EXHIBIT "A"

MILLER LEGG

M e m o r a n d u m

Date: 1/29/2010

To: Richard Labinsky, P.E.

Cc: Darren Badore, Miller Legg

From: Eric S. Czerniejewski, P.E.

Re: **Hallandale Beach Blvd Corridor- NE 8th Ave & NE 10th Ave Conversion**

Rick:

Please reference the below results matrix table which provides a summary of the existing conditions (with one way operations at both 8th and 10th) and proposed conditions (with two way operations and restricted movements per our methodology meetings).

TABLE 1: HBB CORRIDOR SUMMARY						
Scenario	INT LOS	INT DELAY (sec)	Queue (ft)	ART LOS	ART DELAY (sec)	TRAVEL TIME (sec)
Existing AM Conditions			EB/WB	EB/WB	EB/WB	EB/WB
HBB and NE 8th Avenue	F	87.2	576/646	F/F	85.3/90.6	102.6/107.6
HBB and NE 10th Avenue	C	21.1	99/474	B/D	0.9/22.2	17.9/51.9
Existing PM Conditions						
HBB and NE 8th Avenue	F	105.7	778/697	F/F	99.4/109.9	116.7/126.9
HBB and NE 10th Avenue	B	12.7	103/25	C/B	1.6/2.5	18.6/32.2
Proposed AM Conditions						
HBB and NE 8th Avenue	E	77.8	514/590	F/F	77.5/79.5	94.8/96.5
HBB and NE 10th Avenue	A	9.3	58/68	C/C	4.9/7.0	21.9/36.7
Proposed PM Conditions						
HBB and NE 8th Avenue	E	79.1	648/626	F/F	69.8/88.6	87.1/105.6
HBB and NE 10th Avenue	C	23.8	174/512	D/E	9.1/36.6	26.1/66.3

As reflected in Table 1, the result of making the conversion from one way to two way operation on NE 8th Avenue and NE 10th Avenue is predominately a positive one along Hallandale Beach Boulevard at each of these intersections. Compared to the existing conditions, the intersection and arterial delay and arterial travel time decreased, thus improving the overall traffic operations along Hallandale Beach Boulevard. The one instance where it slightly decreased the intersection and arterial delay and arterial travel time is in the pm condition at NE 10th Avenue and Hallandale Beach Blvd. This occurs primarily due to the additional traffic movements added at this location since it was only an ingress access in the existing condition and then an ingress and egress location in the proposed condition. FDOT and BCTED will ultimately make the decision if this traffic operational change has its benefits along the corridor.

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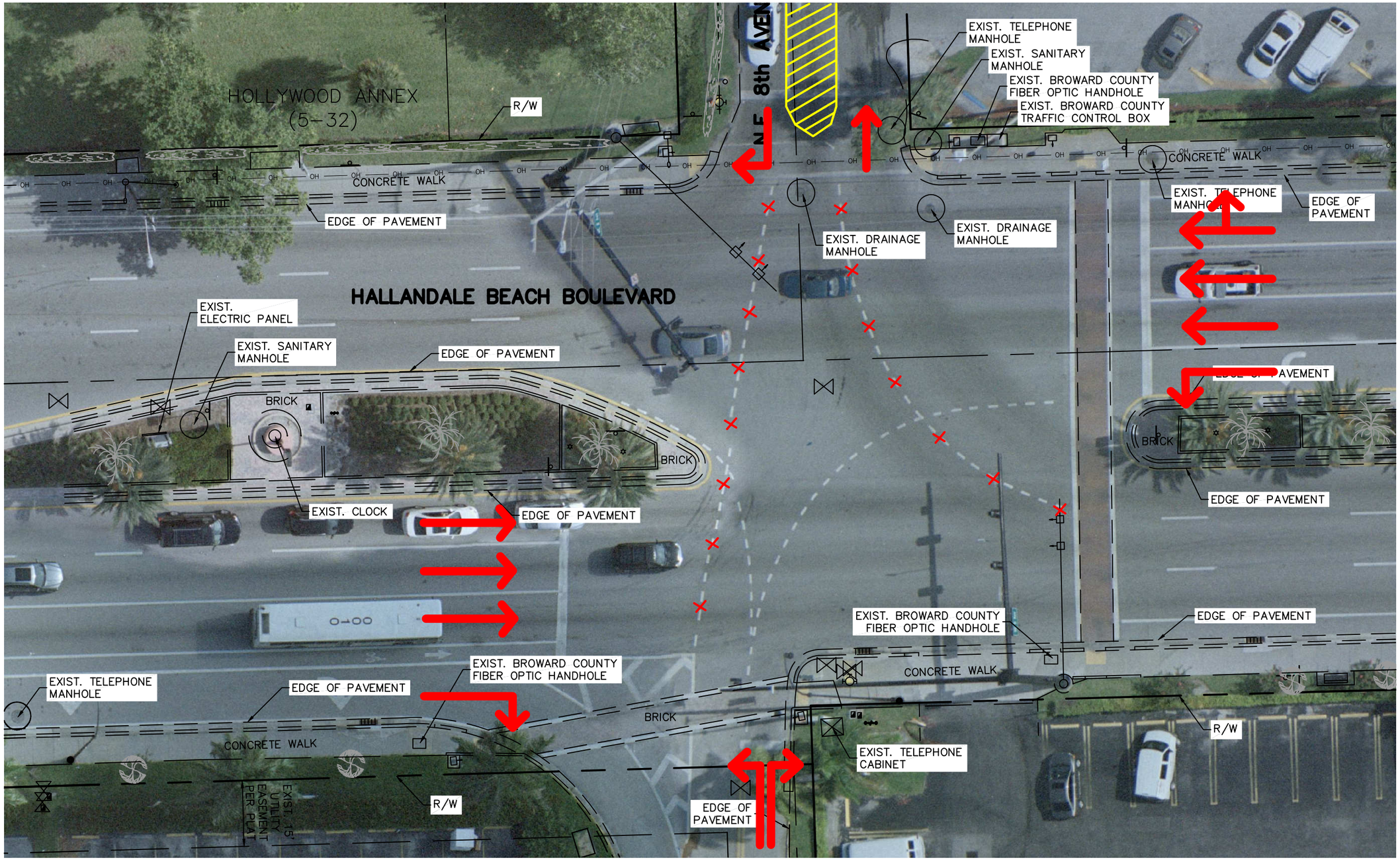

