perm	c0.13			c0.22		
v/c Ratio	0.41			0.62	0.53	
Uniform Delay, d1	9.9			9.7	9.3	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.6			2.1	0.7	
Delay (s)	10.5			11.8	10.0	
Level of Service	B			B	B	
Approach Delay (s)	10.5			11.8	10.0	
Approach LOS	B			B	B	
Intersection Summary						
HCM 2000 Control Delay			10.9		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.52			
Actuated Cycle Length (s)			36.6		Sum of lost time (s)	12.0
Intersection Capacity Utilization			62.3%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

APPENDIX F

Queuing Analysis

Queuing Analysis based on ITE Procedures

$$q = 26 \text{ veh/hr (demand rate)}^*$$

$$Q = 17 \text{ veh/hr (service rate)}$$

$$p = \frac{q}{NQ} = 0.5098 \text{ (N = 3 valet runners)}$$

$$Q_M = 0.5098$$

Using Acceptable Probability of 10% (90% Confidence Level)

$$M = \left(\frac{\ln(x > M) - \ln(Q_M)}{\ln(p)} \right) - 1$$

$$M = \left(\frac{\ln(0.10) - \ln(0.5098)}{\ln(0.5098)} \right) - 1$$

$$M = \left(\frac{-2.3026 - (-0.6737)}{-0.6737} \right) - 1$$

$$M = 2.41 - 1 = 1.41, \text{ say 2 vehicles}$$

* Assumed 100% of trips will use valet parking

APPENDIX G

Signal Warrant Analysis

Warrant 1 - Eight-Hour Vehicular Volume														
Major Street: Ocean Drive					Approach Lanes: 2					Engineer: A-Rod				
Minor Street: 9th Street					Approach Lanes: 1					Date: 13-Nov-17				
City: Miami Beach					County: Miami-Dade									
Major St. Speed > 40mph					Yes	No	Isolated Community < 10,000 Population					Yes	No	
						x							x	
Condition A - Minimum Vehicular Volume														
										WARRANT SATISFIED			Yes	No
														x
										80% Volumes Met			Yes	No
	Requirement	100%	70%	100%	70%	HOUR								
	Approach Lanes	1		2 or more		16:00 to 17:00	to	to	to	to	to	to	to	MET
And	Both Approaches on Major St.	500 (400)	350 (280)	600 (480)	420 (336)	506								Yes x
	Highest Approach on Minor Street	150 (120)	105 (84)	200 (160)	140 (112)	88								Yes x
Condition B - Interruption of Continuous Traffic														
										WARRANT SATISFIED			Yes	No
														x
										80% Volumes Met			Yes	No
	Requirement	100%	70%	100%	70%	HOUR								
	Approach Lanes	1		2 or more		16:00 to 17:00								MET
And	Both Approaches on Major St.	750 (600)	525 (420)	900 (720)	630 (504)	506								Yes x
	Highest Approach on Minor Street	75 (60)	53 (42)	100 (80)	70 (56)	88								Yes x

