

**TRAFFIC IMPACT STUDY
FOR
355 S. GULFVIEW HOTEL
CLEARWATER, FLORIDA**

PREPARED FOR:
GULFVIEW LODGING, LLC

PREPARED BY:
GULF COAST CONSULTING, INC.
APRIL 2017
PROJECT # 17-004



Robert Pergolizzi, AICP / PTP
AICP #9023 / PTP #133

I. INTRODUCTION

The applicant is proposing to redevelop their property on Clearwater Beach into an 88 room hotel. This new hotel will replace an existing smaller hotel at #355 S. Gulfview Boulevard and a small office building that currently exist at #348 Coronado Drive. This analysis is for the new hotel which will be located between S. Gulfview Boulevard and Coronado Drive along the north side of 5th Street. (See Figure 1) The redevelopment of the property is the subject of a Comprehensive Infill Redevelopment in the Tourist "T" zoning district. This application requires an assessment of the traffic impacts of development. This analysis was completed in accordance with a methodology established with Clearwater Traffic Engineering staff in January 2017.

II. EXISTING / BACKGROUND TRAFFIC CONDITIONS

The site has frontage on S. Gulfview Boulevard, Coronado Drive and 5th Street and vehicular access will be taken from 5th Street only. South Gulfview Boulevard is a two-lane collector roadway with on-street parking running along Clearwater Beach. Coronado Drive is a three-lane collector roadway with on-street parking except for a short segment between Devon Drive and S. Gulfview Boulevard which is 4-lanes undivided. Hamden Drive intersects with S. Gulfview Boulevard at a signalized intersection. The segment of S. Gulfview Boulevard between Hamden Drive and the Clearwater Pass bridge is three lanes with a small portion being 4-lanes between Hamden Drive and Bayway Boulevard. Per the approved methodology, traffic counts that were conducted on June 21, 2012 at the following intersections during the weekday PM peak period of 4-6 PM were used as a basis for this study.

S. Gulfview Blvd. / Hamden Drive (signal)
S. Gulfview Blvd. / Coronado Drive (signal)
Coronado Drive / Hamden Drive
Coronado Drive / 5th Street

All traffic counts were converted to annual average equivalents using FDOT seasonal adjustment factors. Existing traffic was adjusted by a 2% annual growth rate to the expected build-out year of 2017 to account for background traffic from other nearby redevelopment projects. In addition, traffic from several approved developments was added as background traffic; these include the proposed Hampton Inn #655 S. Gulfview, the proposed Clearwater Beach Resort at the corner of S. Gulfview and Coronado, the Sea Captain redevelopment at #40 Devon Drive, the Gulfview Hotel at #625 S. Gulfview, the Entrada Hotel at #521 S. Gulfview, Marquesas at #715 S. Gulfview, Mainsteam Hotel "A", Hotel "B", and Hotel "C", Bayway Hotel, the #630 S. Gulfview hotel, the #300 Hamden Springhill Suites/Residence Inn, and Alanik Hotel at 401-421 S. Gulfview Boulevard. Background traffic volumes are shown in Figure 2.



PROJECT LOCATION - #355 S GULFVIEW BLVD

PROJECT NO:
17-004



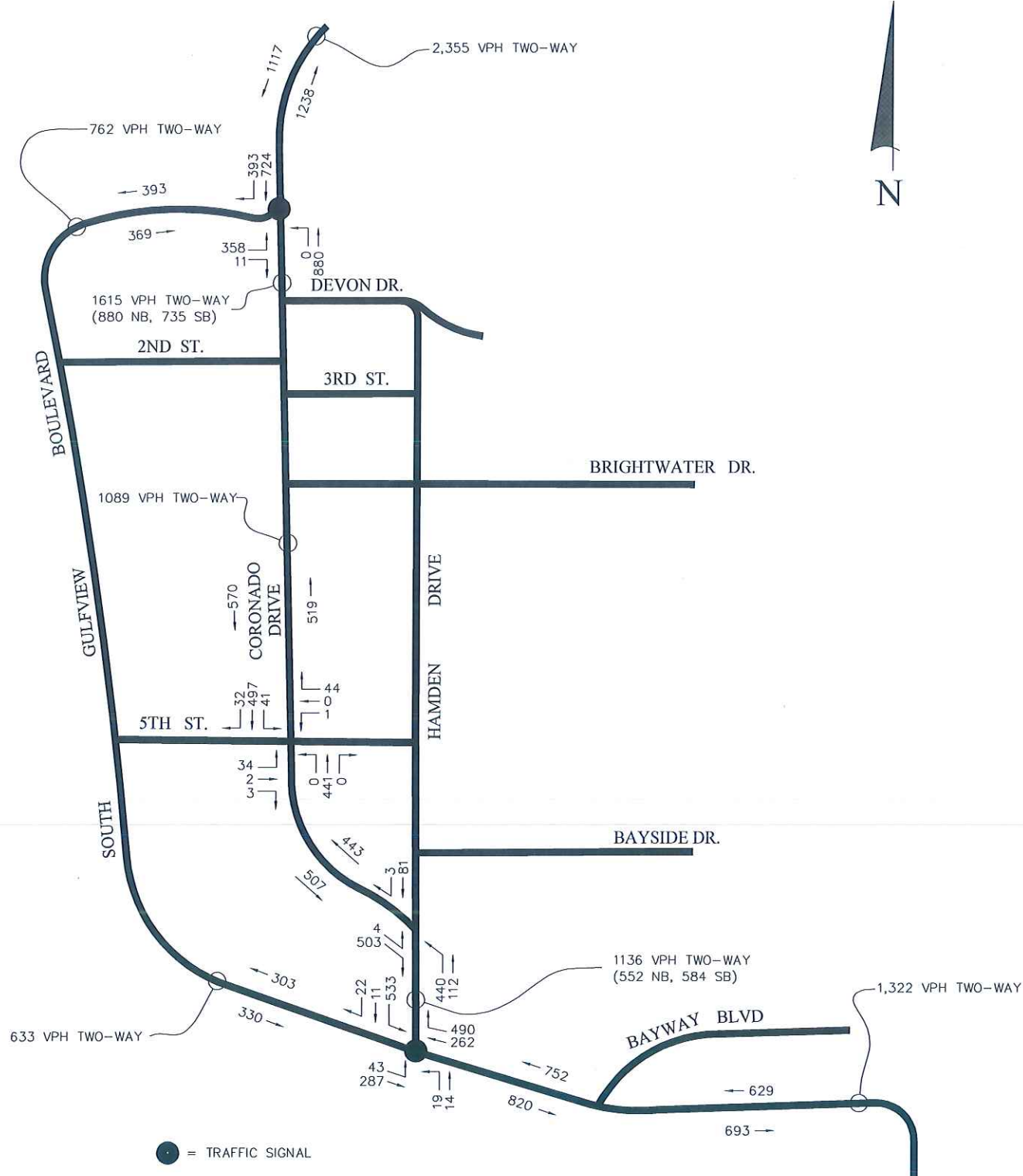
Gulf Coast Consulting, Inc.
Land Development Consulting