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

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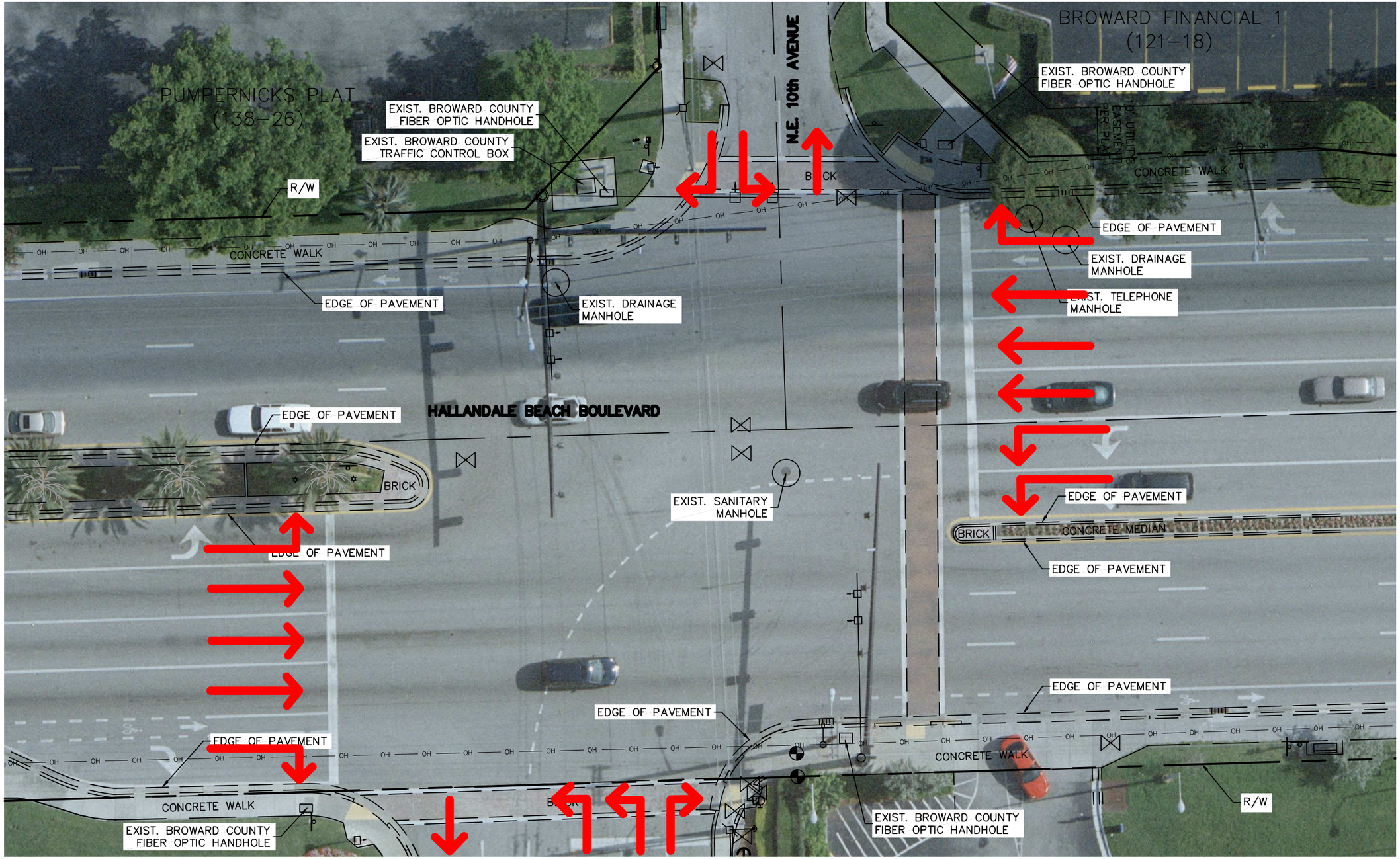
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

ROAD	COUNTY PROJECT ID
HALLANDALE BEACH	78424

ROADWAY PLAN

SHEET NO.
6



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DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

ROAD	COUNTY PROJECT ID
HALLANDALE BEACH	78424

ROADWAY PLAN

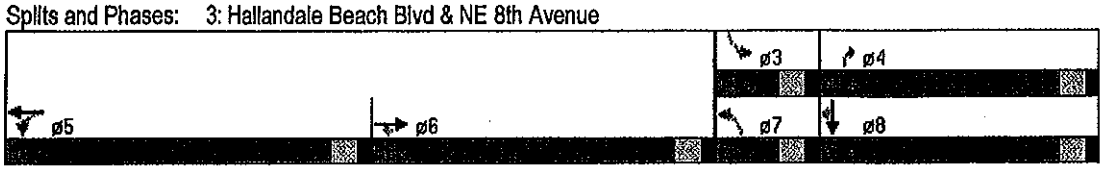
SHEET NO. 7

Lane Configurations		↑↑↑	↱	↰	↑↑↑		↰		↱	↰	↰	↱
Volume (vph)	0	1311	7	21	1432	0	0	0	7	174	1	166
Satd. Flow (prot)	0	5085	1583	1770	5085	0	1863	0	1583	1681	1688	1583
Flt Permitted				0.083						0.950	0.954	
Satd. Flow (perm)	0	5085	1583	155	5085	0	1863	0	1583	1681	1688	1583
Satd. Flow (RTOR)			3						557		1	166
Lane Group Flow (vph)	0	1425	8	23	1557	0	0	0	8	41	40	166
Turn Type			Perm	Perm			Custom		Custom	Custom		Perm
Protected Phases		6			5						8	
Permitted Phases			6	5			7		4	2		8
Total Split (s)	0.0	50.0	50.0	54.0	54.0	0.0	15.0	0.0	41.0	15.0	41.0	41.0
Total Lost Time (s)	4.0	5.0	6.0	6.0	6.0	4.0	6.0	4.0	6.0	6.0	6.0	6.0
Act Effct Green (s)		44.0	44.0	48.0	48.0				35.0	9.0	35.0	35.0
Actuated g/C Ratio		0.28	0.28	0.30	0.30				0.22	0.06	0.22	0.22
v/c Ratio		1.02	0.02	0.49	1.02				0.01	0.43	0.11	0.35
Control Delay		85.3	33.9	86.9	100.6				0.0	87.4	51.1	8.8
Queue Delay		0.0	0.0	0.0	9.8				0.0	0.0	0.0	0.0
Total Delay		85.3	33.9	86.9	100.4				0.0	87.4	51.1	8.8
LOS		F	C	F	F				A	F	D	A
Approach Delay		85.0			100.2						28.7	
Approach LOS		F			F						C	
Queue Length 50th (ft)		~576	4	23	~646				0	44	35	0
Queue Length 95th (ft)		#673	19	m#53	#745				0	91	72	64
Internal Link Dist (ft)		568			558			891			955	
Turn Bay Length (ft)			125	120								100
Base Capacity (vph)		1398	436	47	1526				781	95	369	476
Starvation Cap Reductn		0	0	0	41				0	0	0	0
Spillback Cap Reductn		0	0	0	0				0	0	0	0
Storage Cap Reductn		0	0	0	0				0	0	0	0
Reduced v/c Ratio		1.02	0.02	0.49	1.06				0.01	0.43	0.11	0.35

Intersection Summary

Cycle Length: 160
Actuated Cycle Length: 160
Offset: 0 (0%), Referenced to phase 6:EBT, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.02
Intersection Signal Delay: 87.9 Intersection LOS: F
Intersection Capacity Utilization 49.5% ICU Level of Service A
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Hallandale Beach Blvd & NE 8th Avenue



Movement												
Lane Configurations		↑↑↑	↱	↰	↑↑↑		↰		↱	↰	↲	↱
Volume (vph)	0	1311	7	21	1432	0	0	0	7	74	1	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	6.0	6.0				6.0	6.0	6.0	6.0
Lane Util. Factor		0.91	1.00	1.00	0.91				1.00	0.95	0.95	1.00
Frt		1.00	0.85	1.00	1.00				0.85	1.00	1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00				1.00	0.95	0.95	1.00
Satd. Flow (prot)		5085	1583	1770	5085				1583	1681	1687	1583
Flt Permitted		1.00	1.00	0.08	1.00				1.00	0.95	0.95	1.00
Satd. Flow (perm)		5085	1583	155	5085				1583	1681	1687	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1425	8	23	1557	0	0	0	8	80	1	166
RTOR Reduction (vph)	0	0	2	0	0	0	0	0	6	0	0	130
Lane Group Flow (vph)	0	1425	6	23	1557	0	0	0	2	81	1	36
Turn Type			Perm	Perm			custom		custom	custom		Perm
Protected Phases		6			5						8	
Permitted Phases			6	5			7		4	3		8
Actuated Green, G (s)		44.0	44.0	48.0	48.0				35.0	9.0	35.0	35.0
Effective Green, g (s)		44.0	44.0	48.0	48.0				35.0	9.0	35.0	35.0
Actuated g/C Ratio		0.28	0.28	0.30	0.30				0.22	0.06	0.22	0.22
Clearance Time (s)		6.0	6.0	6.0	6.0				6.0	6.0	6.0	6.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0				2.0	1.5	2.0	2.0
Lane Grp Cap (vph)		1398	435	47	1526				346	95	369	346
v/s Ratio Prot		c0.28			c0.31							
v/s Ratio Perm			0.00	0.15					0.00	c0.02	0.02	0.02
v/c Ratio		1.02	0.01	0.49	1.02				0.01	0.43	0.11	0.10
Uniform Delay, d1		58.0	42.2	45.9	56.0				48.9	73.0	50.0	50.0
Progression Factor		1.00	1.00	1.18	1.18				1.00	1.00	1.00	1.00
Incremental Delay, d2		29.0	0.1	7.0	27.0				0.0	13.7	0.6	0.6
Delay (s)		87.0	42.3	58.8	93.1				48.9	86.7	50.6	50.6
Level of Service		F	D	E	F				D	F	D	D
Approach Delay (s)		86.8			92.6			48.9			55.6	
Approach LOS		F			F			D			E	