Source: Manual on Uniform Traffic Control Devices (MUTCD) - 2009 Edition

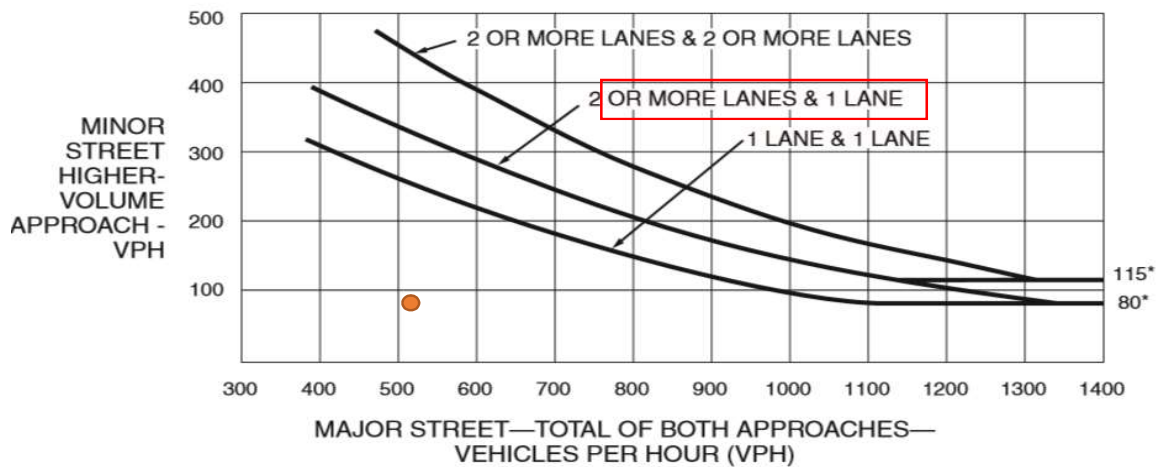
Warrant 2 - Four-Hour Vehicular Volume

Major Street: Ocean Drive		Approach Lanes: 2		Engineer: A-Rod	
Minor Street: 9th Street		Approach Lanes: 1		Date: 13-Nov-17	
City: Miami Beach		County: Miami-Dade			
Major St. Speed > 40mph	Yes	No	Isolated Community < 10,000 Population	Yes	No
		x			x

WARRANT SATISFIED

Yes	No
	x

Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

		HOUR			
		16:00 to 17:00			
	Both Approaches on Major St.	506			
	Highest Approach on Minor Street	88			

Warrant 7 - Crash Experience					
NOT APPLICABLE		WARRANT SATISFIED			Yes No x
AND	Minimum Requirement	Warrant			MET
	One warrant meets 80% of volume requirements	Warrant 1 - Condition A			Yes No x
		or Warrant 1 - Condition B			Yes No x
		or Warrant 4 - Pedestrian Volume			Yes No x
AND	Signal will not seriously disrupt progressive traffic flow.			Yes No x	
AND	Adequate trial of less restrictive remedies has failed to			Yes No x	506
AND	Greater than or equal to five (5) crashes within a one (1) year period correctable by a traffic sign			Yes No x	88