DATE:
1/2017

DRAWN BY:
MKC

FIGURE:

1



EXISTING/BACKGROUND PM PEAK HOUR TRAFFIC #355 S. GULFVIEW

PROJECT NO:
17-004



Gulf Coast Consulting, Inc.
Land Development Consulting
ENGINEERING TRANSPORTATION PLANNING PERMITTING
13825 ICOT BLVD, SUITE 605
Clearwater, Florida 33760
Phone: (727) 524-1818 Fax: (727) 524-6090
www.gulfcoastconsultinginc.com

DATE:

1/2017

DRAWN BY:

MKC

FIGURE:

2

The intersections were analyzed using the HCS2010 and SYNCHRO software. The HCS2010 and SYNCHRO printouts are included in Appendix A.

The signalized intersection at S. Gulfview Boulevard / Coronado Drive operates at LOS A with average delay being 7.4 seconds per vehicle and an intersection capacity utilization (ICU) of 57.0%.

Presently the signalized intersection at S. Gulfview Boulevard / Hamden Drive operates at LOS B with average delay being 12.4 seconds per vehicle with ICU of 58.3%.

At the intersection of Hamden Drive / Coronado Drive the primary movements are eastbound-to-southbound and northbound-to-westbound, whereas the southbound approach (Hamden Drive) is stop controlled. The HCS2010 analysis shows the primary movements operate at LOS A with delay of 8.8 seconds per vehicle and the southbound stop-controlled movements operate at LOS E with delay of 36.1 seconds per vehicle.

At the Coronado Drive / 5th Street intersection, 5th Street is the stop-controlled minor street. Northbound/southbound left turns operate at LOS A with average delay of 8.6 seconds, the eastbound approach operates at LOS E with average delay of 35.4 seconds and the westbound approach operates at LOS B with average delay of 12.5 seconds.

South Gulfview Boulevard functions as collector roadway and according to FDOT 2009 QLOS Handbook capacity tables has a LOS D capacity of 1,440 vehicles per hour on the undivided segment. The segment of Gulfview Boulevard east of Hamden Drive and Coronado Drive are both three-lane collector roads with a LOS D capacity of 1,520 vehicles per hour and 2,175 vehicles per hour on the 4-lane portions. The existing PM peak hour LOS for areas roadway segments is shown below:

BACKGROUND ROADWAY CONDITIONS 2017

Roadway Segment	Lanes	PM Peak Volume	LOS D Capacity	LOS
S. Gulfview (E of Bayway)	3-lanes	1322	1520	C
S. Gulfview (Bywy-Hmdn)	4-lanes	1572	2175	C
S. Gulfview (Hamden -5 th)	2LU	633	1440	B
S. Gulfview (5 th – Coronado)	2LU	762	1440	B
Coronado (Hamden – 5 th)	2LD	950	1520	C
Coronado (5 th – Brightwater)	2LD	1089	1520	C
Coronado (Devon. - Gulfview)	4LU	1615	2175	C
Coronado (Gulfview to Roundabout)	4LD	2355	2900	D
Hamden (S. Gulfview-Coronado)	2LD	1136	1520	C

With background traffic added all roadway segments operate at LOS D or better which indicates acceptable levels of service and traffic operations.

III. FUTURE TRAFFIC CONDITIONS

The site will be developed as an 88 room hotel. Using Institute of Transportation Engineers (ITE) Trip Generation, 9th Edition rates, the amount of gross new trips was calculated and estimates are shown below:

TRIP GENERATION ESTIMATES

Land Use	Amount	Daily Trips	PM Peak Trip
Hotel	88 Rooms	719	53 (27/26)

The hotel will have 53 PM peak hour trips at the driveway to 5th Street, although the net traffic increase from the property may be less due to demolition. The expected distribution is shown in Figure 3 and is as follows:

60% to / from the north (32 PM peak hour trips)
40% to / from the south (21 PM peak hour trips)

The projects impacts to the surrounding roadway system is shown below:

PROJECT IMPACT CALCULATIONS

Road Segment	Lanes	Project Trips	Capacity	Project Percent
S. Gulfview (E. of Bayway)	3-lanes	21	1520	1.38%
S. Gulfview (Bywy-Hmdn)	4-lanes	21	2175	0.97%
S. Gulfview (Hamden-5 th)	2LU	10	1440	0.69%
S. Gulfview (5 th -Coronado)	2LU	22	1440	1.53%
Coronado (5 th – Devon)	2LD	10	1520	0.66%
Coronado (Devon - S. Gulfview)	4LU	10	2175	0.46%
Coronado (Gulfview – Roundabout)	4LD	32	2900	1.10%
Hamden (Gulfview – Coronado)	2LD	11	1520	0.72%

Project traffic impacts will be primarily to S. Gulfview Boulevard and Coronado Drive. Project traffic was added to accumulated background traffic for a build-out of 2017. All intersections, roadway segments and project driveways were analyzed for future conditions. Future traffic volumes are shown in Figure 4, and the SYNCHRO and HCS2010 printouts are included in Appendix B.

The signalized intersection at S. Gulfview Boulevard / Coronado Drive would continue to operate at LOS A with average delay of 7.5 seconds per vehicle and an intersection capacity utilization (ICU) of 57.9%.

The signalized intersection at S. Gulfview Boulevard / Hamden Drive would operate at LOS B with average delay being 12.5 seconds per vehicle with ICU of

58.7%. Traffic from the Entrada Hotel at #521 S. Gulfview requires split-phase operation of this traffic signal.

At the intersection of Hamden Drive / Coronado Drive, the HCS2010 analysis shows the primary movements operate at LOS A with delay of 8.8 seconds per vehicle and the southbound stop-controlled movements operate at LOS E with delay of 36.9 seconds per vehicle.

At the Coronado Drive / 5th Street intersection, northbound and southbound left turns would operate at LOS A, the eastbound approach would operate at LOS E with average delay of 35.8 seconds and the westbound approach would operate at LOS B with average delay of 12.5 seconds.

At the 5th Street/Drive A intersection the eastbound left turns would operate at LOS A with 7.4 seconds delay, and the southbound exiting movements would operate at LOS A with 8.9 seconds delay from a shared lane.