Intersection Summary			
HCM Average Control Delay	87.2	HCM Level of Service	F
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

2: Hallandale Beach Blvd & NE 10th Avenue

1/29/2010

Lane Group	[illegible]	[illegible]	[illegible]	WBT	WBR	[illegible]	NBT	NBR	[illegible]	[illegible]	[illegible]	[illegible]
Lane Configurations												
Volume (vph)	160	1342	25	43	1436	39	5	0	25	0	0	0
Satd. Flow (prot)	1770	5085	1583	3433	5065	0	1681	1681	1583	0	0	0
Flt Permitted	0.107			0.950			0.950	0.950				
Satd. Flow (perm)	199	5085	1583	3433	5065	0	1681	1681	1583	0	0	0
Satd. Flow (RTOR)			6		5				27			
Lane Group Flow (vph)	65	1459	27	47	1603	0	2	3	27	0	0	0
Turn Type	custom		Perm	Prot			Split		Perm			
Protected Phases		6		5	2		4	4				
Permitted Phases	1		6						4			
Total Split (s)	16.0	109.0	109.0	16.0	109.0	0.0	35.0	35.0	35.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	6.0	4.0	4.0	4.0
Act Effct Green (s)	37.4	137.4	137.4	6.3	103.0		6.4	6.4	6.4			
Actuated g/C Ratio	0.23	0.86	0.86	0.04	0.64		0.04	0.04	0.04			
v/c Ratio	1.38	0.33	0.02	0.35	0.49		0.03	0.04	0.30			
Control Delay	278.6	0.9	0.0	107.7	22.2		74.0	74.7	32.4			
Queue Delay	0.0	0.3	0.0	0.0	0.5		0.0	0.0	0.0			
Total Delay	278.6	1.1	0.0	107.7	22.7		74.0	74.7	32.4			
LOS	F	A	A	F	C		E	E	C			
Approach Delay		12.7			25.1			39.0				
Approach LOS		B			C			D				
Queue Length 50th (ft)	~99	2	0	22	474		2	3	0			
Queue Length 95th (ft)	m#109	m3	m0	m49	483		12	15	35			
Internal Link Dist (ft)		558			628			840			928	
Turn Bay Length (ft)	150		25	400					475			
Base Capacity (vph)	47	4366	1360	215	3262		305	305	309			
Starvation Cap Reductn	0	1929	0	0	0		0	0	0			
Spillback Cap Reductn	0	0	0	0	1065		0	0	0			
Storage Cap Reductn	0	0	0	0	0		0	0	0			
Reduced v/c Ratio	1.38	0.60	0.02	0.22	0.73		0.01	0.01	0.09			

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 20 (13%), Referenced to phase 2 WBT and 6 EBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.38

Intersection Signal Delay: 19.3 Intersection LOS: B

Intersection Capacity Utilization 51.9% ICU Level of Service A

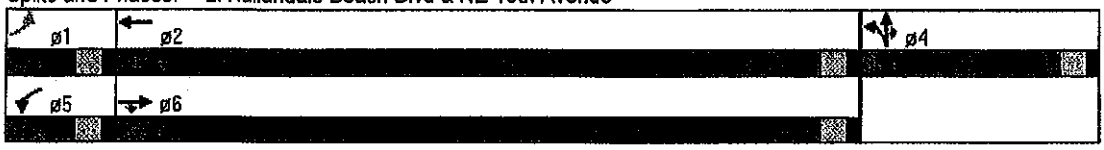
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

Splits and Phases: 2: Hallandale Beach Blvd & NE 10th Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑	↱	↰↰	↑↑↑↳		↰	↰	↱			
Volume (vph)	60	1342	25	43	1436	39	5	0	25	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0			
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91		0.95	0.95	1.00			
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85			
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.95	1.00			
Satd. Flow (prot)	1770	5085	1583	3433	5065		1681	1681	1583			
Flt Permitted	0.11	1.00	1.00	0.95	1.00		0.95	0.95	1.00			
Satd. Flow (perm)	199	5085	1583	3433	5065		1681	1681	1583			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	1459	27	47	1561	42	5	0	27	0	0	0
RTOR Reduction (vph)	0	0	1	0	2	0	0	0	26	0	0	0
Lane Group Flow (vph)	465	1459	26	47	1601	0	2	3	1	0	0	0
Turn Type	custom		Perm	Prot			Split		Perm			
Protected Phases	1	6		5	2		4	4				
Permitted Phases	1		6						4			
Actuated Green, G (s)	137.4	132.6	132.6	5.4	100.6		4.0	4.0	4.0			
Effective Green, g (s)	37.4	132.6	132.6	5.4	100.6		4.0	4.0	4.0			
Actuated g/C Ratio	0.23	0.83	0.83	0.03	0.63		0.02	0.02	0.02			
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0			
Vehicle Extension (s)	1.5	3.0	3.0	1.5	3.0		2.0	2.0	2.0			
Lane Grp Cap (vph)	47	4214	1312	116	3185		42	42	40			
v/s Ratio Prot		0.29		0.01	c0.32		0.00	c0.00				
v/s Ratio Perm	c0.33		0.02						0.00			
v/c Ratio	1.38	0.35	0.02	0.41	0.50		0.05	0.07	0.02			
Uniform Delay, d1	61.3	3.3	2.4	75.7	16.1		76.1	76.2	76.1			
Progression Factor	1.00	0.24	0.00	1.36	1.46		1.00	1.00	1.00			
Incremental Delay, d2	209.0	0.1	0.0	0.8	0.5		0.2	0.3	0.1			
Delay (s)	325.8	0.9	0.0	104.0	24.1		76.3	76.4	76.1			
Level of Service	F	A	A	F	C		E	E	E			
Approach Delay (s)		14.5			26.3			76.2			0.0	
Approach LOS		B			C			E			A	

Intersection Summary			
HCM Average Control Delay	21.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Arterial Level of Service: EB Hallandale Beach Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time	Dist (mi)	Arterial Speed	Arterial LOS
US1	III	30	27.3	311.1	338.4	0.22	2.3	F
NE 8th Avenue	III	30	17.3	85.3	102.6	0.12	4.3	F
NE 10th Avenue	III	30	17.0	0.9	17.9	0.12	24.3	B
NE 14th Avenue	III	30	33.0	40.2	73.2	0.26	12.8	E
Layne Blvd	III	30	32.6	56.7	89.3	0.26	10.3	E
Golden Isles Drive	III	30	9.3	33.6	42.9	0.06	5.0	F
Diplomat Parkway	III	30	12.6	42.7	55.3	0.09	5.8	F
Three Islands Drive	III	30	12.9	5.7	18.6	0.09	17.7	D
Total	III		162.0	576.2	738.2	1.22	5.9	F

Arterial Level of Service: WB Hallandale Beach Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time	Dist (mi)	Arterial Speed	Arterial LOS
Three Islands Drive	III	30	40.6	8.6	49.2	0.32	23.4	C
Diplomat Parkway	III	30	12.9	46.6	59.5	0.09	5.5	F
Golden Isles Drive	III	30	12.6	5.8	18.4	0.09	17.5	D
Layne Blvd	III	30	9.3	8.2	17.5	0.06	12.3	E
NE 14th Avenue	III	30	32.5	27.2	59.7	0.26	15.5	D
NE 10th Avenue	III	30	29.7	22.2	51.9	0.23	16.2	D
NE 8th Avenue	III	30	17.0	90.6	107.6	0.12	4.0	F
US1	III	30	17.3	855.1	872.4	0.12	0.5	F
Total	III		171.9	1064.3	1236.2	1.29	3.8	F

