DAVID PLUMMER & ASSOCIATES, INC.

TRANSPORTATION • CIVIL • STRUCTURAL • ENVIRONMENTAL

Memorandum

To: Wayne Arnold
From: Deven Long
Date: April 12, 2017
RE: **Pelican Landing CPD/RPD Amendment TIS - #15534**
Response to City of Bonita Springs Transportation Comments
cc: Neale Montgomery; Sharon Umpenhour; Barry Ernst; Stephen Leung

DPA is in receipt of City of Bonita Springs Development Review comments dated March 16, 2017 (refer to Attachment A of this memorandum) for the above referenced Project. DPA would like to offer the following response.

Comments

2. **The table titled "Area-Specific Developments" on page 15 of the TIS lists several developments that are assumed to be contributing to the background traffic for 2024. Please provide a map showing the location of each of these developments, the number and direction of PM peak hour trips assigned for each development to the network and the location that each development has access to the network where these trips are assigned. Include the development parameters and a summary of the PM peak hour trip generation for each development. This information will be used to verify the background traffic volumes.**

We are continuing to review the information provided in the response to this comment. Based on this review, we may have additional comments.

Response:

DPA has addressed this comment in the original and revised traffic studies and has been responsive to the request of additional information throughout the review. The City of Bonita Springs has exceeded the three rounds of requests for additional information and the review should have been completed before the fourth round of questions was forwarded on March 16, 2017.

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3. **The approved pelican Landing DRI includes a total of 3,072 PM peak hour external trips. The exhibits for Total Traffic (Current Zoning) show 344 trips at the Coconut Point Resort Drive entrance, 264 trips at The Colony entrance on Coconut Road and 337 trips on Pelican Colony Blvd. just west of North Commons Drive. Please provide a map showing the location(s) of where the remaining 2,127 trips access the external network.**

The comment has not been sufficiently addressed. The Applicant has responded that 923 PM peak hour external trips are distributed to the intersection at US41 and Pelican Colony Boulevard. However, the exhibit provided in the ZTIS shows a total of 339 trips on Pelican Colony Boulevard at the access gate (guard house) west of North Commons Drive. Please be specific on where the remaining 584 trips originate or terminate. It is not clear to the reviewer that all approved Pelican Landing DRI trips have been accounted for in the traffic study. The four main gateways on US 41 mentioned in the response include traffic from other developments. Please identify the trips present at the actual access gates (where access is restricted). At locations included within the Pelican Landing DRI that are physically located outside of the access gates, please identify the number of trips originating or terminating at each driveway access point.

Response:

The requested map showing the location(s) of where the remaining 2,127 trips access the external network at buildout per the approved DRI was provided in the last sufficiency response and provided again and further summarized below.

Pelican Landing DRI – PM Peak Hour External Trip Distribution

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Pelican Landing External Access Points		
Primary Access Location	**DRI Trips**	**% of Total**
Coconut Road at US 41	648	21%
Pelican Colony Boulevard at US 41 (1)	923	30%
Pelican Landing Parkway at US 41	1152	38%
Pelicans Nest Drive at US 41	349	11%
Total	**3,072**	**100%**

Footnote:
(1) Includes The Tides access and Walden Center Drive at US 41.

To further address the reviewer's specific comments regarding the breakdown of Pelican Landing traffic at the Pelican Colony Boulevard and US 41 intersection, this information was provided in the previous sufficiency response and further elaborated in the matrix below.

Some of the land uses (existing and future) within the Pelican Landing DRI fall outside of the gated communities. The remaining trips account for existing and future Pelican Landing developments that are located along Walden Center Drive south of Coconut Road as well as developments located north of Coconut road. The breakdown of Pelican Landing trips at the intersection of US 41 and Pelican Colony Boulevard is as follows.