Expected roadway conditions with the project in impacts are shown below:

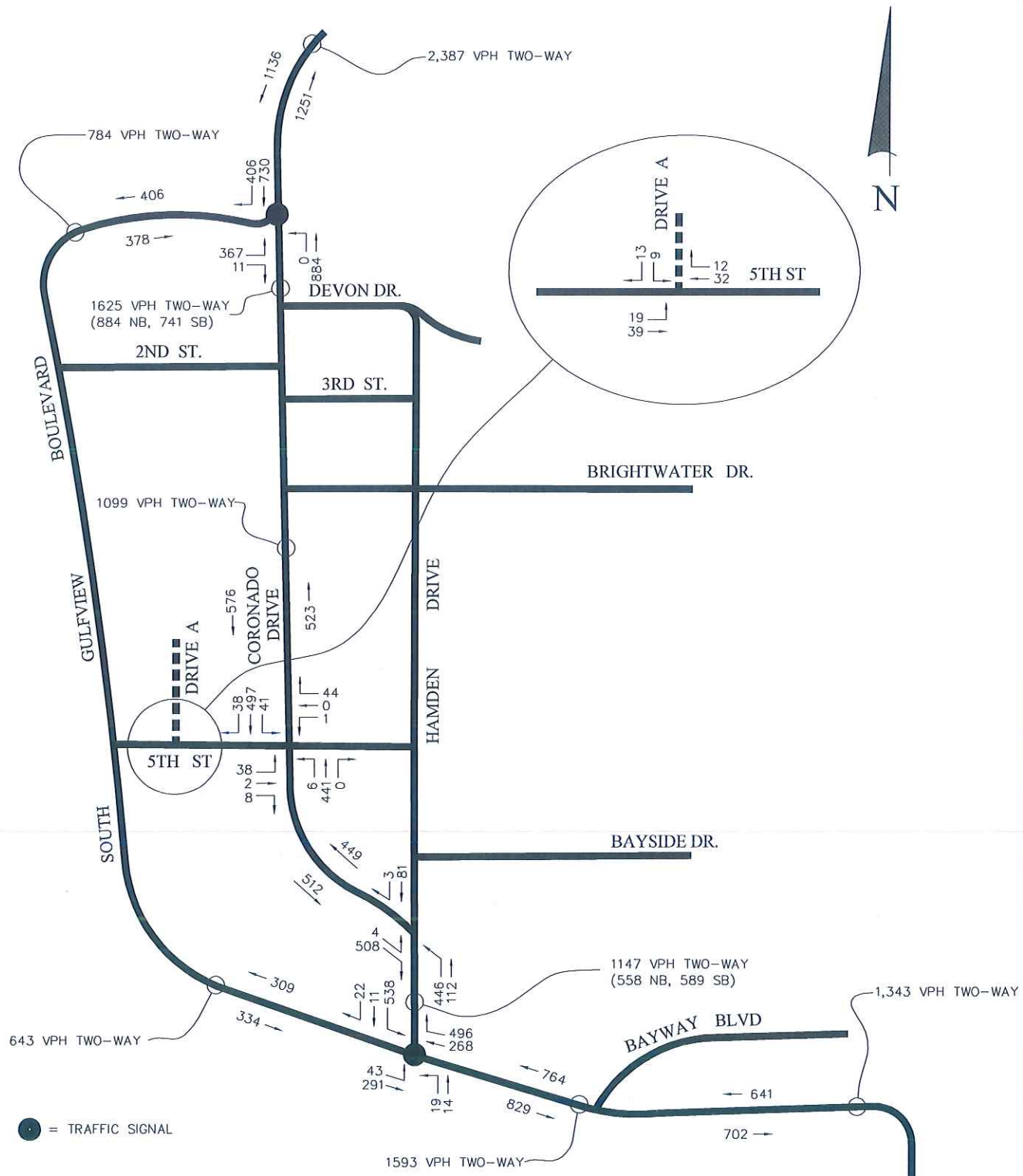
FUTURE ROADWAY CONDITIONS WITH PROJECT

Roadway Segment	Lanes	PM Peak Volume	LOS D Capacity	LOS
S. Gulfview (E of Bayway)	3-lanes	1343	1520	C
S. Gulfview (Bywy-Hmdn)	4-lanes	1593	2175	C
S. Gulfview (Hamden -5 th)	2LU	643	1440	B
S. Gulfview (5 th – Coronado)	2LU	784	1440	B
Coronado (Hamden – 5 th)	2LD	961	1520	C
Coronado (5 th – Brightwater)	2LD	1099	1520	C
Coronado (Devon. - Gulfview)	4LU	1625	2175	C
Coronado (Gulfview to Roundabout)	4LD	2387	2900	D
Hamden (S. Gulfview-Coronado)	2LD	1147	1520	C

All roadway segments would continue to operate at LOS D or better.

IV. CONCLUSION

This analysis was conducted in accordance with a methodology established with City of Clearwater staff. The proposed hotel would generate 719 daily trips of which 53 would occur during the PM peak hour. This analysis demonstrates traffic operations at nearby intersections and on adjacent roadways would continue at acceptable levels of service with or without the project impacts



FUTURE PM PEAK HOUR TRAFFIC #355 S GULFVIEW

PROJECT NO:
17-004



Gulf Coast Consulting, Inc.
Land Development Consulting
ENGINEERING TRANSPORTATION PLANNING PERMITTING
13825 ICOT BLVD., SUITE 605
Clearwater, Florida 33760
Phone: (727) 524-1818 Fax: (727) 524-6090
www.gulfcoastconsultinginc.com

DATE:

4/2017

DRAWN BY:

MKC

FIGURE:

4

APPENDIX A

Robert Pergolizzi

From: Robert Pergolizzi
Sent: Wednesday, January 04, 2017 1:48 PM
To: 'Himanshu.Patni@MyClearwater.com'
Cc: Bennett Elbo (bennett.elbo@myclearwater.com); joeburdette@outlook.com
Subject: 355 S Gulfview Hotel Traffic Study

Himanshu – Thanks for taking my call. As we discussed I will be doing a traffic study for a redevelopment of an existing 34 room hotel and 3,800 SF office to become a new hotel of up to 81 rooms. The hotel will have access to 5th Street between Coronado and S. Gulfview.