Queues
3: Hallandale Beach Blvd & NE 8th Avenue

1/29/2010

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↱	↰	↑↑↑			↰		↱	↰	↱
Volume (vph)	0	1667	6	23	1445	101	8	0	21	92	0	135
Satd. Flow (prot)	0	5085	1583	1770	5085	0	1770	0	1583	1681	1681	1583
Flt Permitted				0.089			0.444			0.950	0.950	
Satd. Flow (perm)	0	5085	1583	166	5085	0	827	0	1583	1681	1681	1583
Satd. Flow (RTOR)			2						23			147
Lane Group Flow (vph)	0	1801	7	25	1574	0	3	0	23	50	50	147
Turn Type			Perm	Perm			custom		custom	custom		Perm
Protected Phases		6			5						8	
Permitted Phases			6	6			7		4	3		8
Total Split (s)	0.0	59.0	59.0	51.0	51.0	0.0	15.0	0.0	25.0	25.0	35.0	35.0
Total Lost Time (s)	4.0	6.0	6.0	6.0	6.0	4.0	6.0	4.0	5.0	5.0	6.0	6.0
Act Effct Green (s)		53.0	53.0	45.0	45.0		9.0		19.0	19.0	29.0	29.0
Actuated g/C Ratio		0.33	0.33	0.28	0.28		0.06		0.12	0.12	0.18	0.18
v/c Ratio		1.07	0.01	0.53	1.10		0.06		0.11	0.25	0.16	0.36
Control Delay		99.4	39.8	86.6	109.9		74.7		22.4	67.7	57.0	10.4
Queue Delay		59.3	0.0	0.0	109.6		0.0		0.0	0.0	0.0	1.7
Total Delay		158.7	39.8	86.6	219.5		74.7		22.4	67.7	57.0	12.1
LOS		F	D	F	F		E		C	E	E	B
Approach Delay		158.2			217.4						32.5	
Approach LOS		F			F						C	
Queue Length 50th (ft)		~778	4	26	~697		0		0	50	47	0
Queue Length 95th (ft)		m#752	m5	m52	#797		15		30	98	91	65
Internal Link Dist (ft)		568			568			891			955	
Turn Bay Length (ft)			125	120								100
Base Capacity (vph)		1684	526	47	1430		47		208	200	305	407
Starvation Cap Reductn		191	0	0	0		0		0	0	0	0
Spillback Cap Reductn		0	0	0	263		0		0	0	0	141
Storage Cap Reductn		0	0	0	0		0		0	0	0	0
Reduced v/c Ratio		1.21	0.01	0.53	1.35		0.06		0.11	0.25	0.16	0.56

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 0 (0%), Referenced to phase 6:EBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.10

Intersection Signal Delay: 174.6 Intersection LOS: F

Intersection Capacity Utilization 55.3% ICU Level of Service B

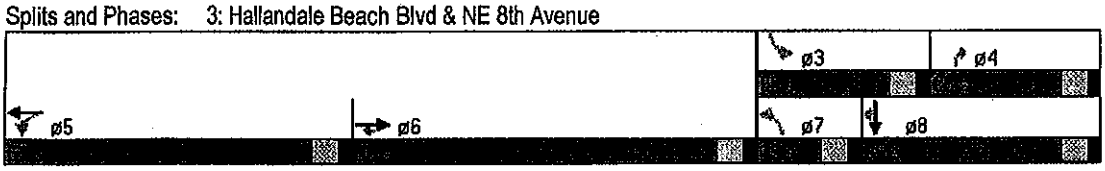
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

Splits and Phases: 3: Hallandale Beach Blvd & NE 8th Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↱	↰	↑↑↑		↰		↱	↰	↰	↱
Volume (vph)	0	1687	6	23	1448	0	3	0	21	92	0	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	6.0	6.0		6.0		6.0	6.0	6.0	6.0
Lane Util. Factor		0.91	1.00	1.00	0.91		1.00		1.00	0.95	0.95	1.00
Frt		1.00	0.85	1.00	1.00		1.00		0.85	1.00	1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00	0.95	0.95	1.00
Satd. Flow (prot)		5085	1583	1770	5085		1770		1583	1681	1681	1583
Flt Permitted		1.00	1.00	0.09	1.00		0.44		1.00	0.95	0.95	1.00
Satd. Flow (perm)		5085	1583	166	5085		1828		1583	1681	1681	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1801	7	25	1574	0	3	0	23	100	0	147
RTOR Reduction (vph)	0	0	1	0	0	0	0	0	20	0	0	120
Lane Group Flow (vph)	0	1801	6	25	1574	0	3	0	3	50	50	27
Turn Type			Perm	Perm			custom		custom	custom		Perm
Protected Phases		6			5						8	
Permitted Phases			6	5			7		4	3		8
Actuated Green, G (s)		53.0	53.0	45.0	45.0		9.0		19.0	19.0	29.0	29.0
Effective Green, g (s)		53.0	53.0	45.0	45.0		9.0		19.0	19.0	29.0	29.0
Actuated g/C Ratio		0.33	0.33	0.28	0.28		0.06		0.12	0.12	0.18	0.18
Clearance Time (s)		6.0	6.0	6.0	6.0		6.0		6.0	6.0	6.0	6.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0		1.5		2.0	1.5	2.0	2.0
Lane Grp Cap (vph)		1684	524	47	1430		47		188	200	305	287
v/s Ratio Prot		c0.35			c0.31							
v/s Ratio Perm			0.00	0.15			0.00		0.00	c0.03	0.03	0.02
v/c Ratio		1.07	0.01	0.53	1.10		0.06		0.01	0.25	0.16	0.09
Uniform Delay, d1		53.5	35.9	48.6	57.5		71.5		62.2	64.0	55.3	54.5
Progression Factor		1.29	1.27	1.01	1.06		1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2		35.9	0.0	9.7	55.1		2.6		0.1	3.0	1.2	0.6
Delay (s)		105.0	45.8	58.3	116.8		74.1		62.4	67.0	56.4	55.2
Level of Service		F	D	E	F		E		E	E	E	E
Approach Delay (s)		104.9			114.9			63.7			57.8	
Approach LOS		F			F			E			E	

Intersection Summary			
HCM Average Control Delay	105.7	HCM Level of Service	F
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues
2: Hallandale Beach Blvd & NE 10th Avenue

1/29/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑	↱	↰↰	↑↑↑↳		↰	↰	↱			
Volume (vph)	64	1687	15	66	1473	56	33	15	83	0	0	0
Satd. Flow (prot)	1770	5085	1583	3433	5055	0	1681	1736	1583	0	0	0
Flt Permitted	0.113	1.000	1.000	0.950	1.000		0.950	0.981	1.000			
Satd. Flow (perm)	210	5085	1583	3433	5055	0	1681	1736	1583	0	0	0
Satd. Flow (RTOR)			3		7				90			
Lane Group Flow (vph)	70	1834	16	72	1662	0	26	26	90	0	0	0
Turn Type	custom	NA	Perm	Prot	NA		Split	NA	Perm			
Protected Phases		6		5	2		4	4				
Permitted Phases	6		6						4			
Total Split (s)	20.0	105.0	105.0	20.0	105.0	0.0	35.0	35.0	35.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	6.0	4.0	4.0	4.0
Act Effct Green (s)	35.4	126.9	126.9	7.5	99.0		7.6	7.6	7.6			
Actuated g/C Ratio	0.22	0.79	0.79	0.05	0.62		0.05	0.05	0.05			
v/c Ratio	1.49	0.45	0.01	0.45	0.53		0.32	0.31	0.56			
Control Delay	295.9	11.6	0.0	87.9	2.5		84.5	82.7	26.5			
Queue Delay	0.0	0.4	0.0	0.0	0.2		0.8	0.0	0.0			
Total Delay	295.9	12.0	0.0	87.9	2.7		84.4	82.7	26.5			
LOS	F	A	A	F	A		F	F	C			
Approach Delay		12.7			6.2			47.4				
Approach LOS		B			A			D				
Queue Length 50th (ft)	~103	16	0	40	25		28	28	0			
Queue Length 95th (ft)	m#104	m0	m0	m55	48		64	64	60			
Internal Link Dist (ft)		558			628			840			928	
Turn Bay Length (ft)	150		25	400					475			
Base Capacity (vph)	47	4032	1256	300	3130		305	315	361			
Starvation Cap Reductn	0	1476	0	0	0		0	0	0			
Spillback Cap Reductn	0	0	0	0	1591		173	0	0			
Storage Cap Reductn	0	0	0	0	0		0	0	0			
Reduced v/c Ratio	1.49	0.72	0.01	0.24	0.65		0.20	0.08	0.25			