Source: Manual on Uniform Traffic Control Devices (MUTCD) - 2009 Edition

HSMV_Report	Reporting_Agency	Crash_Date	Crash_Time	City	Crash_Street	Intersecting_Crash_Type	Non_Motorist_Fatalities	Injuries	Weather	Light_Condition	Crash_Type_Detailed	Manner_of_Collision
84584621	Miami Beach PD	11/1/2015	1:10 PM	Miami Beach	OCEAN DR	900 BLK OCEAN DR	0	0	0 Clear	Daylight	Rear End	Front to Rear
85707911	Miami Beach PD	2/6/2016	3:25 AM	Miami Beach	9TH STREET	OCEAN DRIVE	0	0	0 Clear	Dark - Lighted	Parked Vehicle	Unknown
85710608	Miami Beach PD	3/7/2016	3:10 AM	Miami Beach	9TH ST	OCEAN DR	0	0	0 Clear	Dark - Lighted	Backed Into	Sideswipe, Same Direction
85711567	Miami Beach PD	3/25/2016	2:44 PM	Miami Beach	9TH ST	OCEAN DR	0	0	0 Clear	Daylight	Right Angle	Front to Front
85712927	Miami Beach PD	5/7/2016	2:55 AM	Miami Beach	OCEAN DR	9TH ST	0	0	0 Clear	Dark - Lighted	Rear End	Front to Rear
85713467	Miami Beach PD	5/20/2016	1:10 PM	Miami Beach	OCEAN DR	Other	0	0	0 Clear	Daylight	Parked Vehicle	Sideswipe, Same Direction
85713843	Miami Beach PD	6/18/2016	7:10 PM	Miami Beach	OCEAN DR	9TH ST	0	0	0 Rain	Daylight	Parked Vehicle	Angle
86286343	Miami Beach PD	7/17/2016	6:20 PM	Miami Beach	OCEAN DR	9 STREET	0	0	0 Clear	Daylight	Head On	Sideswipe, Opposite Direction
86286451	Miami Beach PD	7/29/2016	12:30 PM	Miami Beach	OCEAN DR	9TH ST	0	0	0 Clear	Daylight	Parked Vehicle	Sideswipe, Same Direction
85714348	Miami Beach PD	8/6/2016	6:27 PM	Miami Beach	OCEAN DR	9TH ST	0	0	0 Cloudy	Daylight	Opposing Sideswipe	Sideswipe, Opposite Direction
86287177	Miami Beach PD	9/6/2016	6:57 PM	Miami Beach	OCEAN DR	9TH ST	0	0	0 Cloudy	Dawn	Unknown	Angle
85714423	Miami Beach PD	10/1/2016	4:43 PM	Miami Beach	OCEAN DR	9TH ST	0	0	0 Clear	Daylight	Rear End	Front to Rear
86286675	Miami Beach PD	12/7/2016	5:10 PM	Miami Beach	OCEAN DR	9TH ST	0	0	0 Clear	Daylight	Rollover	Other
86288599	Miami Beach PD	12/9/2016	4:30 PM	Miami Beach	OCEAN DR	9TH ST	0	0	0 Cloudy	Daylight	Parked Vehicle	Sideswipe, Same Direction
86291100	Miami Beach PD	12/12/2016	10:58 AM	Miami Beach	9TH ST	OCEAN DR	0	0	0 Clear	Daylight	Parked Vehicle	Sideswipe, Same Direction
86287355	Miami Beach PD	1/19/2017	11:51 PM	Miami Beach	9TH ST	OCEAN DR	0	0	0 Clear	Dark - Lighted	Other	Rear to Side
86286956	Miami Beach PD	1/28/2017	12:57 AM	Miami Beach	OCEAN DR	9TH ST	0	0	0 Clear	Dark - Lighted	Parked Vehicle	Sideswipe, Same Direction
86288080	Miami Beach PD	2/19/2017	3:18 AM	Miami Beach	OCEAN DR	9TH ST	0	0	0 Clear	Dark - Lighted	Parked Vehicle	Front to Rear
86289378	Miami Beach PD	2/21/2017	3:03 AM	Miami Beach	OCEAN DR	9TH ST	0	0	0 Clear	Dark - Lighted	Same Direction Sidesw	Sideswipe, Same Direction
86290532	Miami Beach PD	3/15/2017	11:17 PM	Miami Beach	OCEAN DR	9TH ST	0	0	0 Clear	Dark - Lighted	Parked Vehicle	Angle
86288412	Miami Beach PD	4/2/2017	2:55 PM	Miami Beach	OCEAN DR	Other	0	0	0 Clear	Dark - Lighted	Parked Vehicle	Front to Rear
86290032	Miami Beach PD	4/24/2017	4:32 AM	Miami Beach	OCEAN DR	9TH ST	0	0	0 Clear	Dark - Lighted	Parked Vehicle	Sideswipe, Same Direction
86288710	Miami Beach PD	5/30/2017	2:10 PM	Miami Beach	OCEAN DR	9TH ST	0	0	0 Clear	Daylight	Parked Vehicle	Sideswipe, Opposite Direction
86289637	Miami Beach PD	7/20/2017	8:45 PM	Miami Beach	OCEAN DR	9TH ST	1	0	0 Clear	Dark - Lighted	Parked Vehicle	Sideswipe, Same Direction
87015831	Miami Beach PD	8/13/2017	9:10 PM	Miami Beach	OCEAN DR	9TH ST	1	0	0 Clear	Dark - Lighted	Single Vehicle	Front to Rear
87014421	Miami Beach PD	8/16/2017	11:39 PM	Miami Beach	OCEAN DR	9TH ST	0	0	0 Clear	Dark - Lighted	Parked Vehicle	Sideswipe, Same Direction
87015833	Miami Beach PD	8/20/2017	2:15 AM	Miami Beach	OCEAN DR	9TH ST	0	0	0 Clear	Dark - Lighted	Parked Vehicle	Front to Rear
87014602	Miami Beach PD	8/28/2017	1:13 PM	Miami Beach	OCEAN DR	9TH ST	0	0	0 Clear	Daylight	Unknown	Angle
87017188	Miami Beach PD	8/31/2017	7:15 AM	Miami Beach	OCEAN DR	9TH ST	0	0	0 Clear	Daylight	Parked Vehicle	Sideswipe, Same Direction
870XXXXX	Miami Beach PD	9/16/2017	11:35 AM	Miami Beach	OCEAN DR	9TH ST	0	0	0 Clear	Daylight	Parked Vehicle	Front to Rear
857XXXXX	Miami Beach PD	9/30/2017	1:55 AM	Miami Beach	OCEAN DR	Rear End	0	0	0 Clear	Dark - Lighted	Rear End	Front to Rear
870XXXXX	Miami Beach PD	10/8/2017	9:35 PM	Miami Beach	OCEAN DR	9TH ST	0	0	0 Clear	Dark - Lighted	Parked Vehicle	Front to Rear
870XXXXX	Miami Beach PD	10/22/2017	12:20 PM	Miami Beach	OCEAN DR	Sideswipe	0	0	0 Clear	Daylight	Same Direction Sidesw	Sideswipe, Same Direction