As a basis for the existing and background traffic I will utilize the “total traffic” from my 2014 study of 401-421 S. Gulfview which includes many of the proposed hotels in the area. This will be “background traffic” for a 2018 build-out. I will add traffic of the proposed 81 room hotel to the background traffic and analyze the intersections at:

S Gulfview / MHamden (signal)
S Gulfview / Coronado (signal)
Coronado / Hamden
Coronado / 5th Street
5th Street / Project Driveway

A written report will be provided and will be submitted with the application package. Expect February 1st submittal.

I am sorry to hear you are leaving Clearwater for Washington, DC. Good luck, it has always been a pleasure working with you.

Robert Pergolizzi, AICP PTP
Gulf Coast Consulting, Inc.
13825 ICOT Boulevard, Suite 605
Clearwater, FL 33760
Phone: 727-524-1818
Fax: 727-524-6090
Cell: 727-644-2695
Email: pergo@gulfcoastconsultinginc.com

Lanes, Volumes, Timings

3:

1/16/2017

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	358	11	0	880	724	393
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	500	500	500			0
Storage Lanes	1	0	0			1
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	0.95	0.95	0.95	0.95	1.00
Ped Bike Factor	0.97					0.95
Frt	0.996					0.850
Flt Protected	0.954					
Satd. Flow (prot)	3434	0	0	3539	3539	1583
Flt Permitted	0.954					
Satd. Flow (perm)	3327	0	0	3539	3539	1502
Right Turn on Red		No				Yes
Satd. Flow (RTOR)						432
Link Speed (mph)	20			25	25	
Link Distance (ft)	331			260	350	
Travel Time (s)	11.3			7.1	9.5	
Confl. Peds. (#/hr)	17		33			17
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	393	12	0	967	796	432
Shared Lane Traffic (%)						
Lane Group Flow (vph)	405	0	0	967	796	432
Turn Type	Prot			NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases			2			6
Detector Phase	4		2	2	6	6
Switch Phase						
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	20.0		20.0	20.0	20.0	20.0
Total Split (s)	25.0		35.0	35.0	35.0	35.0
Total Split (%)	41.7%		58.3%	58.3%	58.3%	58.3%
Maximum Green (s)	21.0		31.0	31.0	31.0	31.0
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	4.0			4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		Max	Max	Max	Max
Walk Time (s)	5.0		5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0		0	0	0	0
Act Effct Green (s)	11.1			31.5	31.5	31.5
Actuated g/C Ratio	0.22			0.62	0.62	0.62
v/c Ratio	0.54			0.44	0.36	0.39
Control Delay	20.1			6.1	5.6	1.8
Queue Delay	0.0			0.0	0.0	0.0

Lanes, Volumes, Timings

3:

1/16/2017



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Delay	20.1			6.1	5.6	1.8
LOS	C			A	A	A
Approach Delay	20.1			6.1	4.3	
Approach LOS	C			A	A	

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 50.6

Natural Cycle: 40

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.54

Intersection Signal Delay: 7.4

Intersection LOS: A

Intersection Capacity Utilization 57.0%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3:

 Ø2	 Ø4
35 s	25 s
 Ø6	
35 s	

Lanes, Volumes, Timings

3:

1/16/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	43	287	0	0	262	490	19	14	0	533	11	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor		0.99				0.80					1.00	
Frt						0.850					0.989	
Flt Protected		0.993						0.972		0.950	0.958	
Satd. Flow (prot)	0	3514	0	0	1863	1583	0	1811	0	1681	1671	0
Flt Permitted		0.889						0.972		0.950	0.958	
Satd. Flow (perm)	0	3112	0	0	1863	1273	0	1811	0	1681	1671	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						521					6	
Link Speed (mph)		25			25			30			25	
Link Distance (ft)		300			500			415			300	
Travel Time (s)		8.2			13.6			9.4			8.2	
Confl. Peds. (#/hr)	82					82						11
Peak Hour Factor	0.94	0.94	0.92	0.92	0.94	0.94	0.94	0.94	0.94	0.94	0.92	0.94
Adj. Flow (vph)	46	305	0	0	279	521	20	15	0	567	12	23
Shared Lane Traffic (%)										47%		
Lane Group Flow (vph)	0	351	0	0	279	521	0	35	0	301	301	0
Turn Type	pm+pt	NA			NA	Perm	Split	NA		Split	NA	
Protected Phases	7	4			8		2	2		6	6	
Permitted Phases	4			8		8						
Detector Phase	7	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	8.5	20.0		20.0	20.0	20.0	10.0	10.0		20.0	20.0	
Total Split (s)	15.0	35.0		20.0	20.0	20.0	15.0	15.0		20.0	20.0	
Total Split (%)	21.4%	50.0%		28.6%	28.6%	28.6%	21.4%	21.4%		28.6%	28.6%	
Maximum Green (s)	10.5	31.0		16.0	16.0	16.0	11.0	11.0		16.0	16.0	
Yellow Time (s)	3.5	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	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	0.0	
Total Lost Time (s)		4.0			4.0	4.0		4.0		4.0	4.0	
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	Min		Min	Min	Min	None	None		None	None	
Walk Time (s)		5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)		11.0		11.0	11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0		0	0	0	0	0		0	0	
Act Effct Green (s)		13.1			13.1	13.1		6.8		13.5	13.5	
Actuated g/C Ratio		0.34			0.34	0.34		0.18		0.35	0.35	
v/c Ratio		0.33			0.44	0.67		0.11		0.51	0.51	
Control Delay		12.3			14.6	7.1		18.8		15.9	15.6	
Queue Delay		0.0			0.0	0.0		0.0		0.0	0.0	
Total Delay		12.3			14.6	7.1		18.8		15.9	15.6	
LOS		B			B	A		B		B	B	
Approach Delay		12.3			9.7			18.8			15.7	

Lanes, Volumes, Timings

3:

1/16/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			A			B			B	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 38.7

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 12.4

Intersection Capacity Utilization 58.3%

Analysis Period (min) 15

Intersection LOS: B

ICU Level of Service B

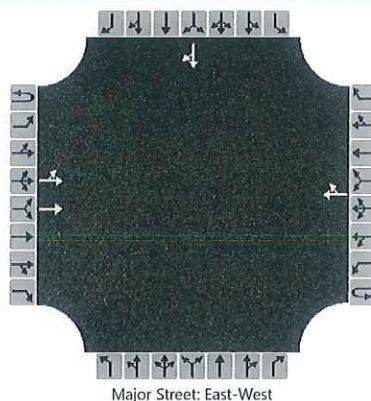
Splits and Phases: 3:

		
ø2	ø6	ø4
15 s	20 s	35 s
		
	ø7	ø8
	15 s	20 s

HCS 2010 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	RP	Intersection	CORONADO DR / HAMDEN DR
Agency/Co.	GCC	Jurisdiction	CLEARWATER
Date Performed	1/16/17	East/West Street	CORONADO DR
Analysis Year	2017	North/South Street	HAMDEN DRIVE
Time Analyzed	PM Peak	Peak Hour Factor	0.91
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	BACKGROUND TRAFFIC		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	2	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT	T					TR								TR
Volume, V (veh/h)		4	503				440	112							81	3
Percent Heavy Vehicles (%)		1													1	1
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage					Left Only				1							

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1													6.5	6.2
Critical Headway (sec)		4.10													6.52	6.20
Base Follow-Up Headway (sec)		2.2													4.0	3.3
Follow-Up Headway (sec)		2.20													4.01	3.30

Delay, Queue Length, and Level of Service

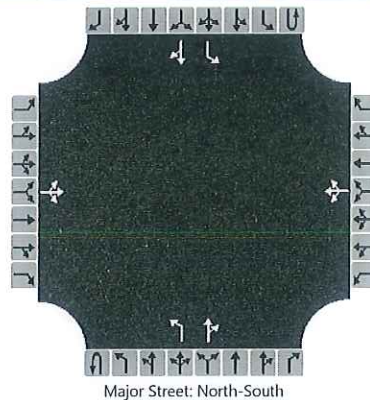
Flow Rate, v (veh/h)		4														92	
Capacity, c (veh/h)		952														205	
v/c Ratio		0.00														0.45	
95% Queue Length, Q ₉₅ (veh)		0.0														2.1	
Control Delay (s/veh)		8.8														36.1	
Level of Service, LOS		A														E	
Approach Delay (s/veh)		0.1												36.1			
Approach LOS														E			

HCS 2010 Two-Way Stop-Control Report

General Information

Analyst	RP	Intersection	CORONADO DR / 5TH ST
Agency/Co.	GCC	Jurisdiction	CLEARWATER
Date Performed	1/16/17	East/West Street	5TH STREET
Analysis Year	2017	North/South Street	CORONADO DRIVE
Time Analyzed	PM PEAK	Peak Hour Factor	0.93
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	BACKGROUND TRAFFIC		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	1	1	0	0	1	1	0
Configuration			LTR				LTR			L		TR		L		TR
Volume, V (veh/h)		34	2	3		1	0	44		0	441	0		41	497	32
Percent Heavy Vehicles (%)		1	0	0		1	0	0		1				1		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.10	6.50	6.20		7.10	6.50	6.20		4.11				4.11		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50	4.00	3.30		3.50	4.00	3.30		2.21				2.21		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			42				48				0				44	
Capacity, c (veh/h)			160				528				977				1048	
v/c Ratio			0.26				0.09				0.00				0.04	
95% Queue Length, Q ₉₅ (veh)			1.0				0.3				0.0				0.1	
Control Delay (s/veh)			35.4				12.5				8.7				8.6	
Level of Service, LOS			E				B				A				A	
Approach Delay (s/veh)	35.4				12.5				0.0				0.6			
Approach LOS	E				B											

TABLE 4

Generalized Peak Hour Two-Way Volumes for Florida's
Urbanized Areas¹

10/4/10

STATE SIGNALIZED ARTERIALS					
Class I (>0.00 to 1.99 signalized intersections per mile)					
Lanes	Median	B	C	D	E
2	Undivided	930	1,500	1,600	***
4	Divided	2,840	3,440	3,560	***
6	Divided	4,370	5,200	5,360	***
8	Divided	5,900	6,970	7,160	***
2LD GULFW HW 837 1350 1440 2LD Class II (2.00 to 4.50 signalized intersections per mile) 885 1425 1528					
Lanes	Median	B	C	D	E
2	Undivided	**	1,020	1,480	1,570
4	Divided	**	2,420	3,220	3,400
6	Divided	**	3,790	4,880	5,150
8	Divided	**	5,150	6,530	6,880
4LD Coronado (0.90) 2178 2900 4LD Class III/IV (more than 4.50 signalized intersections per mile) 1682 2175					
Lanes	Median	B	C	D	E
2	Undivided	**	500	1,150	1,440
4	Divided	**	1,220	2,730	3,100
6	Divided	**	1,910	4,240	4,680
8	Divided	**	2,620	5,770	6,280
Coronado/Hamden 2LD/TWLT					

FREEWAYS					
Lanes	B	C	D	E	
4	4,000	5,500	6,770	7,300	
6	6,000	8,320	10,150	11,290	
8	8,000	11,050	13,480	15,270	
10	10,000	13,960	16,930	19,250	
12	13,730	18,600	21,950	23,230	
Freeway Adjustments					
Auxiliary Lanes		Ramp Metering			
+ 1,800		+ 5%			

UNINTERRUPTED FLOW HIGHWAYS					
Lanes	Median	B	C	D	E
2	Undivided	730	1,460	2,080	2,620
4	Divided	3,220	4,660	6,040	6,840
6	Divided	4,840	6,990	9,060	10,280
Uninterrupted Flow Highway Adjustments					
Lanes	Median	Exclusive left lanes	Adjustment factors		
2	Divided	Yes	+5%		
Multi	Undivided	Yes	-5%		
Multi	Undivided	No	-25%		

Non-State Signalized Roadway Adjustments					
(Alter corresponding state volumes by the indicated percent.)					
Major City/County Roadways -10% GULFW HW					
Other Signalized Roadways -35% Coronado Hamden					
165 Hamden 600 715 1040					
State & Non-State Signalized Roadway Adjustments					
(Alter corresponding state volumes by the indicated percent.)					
Divided/Undivided & Turn Lane Adjustments					
Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors	
2	Divided	Yes	No	+5%	
2	Undivided	No	No	-20%	
Multi	Undivided	Yes	No	-5%	
Multi	Undivided	No	No	-25%	
-	-	-	Yes	+ 5%	

BICYCLE MODE ²					
(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)					
Paved Shoulder/Bicycle Lane					
Coverage	B	C	D	E	
0-49%	**	310	1,180	>1,180	
50-84%	240	360	>360	***	
85-100%	620	>620	***	***	
PEDESTRIAN MODE ²					
(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)					
Sidewalk Coverage	B	C	D	E	
0-49%	**	**	480	1,390	
50-84%	**	**	1,100	1,820	
85-100%	**	1,100	1,820	>1,820	
BUS MODE (Scheduled Fixed Route) ³					
(Buses in peak hour in peak direction)					
Sidewalk Coverage	B	C	D	E	
0-84%	>5	≥4	≥3	≥2	
85-100%	>4	≥3	≥2	≥1	

¹ Values shown are presented as hourly two-way volumes for levels of service and are for the automobile/truck modes unless specifically stated. Although presented as peak hour two-way volumes, they actually represent peak hour peak direction conditions with an applicable D factor applied. This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The table and deriving computer models should not be used for corridor or intersection design, where more refined techniques exist. Calculations are based on planning applications of the Highway Capacity Manual, Bicycle, LOS Model, Pedestrian LOS Model and Transit Capacity and Quality of Service Manual, respectively for the automobile/truck, bicycle, pedestrian and bus modes.