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 20 (13%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.49

Intersection Signal Delay: 11.1 Intersection LOS: B

Intersection Capacity Utilization 65.9% ICU Level of Service B

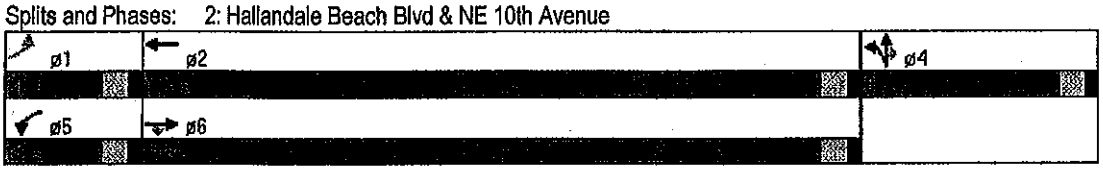
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

Splits and Phases: 2: Hallandale Beach Blvd & NE 10th Avenue



HCM Signalized Intersection Capacity Analysis
2: Hallandale Beach Blvd & NE 10th Avenue

1/29/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	64	1687	15	66	1478	56	33	15	83	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0			
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91		0.95	0.95	1.00			
Frt	1.00	1.00	0.86	1.00	0.99		1.00	1.00	0.85			
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00			
Satd. Flow (prot)	1770	5085	1583	3433	5057		1681	1736	1583			
Flt Permitted	0.11	1.00	1.00	0.95	1.00		0.95	0.98	1.00			
Satd. Flow (perm)	210	5085	1583	3433	5057		1681	1736	1583			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	70	1834	16	72	1607	61	36	16	90	0	0	0
RTOR Reduction (vph)	0	0	1	0	3	0	0	0	86	0	0	0
Lane Group Flow (vph)	70	1834	15	72	1658	0	36	26	4	0	0	0
Turn Type	custom		Perm	Prot			Split		Perm			
Protected Phases		6		5	2		4	4				
Permitted Phases	1		6						4			
Actuated Green, G (s)	35.4	126.9	126.9	7.5	99.0		7.6	7.6	7.6			
Effective Green, g (s)	35.4	126.9	126.9	7.5	99.0		7.6	7.6	7.6			
Actuated g/C Ratio	0.22	0.79	0.79	0.05	0.62		0.05	0.05	0.05			
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0			
Vehicle Extension (s)	1.5	3.0	3.0	1.5	3.0		2.0	2.0	2.0			
Lane Grp Cap (vph)	46	4033	1256	161	3129		80	82	75			
v/s Ratio Prot		0.36		0.02	c0.33		c0.02	0.01				
v/s Ratio Perm	c0.33		0.01						0.00			
v/c Ratio	1.52	0.45	0.01	0.45	0.53		0.02	0.32	0.06			
Uniform Delay, d1	62.3	5.4	3.5	74.2	17.3		73.7	73.7	72.8			
Progression Factor	1.82	0.28	0.00	1.11	0.12		1.00	1.00	1.00			
Incremental Delay, d2	244.6	0.0	0.0	0.5	0.5		0.9	0.8	0.1			
Delay (s)	357.9	1.5	0.0	82.6	2.5		74.6	74.5	72.9			
Level of Service	F	A	A	F	A		E	E	E			
Approach Delay (s)		14.5			5.8			73.5			0.0	
Approach LOS		B			A			E			A	

Intersection Summary			
HCM Average Control Delay	12.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Arterial Level of Service

1/29/2010

Arterial Level of Service: EB Hallandale Beach Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time	Dist (mi)	Arterial Speed	Arterial LOS
US1	III	30	27.8	61.2	88.5	0.22	8.8	F
NE 8th Avenue	III	30	17.3	99.4	116.7	0.12	3.8	F
NE 10th Avenue	III	30	17.0	1.6	18.6	0.12	23.4	C
NE 14th Avenue	III	30	33.0	49.0	82.0	0.26	11.4	E
Layne Blvd	III	30	32.6	40.9	73.5	0.26	12.6	E
Golden Isles Drive	III	30	9.3	25.9	35.2	0.06	6.1	F
Diplomat Parkway	III	30	12.6	46.4	59.0	0.09	5.4	F
Three Islands Drive	III	30	12.9	6.1	19.0	0.09	17.3	D
Total	III		162.0	330.5	492.5	1.22	8.9	F

Arterial Level of Service: WB Hallandale Beach Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time	Dist (mi)	Arterial Speed	Arterial LOS
Three Islands Drive	III	30	40.6	11.0	51.6	0.32	22.3	C
Diplomat Parkway	III	30	12.9	41.4	54.3	0.09	6.1	F
Golden Isles Drive	III	30	12.6	7.6	20.2	0.09	16.0	D
Layne Blvd	III	30	9.3	13.7	23.0	0.06	9.4	F
NE 14th Avenue	III	30	32.5	42.8	75.3	0.26	12.3	E
NE 10th Avenue	III	30	29.7	2.5	32.2	0.23	26.1	B
NE 8th Avenue	III	30	17.0	109.9	126.9	0.12	3.4	F
US1	III	30	17.3	308.6	325.9	0.12	1.4	F
Total	III		171.9	537.5	709.4	1.29	6.6	F

Queues
3: Hallandale Beach Blvd & NE 8th Avenue

1/29/2010

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↱	↰	↑↑↑	↱	↰		↱		↱	
Volume (vph)	0	1311	7	21	1432	20	0	0	7	0	0	77
Satd. Flow (prot)	0	5085	1583	1770	5085	1583	1863	0	1583	0	1611	0
Flt Permitted				0.089								
Satd. Flow (perm)	0	5085	1583	166	5085	1583	1863	0	1583	0	1611	0
Satd. Flow (RTOR)			3			15			565		552	
Lane Group Flow (vph)	0	1425	8	23	1557	22	0	0	8	0	84	0
Turn Type			Perm	Perm		Perm	custom		custom			
Protected Phases		6			5						8	
Permitted Phases			6	5		5	7		4			
Total Split (s)	0.0	48.0	48.0	51.0	51.0	51.0	10.0	0.0	51.0	0.0	41.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	4.0	6.0	4.0
Act Effct Green (s)		42.0	42.0	45.0	45.0	45.0			45.0		35.0	
Actuated g/C Ratio		0.28	0.28	0.30	0.30	0.30			0.30		0.23	
v/c Ratio		1.00	0.02	0.46	1.02	0.05			0.01		0.11	
Control Delay		77.5	31.6	75.5	79.5	20.0			0.0		0.3	
Queue Delay		0.0	0.0	0.0	0.0	0.0			0.0		0.0	
Total Delay		77.5	31.6	75.5	79.5	20.0			0.0		0.3	
LOS		E	C	E	E	B			A		A	
Approach Delay		77.2			78.6						0.3	
Approach LOS		E			E						A	
Queue Length 50th (ft)		~514	4	18	~590	5			0		0	
Queue Length 95th (ft)		#627	18	#63	#687	28			0		0	
Internal Link Dist (ft)		568			558			891			955	
Turn Bay Length (ft)			125	120								
Base Capacity (vph)		1424	445	50	1526	485			870		799	
Starvation Cap Reductn		0	0	0	0	0			0		0	
Spillback Cap Reductn		0	0	0	0	0			0		0	
Storage Cap Reductn		0	0	0	0	0			0		0	
Reduced v/c Ratio		1.00	0.02	0.46	1.02	0.05			0.01		0.11	