APPENDIX H

Pedestrian Flow and LOS for Sidewalks

parts of the walkway. In cross-flow locations, the LOS E–F threshold is 13 ft²/p, as indicated in the notes for Exhibit 23-1 and Exhibit 23-2.

LOS	Average Space (ft ² /p)	Related Measures			Comments
		Flow Rate (p/min/ft) ^a	Average Speed (ft/s)	v/c Ratio ^b	
A	>60	≤5	>4.25	≤0.21	Ability to move in desired path, no need to alter movements
B	>40–60	>5–7	>4.17–4.25	>0.21–0.31	Occasional need to adjust path to avoid conflicts
C	>24–40	>7–10	>4.00–4.17	>0.31–0.44	Frequent need to adjust path to avoid conflicts
D	>15–24	>10–15	>3.75–4.00	>0.44–0.65	Speed and ability to pass slower pedestrians restricted
E	>8–15 ^c	>15–23	>2.50–3.75	>0.65–1.00	Speed restricted, very limited ability to pass slower pedestrians
F	≤8 ^c	Variable	≤2.50	Variable	Speeds severely restricted, frequent contact with other users

Notes: Exhibit 23-1 does not apply to walkways with steep grades (>5%). See the Special Cases section for further discussion.

^a Pedestrians per minute per foot of walkway width.

^b v/c ratio = flow rate/23. LOS is based on average space per pedestrian.

^c In cross-flow situations, the LOS E–F threshold is 13 ft²/p.

Exhibit 23-1

Average Flow LOS Criteria for Walkways

LOS	Average Space (ft ² /p)	Related Measure Flow Rate ^a (p/min/ft) ^b	Comments
A	>530	≤0.5	Ability to move in desired path, no need to alter movements
B	>90–530	>0.5–3	Occasional need to adjust path to avoid conflicts
C	>40–90	>3–6	Frequent need to adjust path to avoid conflicts
D	>23–40	>6–11	Speed and ability to pass slower pedestrians restricted
E	>11–23 ^c	>11–18	Speed restricted, very limited ability to pass slower pedestrians
F	≤11 ^c	>18	Speeds severely restricted, frequent contact with other users

Notes: ^a Rates in the table represent average flow rates over a 5-min period. Flow rate is directly related to space; however, LOS is based on average space per pedestrian.

^b Pedestrians per minute per foot of walkway width.

^c In cross-flow situations, the LOS E–F threshold is 13 ft²/p.

Exhibit 23-2

Platoon-Adjusted LOS Criteria for Walkways

Stairways

Exhibit 23-3 provides the LOS criteria for stairways.

LOS	Average Space (ft ² /p)	Related Measures		Comments
		Flow Rate (p/min/ft) ^a	v/c Ratio ^b	
A	>20	≤5	≤0.33	No need to alter movements
B	>17–20	>5–6	>0.33–0.41	Occasional need to adjust path to avoid conflicts
C	>12–17	>6–8	>0.41–0.53	Frequent need to adjust path to avoid conflicts
D	>8–12	>8–11	>0.53–0.73	Limited ability to pass slower pedestrians
E	>5–8	>11–15	>0.73–1.00	Very limited ability to pass slower pedestrians
F	≤5	Variable	Variable	Speeds severely restricted, frequent contact with other users

Notes: ^a Pedestrians per minute per foot of walkway width.

^b v/c ratio = flow rate/15. LOS is based on average space per pedestrian.

Exhibit 23-3

LOS Criteria for Stairways