² Level of service for the bicycle and pedestrian modes in this table is based on number of motorized vehicles, not number of bicyclists or pedestrians using the facility.

³ Buses per hour shown are only for the peak hour in the single direction of the higher traffic flow.

** Cannot be achieved using table input value defaults.

*** Not applicable for that level of service letter grade. For the automobile mode, volumes greater than level of service D become F because intersection capacities have been reached. For the bicycle mode, the level of service letter grade (including F) is not achievable because there is no maximum vehicle volume threshold using table input value defaults.

Source:

Florida Department of Transportation
Systems Planning Office
605 Suwannee Street, MS 19
Tallahassee, FL 32399-0450

APPENDIX B

Hotel (310)

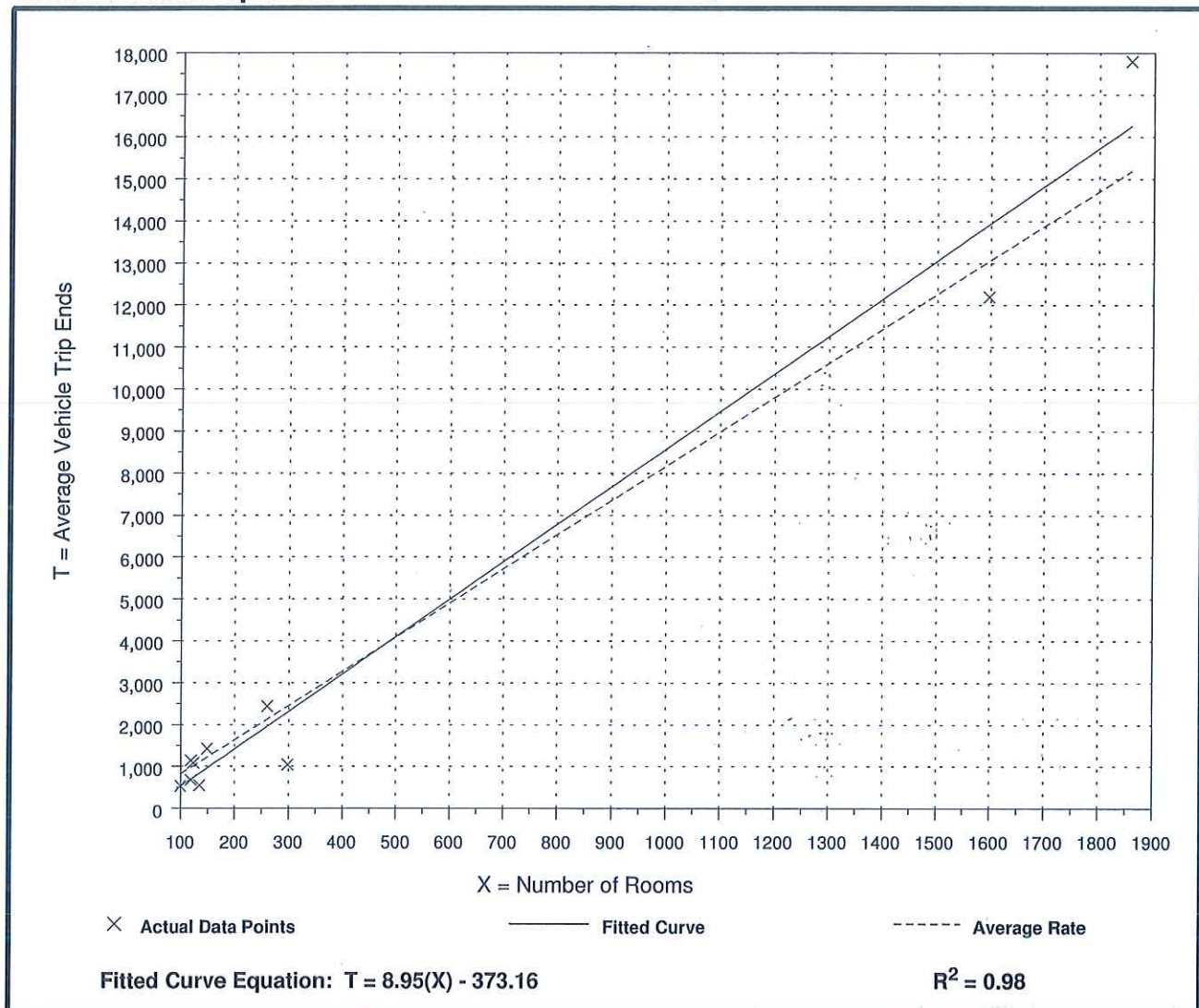
Average Vehicle Trip Ends vs: Rooms On a: Weekday

Number of Studies: 10
Average Number of Rooms: 476
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
8.17	3.47 - 9.58	3.38

Data Plot and Equation



Hotel (310)