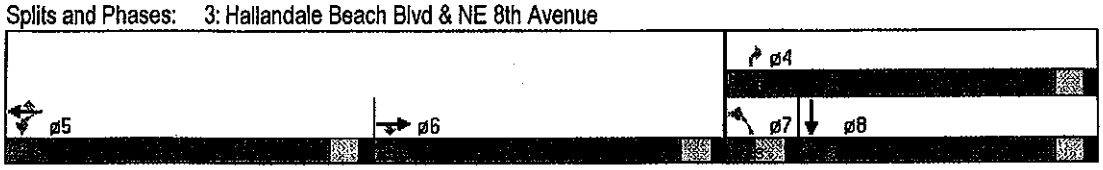
Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 6:EBT, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.02
Intersection Signal Delay: 75.7 Intersection LOS: E
Intersection Capacity Utilization 42.7% ICU Level of Service A
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Hallandale Beach Blvd & NE 8th Avenue



HCM Signalized Intersection Capacity Analysis
3: Hallandale Beach Blvd & NE 8th Avenue

1/29/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↱	↰	↑↑↑	↱	↰		↱		↑	
Volume (vph)	0	1311	7	21	1432	20	0	0	7	0	0	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	6.0	6.0	6.0			6.0		6.0	
Lane Util. Factor		0.91	1.00	1.00	0.91	1.00			1.00		1.00	
Frt		1.00	0.85	1.00	1.00	0.85			0.85		0.86	
Flt Protected		1.00	1.00	0.95	1.00	1.00			1.00		1.00	
Satd. Flow (prot)		5085	1583	1770	5085	1583			1583		1611	
Flt Permitted		1.00	1.00	0.09	1.00	1.00			1.00		1.00	
Satd. Flow (perm)		5085	1583	166	5085	1583			1583		1611	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1425	8	23	1557	22	0	0	8	0	0	84
RTOR Reduction (vph)	0	0	2	0	0	11	0	0	6	0	64	0
Lane Group Flow (vph)	0	1425	6	23	1557	12	0	0	2	0	20	0
Turn Type			Perm	Perm		Perm	custom		custom			
Protected Phases		6			5						8	
Permitted Phases			6	5		5	7		4			
Actuated Green, G (s)		42.0	42.0	45.0	45.0	45.0			45.0		35.0	
Effective Green, g (s)		42.0	42.0	45.0	45.0	45.0			45.0		35.0	
Actuated g/C Ratio		0.28	0.28	0.30	0.30	0.30			0.30		0.23	
Clearance Time (s)		6.0	6.0	6.0	6.0	6.0			6.0		6.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0			2.0		2.0	
Lane Grp Cap (vph)		1424	443	50	1526	475			475		376	
v/s Ratio Prot		c0.28			c0.31						c0.01	
v/s Ratio Perm			0.00	0.14		0.01			c0.00			
v/c Ratio		1.00	0.01	0.46	1.02	0.02			0.01		0.05	
Uniform Delay, d1		54.0	39.0	42.6	52.5	37.0			36.8		44.6	
Progression Factor		1.00	1.00	1.00	1.00	1.00			1.00		1.00	
Incremental Delay, d2		24.0	0.1	6.6	28.3	0.0			0.0		0.3	
Delay (s)		78.0	39.1	49.2	80.8	37.0			36.8		44.9	
Level of Service		E	D	D	F	D			D		D	
Approach Delay (s)		77.8			79.7			36.8			44.9	
Approach LOS		E			E			D			D	

Intersection Summary			
HCM Average Control Delay	77.8	HCM Level of Service	E
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	42.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues
2: Hallandale Beach Blvd & NE 10th Avenue

1/29/2010

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑	↱	↰↰	↑↑↑		↰	↑	↱	↰		↱
Volume (vph)	60	1342	25	43	1436	39	5	0	25	74	0	76
Satd. Flow (prot)	1770	5085	1583	3433	5065	0	1681	1681	1583	1770	0	1583
Flt Permitted	0.836			0.950			0.950	0.950		0.072		
Satd. Flow (perm)	626	5085	1583	3433	5065	0	1681	1681	1583	134	0	1583
Satd. Flow (RTOR)			10		5				27			83
Lane Group Flow (vph)	65	1459	27	47	1603	0	2	3	27	80	0	83
Turn Type	custom		Perm	Prot			Split		Perm	custom		custom
Protected Phases		6l		5	2l		4	4				
Permitted Phases	1		6						4	6l		6
Total Split (s)	25.0	48.0	48.0	10.0	33.0	0.0	22.0	22.0	22.0	48.0	0.0	48.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	4.0	6.0
Act Effct Green (s)	12.7	64.3	64.3	5.3	53.6		6.2	6.2	6.2	64.3		64.3
Actuated g/C Ratio	0.16	0.80	0.80	0.07	0.67		0.08	0.08	0.08	0.80		0.80
v/c Ratio	0.66	0.36	0.02	0.21	0.47		0.02	0.02	0.18	0.74		0.06
Control Delay	58.4	4.9	4.2	37.6	7.0		34.0	34.3	16.9	59.4		1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	58.4	4.9	4.2	37.6	7.0		34.0	34.3	16.9	59.4		1.8
LOS	E	A	A	D	A		C	C	B	E		A
Approach Delay		7.1			7.9			19.6				
Approach LOS		A			A			B				
Queue Length 50th (ft)	31	58		17	68		1	1	10	15		0
Queue Length 95th (ft)	65	165	12	m31	334		8	9	24	#88		16
Internal Link Dist (ft)		558			628			840			928	
Turn Bay Length (ft)	150		25	400					475			250
Base Capacity (vph)	153	4087	1274	227	3393		336	336	338	108		1289
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0		0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0		0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0		0
Reduced v/c Ratio	0.42	0.36	0.02	0.21	0.47		0.01	0.01	0.08	0.74		0.06

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBSB, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 8.7 Intersection LOS: A

Intersection Capacity Utilization 58.6% ICU Level of Service B

Analysis Period (min) 15

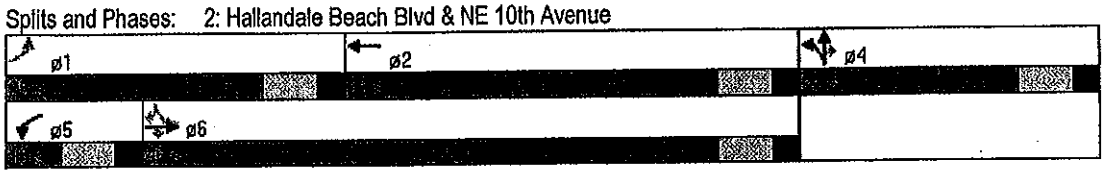
\# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

! Phase conflict between lane groups.

Splits and Phases: 2: Hallandale Beach Blvd & NE 10th Avenue



HCM Signalized Intersection Capacity Analysis
2: Hallandale Beach Blvd & NE 10th Avenue

1/29/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑	↱	↰↰	↑↑↱		↰	↲	↱	↰		↱
Volume (vph)	50	1342	26	43	1436	39	5	0	25	174	0	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91		0.95	0.95	1.00	1.00		1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.95	1.00	0.95		1.00
Satd. Flow (prot)	1770	5085	1583	3433	5065		1681	1681	1583	1770		1583
Flt Permitted	0.34	1.00	1.00	0.95	1.00		0.95	0.95	1.00	0.07		1.00
Satd. Flow (perm)	626	5085	1583	3433	5065		1681	1681	1583	133		1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	55	1459	28	47	1561	42	5	0	27	189	0	83
RTOR Reduction (vph)	0	0	3	0	2	0	0	0	26	0	0	25
Lane Group Flow (vph)	55	1459	24	47	1601	0	2	3	1	189	0	58
Turn Type	custom		Perm	Prot			Split		Perm	custom		custom
Protected Phases		6		5	2		4	4		2	2	
Permitted Phases	1		6						4	6		6
Actuated Green, G (s)	11.9	55.9	55.9	3.5	47.5		2.6	2.6	2.6	55.9		55.9
Effective Green, g (s)	11.9	55.9	55.9	3.5	47.5		2.6	2.6	2.6	55.9		55.9
Actuated g/C Ratio	0.15	0.70	0.70	0.04	0.59		0.03	0.03	0.03	0.70		0.70
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	1.5	3.0	3.0	1.5	3.0		2.0	2.0	2.0	3.0		3.0
Lane Grp Cap (vph)	93	3553	1106	150	3007		55	55	51	93		1106
v/s Ratio Prot		0.29		0.01	0.32		0.00	c0.00				
v/s Ratio Perm	c0.10		0.02						0.00	c0.60		0.04
v/c Ratio	0.70	0.41	0.02	0.31	0.53		0.04	0.05	0.02	0.86		0.05
Uniform Delay, d1	32.3	5.1	3.7	37.1	9.7		37.5	37.5	37.5	9.1		3.8
Progression Factor	1.00	1.00	1.00	1.02	0.67		1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	16.9	0.4	0.0	0.4	0.6		0.1	0.2	0.0	60.6		0.1
Delay (s)	49.2	5.4	3.7	38.2	7.1		37.6	37.7	37.5	69.7		3.9
Level of Service	D	A	A	D	A		D	D	D	E		A
Approach Delay (s)		7.2			8.0			37.5		66.2		
Approach LOS		A			A			D		D		