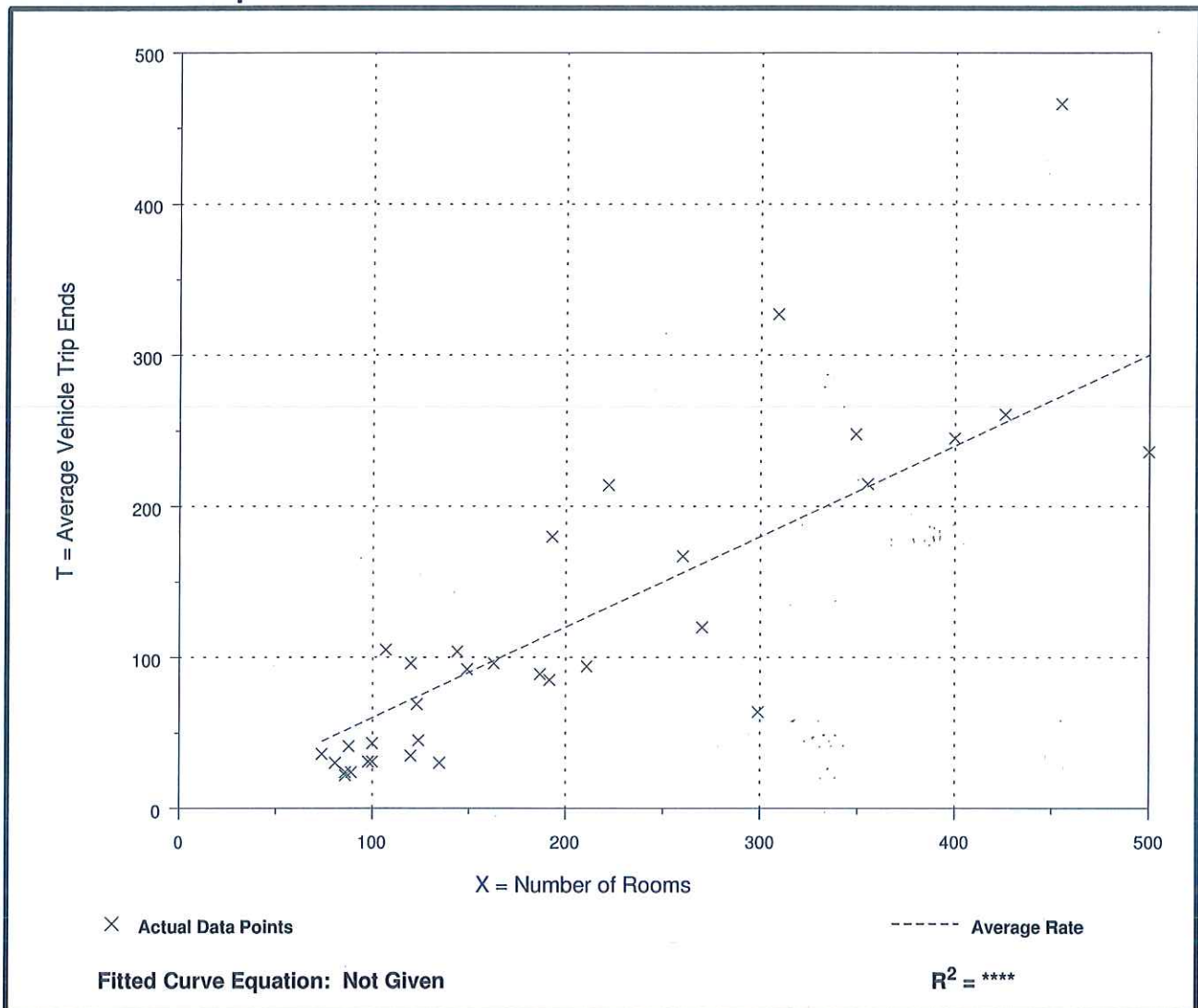
Average Vehicle Trip Ends vs: Rooms
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Number of Studies: 33
 Average Number of Rooms: 200
 Directional Distribution: 51% entering, 49% exiting

Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
0.60	0.21 - 1.06	0.81

Data Plot and Equation



Lanes, Volumes, Timings

3:

4/27/2017

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	367	11	0	884	730	406
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	500	500	500			0
Storage Lanes	1	0	0			1
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	0.95	0.95	0.95	0.95	1.00
Ped Bike Factor	0.97					0.95
Frt	0.996					0.850
Flt Protected	0.954					
Satd. Flow (prot)	3434	0	0	3539	3539	1583
Flt Permitted	0.954					
Satd. Flow (perm)	3327	0	0	3539	3539	1502
Right Turn on Red		No				Yes
Satd. Flow (RTOR)						446
Link Speed (mph)	20			25	25	
Link Distance (ft)	331			260	350	
Travel Time (s)	11.3			7.1	9.5	
Confl. Peds. (#/hr)	17		33			17
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	403	12	0	971	802	446
Shared Lane Traffic (%)						
Lane Group Flow (vph)	415	0	0	971	802	446
Turn Type	Prot			NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases			2			6
Detector Phase	4		2	2	6	6
Switch Phase						
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	20.0		20.0	20.0	20.0	20.0
Total Split (s)	25.0		35.0	35.0	35.0	35.0
Total Split (%)	41.7%		58.3%	58.3%	58.3%	58.3%
Maximum Green (s)	21.0		31.0	31.0	31.0	31.0
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	4.0			4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		Max	Max	Max	Max
Walk Time (s)	5.0		5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0		0	0	0	0
Act Effct Green (s)	11.2			31.4	31.4	31.4
Actuated g/C Ratio	0.22			0.62	0.62	0.62
v/c Ratio	0.55			0.44	0.37	0.41
Control Delay	20.2			6.2	5.7	1.9
Queue Delay	0.0			0.0	0.0	0.0

Lanes, Volumes, Timings

3:

4/27/2017



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Delay	20.2			6.2	5.7	1.9
LOS	C			A	A	A
Approach Delay	20.2			6.2	4.3	
Approach LOS	C			A	A	

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 50.7

Natural Cycle: 40

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 7.5

Intersection LOS: A

Intersection Capacity Utilization: 57.9%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3:

 ø2	 ø4
35 s	25 s
 ø6	
35 s	

Lanes, Volumes, Timings

3:

4/27/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	43	291	0	0	268	496	19	14	0	538	11	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor		0.99				0.80					1.00	
Frft						0.850					0.989	
Flt Protected		0.994						0.972		0.950	0.958	
Satd. Flow (prot)	0	3518	0	0	1863	1583	0	1811	0	1681	1671	0
Flt Permitted		0.889						0.972		0.950	0.958	
Satd. Flow (perm)	0	3114	0	0	1863	1273	0	1811	0	1681	1671	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						528					5	
Link Speed (mph)		25			25			30			25	
Link Distance (ft)		300			500			415			300	
Travel Time (s)		8.2			13.6			9.4			8.2	
Confl. Peds. (#/hr)	82					82						11
Peak Hour Factor	0.94	0.94	0.92	0.92	0.94	0.94	0.94	0.94	0.94	0.94	0.92	0.94
Adj. Flow (vph)	46	310	0	0	285	528	20	15	0	572	12	23
Shared Lane Traffic (%)										47%		
Lane Group Flow (vph)	0	356	0	0	285	528	0	35	0	303	304	0
Turn Type	pm+pt	NA			NA	Perm	Split	NA		Split	NA	
Protected Phases	7	4			8		2	2		6	6	
Permitted Phases	4			8		8						
Detector Phase	7	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	8.5	20.0		20.0	20.0	20.0	10.0	10.0		20.0	20.0	
Total Split (s)	15.0	35.0		20.0	20.0	20.0	15.0	15.0		20.0	20.0	
Total Split (%)	21.4%	50.0%		28.6%	28.6%	28.6%	21.4%	21.4%		28.6%	28.6%	
Maximum Green (s)	10.5	31.0		16.0	16.0	16.0	11.0	11.0		16.0	16.0	
Yellow Time (s)	3.5	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	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	0.0	
Total Lost Time (s)		4.0			4.0	4.0		4.0		4.0	4.0	
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	Min		Min	Min	Min	None	None		None	None	
Walk Time (s)		5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)		11.0		11.0	11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0		0	0	0	0	0		0	0	
Act Effct Green (s)		13.2			13.2	13.2		6.8		13.6	13.6	
Actuated g/C Ratio		0.34			0.34	0.34		0.17		0.35	0.35	
v/c Ratio		0.34			0.45	0.68		0.11		0.52	0.52	
Control Delay		12.3			14.7	7.2		18.8		16.0	15.8	
Queue Delay		0.0			0.0	0.0		0.0		0.0	0.0	
Total Delay		12.3			14.7	7.2		18.8		16.0	15.8	
LOS		B			B	A		B		B	B	
Approach Delay		12.3			9.8			18.8			15.9	