Intersection Summary			
HCM Average Control Delay	9.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

Arterial Level of Service: EB Hallandale Beach Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial Level
US1	III	30	27.3	311.1	338.4	0.22	2.3	F
NE 8th Avenue	III	30	17.3	77.5	94.8	0.12	4.7	F
NE 10th Avenue	III	30	17.0	4.9	21.9	0.12	19.9	C
NE 14th Avenue	III	30	33.0	16.5	49.5	0.26	18.9	C
Layne Blvd	III	30	32.6	57.7	90.3	0.26	10.2	E
Golden Isles Drive	III	30	9.3	33.4	42.7	0.06	5.0	F
Diplomat Parkway	III	30	12.6	42.7	55.8	0.09	5.8	F
Three Islands Drive	III	30	12.9	5.7	18.6	0.09	17.7	D
Total	III		162.0	549.5	711.5	1.22	6.2	F

Arterial Level of Service: WB Hallandale Beach Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial Level
Three Islands Drive	III	30	40.6	8.6	49.2	0.32	23.4	C
Diplomat Parkway	III	30	12.9	46.6	59.5	0.09	5.5	F
Golden Isles Drive	III	30	12.6	5.8	18.4	0.09	17.5	D
Layne Blvd	III	30	9.3	8.2	17.5	0.06	12.3	E
NE 14th Avenue	III	30	32.5	27.2	59.7	0.26	15.5	D
NE 10th Avenue	III	30	29.7	7.0	36.7	0.23	22.9	C
NE 8th Avenue	III	30	17.0	79.5	96.5	0.12	4.5	F
US1	III	30	17.3	855.1	872.4	0.12	0.5	F
Total	III		171.9	1038.0	1209.9	1.29	3.8	F

Queues

3: Hallandale Beach Blvd & NE 8th Avenue

1/29/2010

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↱	↰	↑↑↑↱		↰		↱		↱	
Volume (vph)	0	1657	6	23	1445	28	3	0	21	0	0	67
Satd. Flow (prot)	0	5085	1583	1770	5070	0	1770	0	1583	0	1611	0
Flt Permitted				0.089			0.444					
Satd. Flow (perm)	0	5085	1583	166	5070	0	827	0	1583	0	1611	0
Satd. Flow (RTOR)			2		2				23		627	
Lane Group Flow (vph)	0	1801	7	25	1604	0	3	0	23	0	73	0
Turn Type			Perm	Perm			custom		custom			
Protected Phases		6			5						8	
Permitted Phases			6	5	2		7		4			
Total Split (s)	0.0	59.0	59.0	51.0	51.0	0.0	15.0	0.0	40.0	0.0	25.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	6.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0	4.0
Act Effct Green (s)		53.0	53.0	45.0	45.0		9.0		34.0		19.0	
Actuated g/C Ratio		0.35	0.35	0.30	0.30		0.06		0.23		0.13	
v/c Ratio		1.00	0.01	0.50	1.05		0.06		0.06		0.10	
Control Delay		69.8	27.5	80.1	88.6		69.3		16.0		0.3	
Queue Delay		29.0	0.0	0.0	0.0		0.0		0.0		0.0	
Total Delay		98.8	27.5	80.1	88.6		69.3		16.0		0.3	
LOS		F	C	F	F		E		B		A	
Approach Delay		98.5			88.4						0.3	
Approach LOS		F			F						A	
Queue Length 50th (ft)		548	3	20	626		3		0		0	
Queue Length 95th (ft)		#765	15	#69	#724		14		26		0	
Internal Link Dist (ft)		568			558			891			955	
Turn Bay Length (ft)			125	120								
Base Capacity (vph)		1797	561	50	1522		50		377		752	
Starvation Cap Reductn		134	0	0	0		0		0		0	
Spillback Cap Reductn		10	0	0	0		0		0		0	
Storage Cap Reductn		0	0	0	0		0		0		0	
Reduced v/c Ratio		1.08	0.01	0.50	1.05		0.06		0.06		0.10	

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 0 (0%), Referenced to phase 6:EBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.05

Intersection Signal Delay: 91.3 Intersection LOS: F

Intersection Capacity Utilization 47.0% ICU Level of Service A

Analysis Period (min) 15

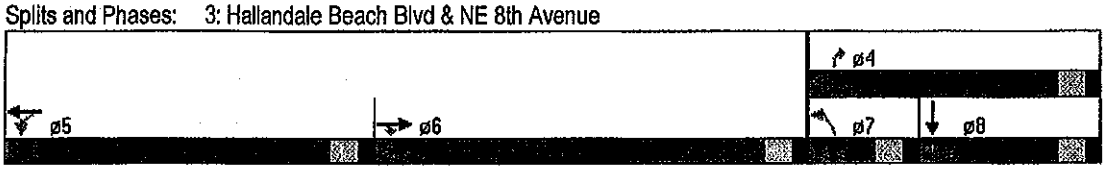
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Hallandale Beach Blvd & NE 8th Avenue



HCM Signalized Intersection Capacity Analysis
3: Hallandale Beach Blvd & NE 8th Avenue

1/29/2010

Movement												
Lane Configurations		↑↑↑	↱	↰	↑↑↑↳		↰		↱		↳	
Volume (vph)	0	1667	6	23	1148	28	3	0	21	0	0	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	6.0	6.0		6.0		6.0		6.0	
Lane Util. Factor		0.91	1.00	1.00	0.91		1.00		1.00		1.00	
Flt		1.00	0.85	1.00	1.00		1.00		0.85		0.86	
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00		1.00	
Satd. Flow (prot)		5085	1583	1770	5071		1770		1583		1611	
Flt Permitted		1.00	1.00	0.09	1.00		0.44		1.00		1.00	
Satd. Flow (perm)		5085	1583	166	5071		828		1583		1611	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1801	7	25	1674	30	3	0	23	0	0	73
RTOR Reduction (vph)	0	0	1	0	1	0	0	0	18	0	64	0
Lane Group Flow (vph)	0	1801	6	25	1703	0	3	0	5	0	9	0
Turn Type			Perm	Perm			custom		custom			
Protected Phases		6			5						8	
Permitted Phases			6	5			7		4			
Actuated Green, G (s)		53.0	53.0	45.0	45.0		9.0		34.0		19.0	
Effective Green, g (s)		53.0	53.0	45.0	45.0		9.0		34.0		19.0	
Actuated g/C Ratio		0.35	0.35	0.30	0.30		0.06		0.23		0.13	
Clearance Time (s)		6.0	6.0	6.0	6.0		6.0		6.0		6.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0		1.5		2.0		2.0	
Lane Grp Cap (vph)		1797	559	50	1521		50		359		204	
v/s Ratio Prot		c0.35		0.15	c0.32						c0.01	
v/s Ratio Perm			0.00				c0.00		0.00			
v/c Ratio		1.00	0.01	0.50	1.05		0.06		0.01		0.05	
Uniform Delay, d1		48.5	31.5	43.2	52.5		66.5		45.0		57.5	
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00		1.00	
Incremental Delay, d2		21.8	0.0	7.7	38.7		2.3		0.1		0.4	
Delay (s)		70.3	31.5	50.9	91.2		68.8		45.1		58.0	
Level of Service		E	C	D	F		E		D		E	
Approach Delay (s)		70.1			90.5			47.8			58.0	
Approach LOS		E			F			D			E	

Intersection Summary			
HCM Average Control Delay	79.1	HCM Level of Service	E
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		
c - Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	64	1687	15	66	1473	28	33	15	85	92	0	67
Satd. Flow (prot)	1770	5085	1583	3433	5070	0	1681	1736	1583	1770	0	1583
Flt Permitted	0.258			0.950			0.950	0.981		0.078		
Satd. Flow (perm)	481	5085	1583	3433	5070	0	1681	1736	1583	145	0	1583
Satd. Flow (RTOR)			4		4		7		90			73
Lane Group Flow (vph)	70	1834	16	72	1631	0	26	26	90	100	0	73
Turn Type	custom		Perm	Prot			Split		Perm	custom		custom
Protected Phases		6l		5	2l		4	4				
Permitted Phases			6						4	6l		6
Total Split (s)	23.0	38.0	38.0	20.0	35.0	0.0	22.0	22.0	22.0	38.0	0.0	38.0
Total Lost Time (s)	6.0	6.0	6.0	5.0	6.0	4.0	6.0	6.0	6.0	6.0	4.0	6.0
Act Effct Green (s)	16.8	55.1	55.1	5.8	44.5		6.7	6.7	6.7	55.1		55.1
Actuated g/C Ratio	0.21	0.69	0.69	0.07	0.56		0.08	0.08	0.08	0.69		0.69
v/c Ratio	0.69	0.52	0.01	0.29	0.58		0.18	0.18	0.42	1.00		0.07
Control Delay	60.1	19.1	5.9	32.5	36.6		35.6	36.4	14.4	119.8		2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	60.1	19.1	5.9	32.5	36.6		35.6	36.4	14.4	119.8		2.2
LOS	E	A	A	C	D		D	D	B	F		A
Approach Delay		19.9			36.4			22.8				
Approach LOS		B			D			C				
Queue Length 50th (ft)	32	174	2	17	512		13	13	0	~58		0
Queue Length 95th (ft)	#74	254	10	m28	656		36	36	41	#117		16
Internal Link Dist (ft)		558			628			840			928	
Turn Bay Length (ft)	150		25	400					475			250
Base Capacity (vph)	118	3501	1091	601	2824		336	347	389	100		1113
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0		0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0		0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0		0
Reduced v/c Ratio	0.59	0.52	0.01	0.12	0.58		0.08	0.07	0.23	1.00		0.07

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBSB, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 24.9 Intersection LOS: C
Intersection Capacity Utilization 61.0% ICU Level of Service B
Analysis Period (min) 15

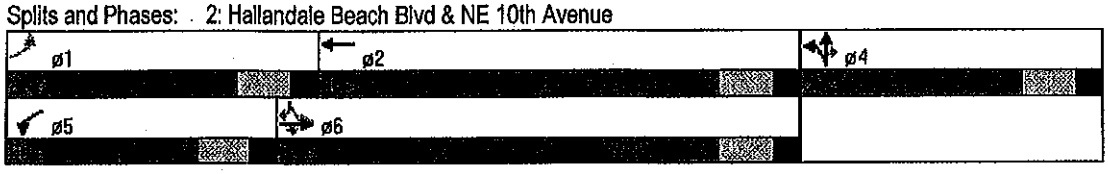
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

l Phase conflict between lane groups.

Splits and Phases: 2: Hallandale Beach Blvd & NE 10th Avenue



HCM Signalized Intersection Capacity Analysis
2: Hallandale Beach Blvd & NE 10th Avenue

10/25/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	64	1687	15	66	1473	28	33	0	83	92	0	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0		6.0	6.0		6.0
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91		0.97		1.00	1.00		1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00		0.85	1.00		0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95		1.00	0.95		1.00
Satd. Flow (prot)	1770	5085	1583	3433	5071		3433		1583	1770		1583
Flt Permitted	0.24	1.00	1.00	0.95	1.00		0.95		1.00	0.95		1.00
Satd. Flow (perm)	452	5085	1583	3433	5071		3433		1583	1770		1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	70	1834	16	72	1601	30	36	0	90	100	0	73
RTOR Reduction (vph)	0	0	1	0	2	0	0	0	84	0	0	26
Lane Group Flow (vph)	70	1834	15	72	1629	0	36	0	6	100	0	47
Turn Type	custom		Perm	Prot			Prot		custom	custom		custom
Protected Phases		6		5	2		4					
Permitted Phases	1		6						4	6		6
Actuated Green, G (s)	16.5	51.5	51.5	5.0	40.0		5.5		5.5	51.5		51.5
Effective Green, g (s)	16.5	51.5	51.5	5.0	40.0		5.5		5.5	51.5		51.5
Actuated g/C Ratio	0.21	0.64	0.64	0.06	0.50		0.07		0.07	0.64		0.64
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0		6.0	6.0		6.0
Vehicle Extension (s)	1.5	3.0	3.0	1.5	3.0		2.0		2.0	3.0		3.0
Lane Grp Cap (vph)	93	3273	1019	215	2536		236		109	1139		1019
v/s Ratio Prot		0.36		0.02	c0.32		c0.01					
v/s Ratio Perm	c0.16		0.01						0.00	0.06		0.03
v/c Ratio	0.76	0.56	0.01	0.33	0.64		0.15		0.06	0.09		0.05
Uniform Delay, d1	29.8	7.9	5.1	35.9	14.7		35.1		34.8	5.4		5.2
Progression Factor	1.00	1.00	1.00	0.88	2.26		1.00		1.00	1.00		1.00
Incremental Delay, d2	25.8	0.7	0.0	0.2	0.9		0.1		0.1	0.2		0.1
Delay (s)	55.7	8.6	5.1	31.8	34.2		35.2		34.9	5.5		5.3
Level of Service	E	A	A	C	C		D		C	A		A
Approach Delay (s)		10.3			34.1			35.0			5.4	
Approach LOS		B			C			C			A	

Intersection Summary			
HCM Average Control Delay	21.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

Arterial Level of Service: EB Hallandale Beach Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Total Time	D/C	Arterial Speed	Arterial LOS
US1	III	30	27.3	61.2	88.5	0.22	8.8	F
NE 8th Avenue	III	30	17.3	69.8	87.1	0.12	5.1	F
NE 10th Avenue	III	30	17.0	9.1	26.1	0.12	16.7	D
NE 14th Avenue	III	30	33.0	17.4	50.4	0.26	18.6	C
Layne Blvd	III	30	32.6	49.9	82.5	0.26	11.2	E
Golden Isles Drive	III	30	9.3	25.5	34.8	0.06	6.2	F
Diplomat Parkway	III	30	12.6	46.4	59.0	0.09	5.4	F
Three Islands Drive	III	30	12.9	6.1	19.0	0.09	17.3	D
Total	III		162.0	285.4	447.4	1.22	9.8	F

Arterial Level of Service: WB Hallandale Beach Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Total Time	D/C	Arterial Speed	Arterial LOS
Three Islands Drive	III	30	40.6	11.0	51.6	0.32	22.3	C
Diplomat Parkway	III	30	12.9	41.4	54.3	0.09	6.1	F
Golden Isles Drive	III	30	12.6	7.6	20.2	0.09	16.0	D
Layne Blvd	III	30	9.3	13.7	23.0	0.06	9.4	F
NE 14th Avenue	III	30	32.5	42.8	75.3	0.26	12.3	E
NE 10th Avenue	III	30	29.7	36.6	66.3	0.23	12.7	E
NE 8th Avenue	III	30	17.0	88.6	105.6	0.12	4.1	F
US1	III	30	17.3	303.6	320.9	0.12	1.4	F
Total	III		171.9	545.3	717.2	1.29	6.5	F