Lanes, Volumes, Timings

3:

4/27/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	B			A			B			B		

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 38.9

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 12.5

Intersection Capacity Utilization 58.7%

Analysis Period (min) 15

Intersection LOS: B

ICU Level of Service B

Splits and Phases: 3:

		
ø2	ø6	ø4
15 s	20 s	35 s
		
		ø7
		15 s
		
		ø8
		20 s

HCS 2010 Two-Way Stop-Control Report

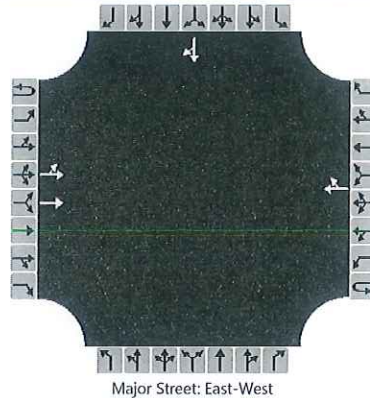
General Information

Analyst	RP
Agency/Co.	GCC
Date Performed	4/27/17
Analysis Year	2017
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	FUTURE TRAFFIC WITH PROJECT

Site Information

Intersection	CORONADO DR / HAMDEN DR
Jurisdiction	CLEARWATER
East/West Street	CORONADO DR
North/South Street	HAMDEN DRIVE
Peak Hour Factor	0.91
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	2	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT	T					TR								TR
Volume, V (veh/h)		4	508				446	112							81	3
Percent Heavy Vehicles (%)		1													1	1
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Left Only								1							

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1													6.5	6.2
Critical Headway (sec)		4.10													6.52	6.20
Base Follow-Up Headway (sec)		2.2													4.0	3.3
Follow-Up Headway (sec)		2.20													4.01	3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		4														92
Capacity, c (veh/h)		947														202
v/c Ratio		0.00														0.46
95% Queue Length, Q ₉₅ (veh)		0.0														2.2
Control Delay (s/veh)		8.8														36.9
Level of Service, LOS		A														E
Approach Delay (s/veh)		0.1													36.9	
Approach LOS															E	

HCS 2010 Two-Way Stop-Control Report

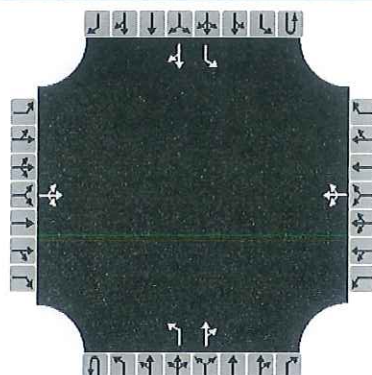
General Information

Analyst	RP
Agency/Co.	GCC
Date Performed	4/27/17
Analysis Year	2017
Time Analyzed	PM PEAK
Intersection Orientation	North-South
Project Description	FUTURE TRAFFIC WITH PROJECT

Site Information

Intersection	CORONADO DR / 5TH ST
Jurisdiction	CLEARWATER
East/West Street	5TH STREET
North/South Street	CORONADO DRIVE
Peak Hour Factor	0.93
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	1	1	0	0	1	1	0
Configuration			LTR				LTR			L		TR		L		TR
Volume, V (veh/h)		38	2	8		1	0	44		6	441	0		41	497	38
Percent Heavy Vehicles (%)		1	0	0		1	0	0		1				1		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.10	6.50	6.20		7.10	6.50	6.20		4.11				4.11		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50	4.00	3.30		3.50	4.00	3.30		2.21				2.21		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			52				48			6				44			
Capacity, c (veh/h)			168				526			971				1048			
v/c Ratio			0.31				0.09			0.01				0.04			
95% Queue Length, Q ₉₅ (veh)			1.2				0.3			0.0				0.1			
Control Delay (s/veh)			35.9				12.5			8.7				8.6			
Level of Service, LOS			E				B			A				A			
Approach Delay (s/veh)		35.9				12.5				0.1				0.6			
Approach LOS		E				B											

HCS 2010 Two-Way Stop-Control Report

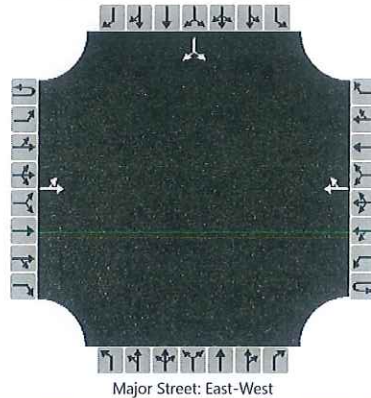
General Information

Analyst	RP
Agency/Co.	GCC
Date Performed	4/27/2017
Analysis Year	2017
Time Analyzed	PM PEAK
Intersection Orientation	East-West
Project Description	FUTURE TRAFFIC WITH PROJECT

Site Information

Intersection	5TH STREET / DRIVE A
Jurisdiction	CLEARWATER
East/West Street	5TH STREET
North/South Street	DRIVE A
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration		LT						TR							LR	
Volume, V (veh/h)		19	39				32	12						9		13
Percent Heavy Vehicles (%)		3												3		3
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		21												24		
Capacity, c (veh/h)		1551												946		
v/c Ratio		0.01												0.03		
95% Queue Length, Q ₉₅ (veh)		0.0												0.1		
Control Delay (s/veh)		7.4												8.9		
Level of Service, LOS		A												A		
Approach Delay (s/veh)		2.5												8.9		
Approach LOS														A		