ID #	Turning Movements at US 41/ PCB Current Zoning with PCB Signal						Net New Trips
	EBL	EBT	EBR	NBL	WBT	SBR	
1 – Pelican Landing Community Association	0	0	3	3	0	0	6
3 – Project	0	5	35	29	4	0	73
4 – Pelican Landing Timeshare Ventures LP	0	3	20	21	3	0	47
5 – Altaira High Rise	3	3	2	4	5	4	21
6 – WCI Communities Inc Two High Rise	6	7	6	11	15	13	58
13 – Coconut Road Associates LLC	40	56	0	0	0	0	96
16 – Allsee Investment LP	23	32	0	0	0	0	55
17 – Naples Diagnostic Imaging	20	28	0	0	0	0	48
Unbuilt PL commercial trips	8	7	18	18	3	2	56
Future PL Total Trips	100	141	84	86	30	19	460
Existing PL Trips	172	20	119	116	1	35	463
Buildout Total	272	161	203	202	31	54	923

Lee County ZTIS guidelines do not require a comprehensive review of the entire Pelican Landing DRI. The approved parameters of the Pelican Landing DRI have not changed so the residential units proposed for the Project are approved under the DRI. Therefore, the reviewer's request to identify each component of Pelican Landing's traffic at every access point and intersection exceeds the County requirements, and is inconsistent with the historic application of the requirements. The level of documentation of all background traffic assumptions has far exceeded what is warranted for a zoning traffic study and far beyond the details provided in the Estero Village – Coconut Road Traffic Study.

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5. **Please confirm that the signal timing, including phase length and splits, used for the analysis of the Coconut Road/US 41 signal is consistent with the timing plan currently in operation. The Existing conditions analysis used a cycle length of 180 seconds. The Buildout conditions analysis used a cycle length of 165 seconds. Has FDOT or Lee County DOT indicated that they intend to reduce the cycle length as traffic volumes increase along US 41?**

The question asked in the comment was not specifically answered. Has FDOT or Lee County DOT indicated that they intend to reduce the cycle length as traffic volumes increase along US 41?

Response:

It would be premature for FDOT or LCDOT to indicate whether or not they intend to change the cycle length 10 years from now. They may change it, they may not. Both scenarios are possible.

To address the reviewer's concern regarding the cycle length, additional intersection capacity analysis was performed to reflect the existing 180 second cycle length, Attachment B. A comparison of results is summarized below.

Scenario	Without PCB Signal		With PCB Signal	
Cycle Length	165 s	180 s	165 s	180 s
Overall LOS[1]	E	E	C	E

Footnote:
(1) Future traffic conditions with rezoning.

As shown above, using a cycle length of 180 seconds will maintain acceptable levels of service with and without the Pelican Colony Boulevard signal. However, reducing the cycle length to 165 seconds could improve overall performance of the intersection.

Trebilcock Consulting Solutions performed an independent review of the Coconut Road corridor and provided recommendations for improvements at the intersection of US 41/ Coconut Road. One of the recommended improvements was signal retiming and reducing the cycle length to 165 seconds. The applicant agrees with Trebilcock Consulting Solutions and since they represent the Village of Estero (which now has jurisdiction over Coconut Road), the applicant relied on the Village's consultant and used the 165 second cycle length.

To further research viability and pursue this recommendation, the City of Bonita Springs should coordinate with FDOT and LCDOT.

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7. **Please provide origin and destination information for the trips that are diverted due to the proposed signal at US 41 and Pelican Colony Boulevard. The Future Total Traffic (Rezoning) exhibits indicate that 520 trips will divert from Coconut Road to Pelican Colony Boulevard. This is a substantial diversion of traffic. Almost half of this volume is diverting south to head north on US 41. The result of this diversion is that the eastbound approach of Coconut Blvd at US 41 is projected to operate at LOS E with an approach delay of 72 seconds per vehicle while the eastbound approach of Pelican Colony Blvd at US 41 is projected to operate at LOS F with an approach delay of 120 seconds per vehicle. Why would so many vehicles divert south to Pelican Colony Boulevard to travel north on US 41 when delay at the intersection is almost twice as long? This needs to be justified.**

The comment has not been sufficiently addressed. It appears to the reviewer that the diverted vehicles will experience longer delays. This is counterintuitive. Please provide a comparison of travel times using the two different routes, one for each of the two signals. The travel times should be between a variety origins and destinations as mentioned in the Applicant's response. However, make sure that the begin and end point for each origin and destination pair is the same for each route compared.

Response:

In the last submission, the signalized intersection analysis of US 41/ Pelican Colony Boulevard did not reflect a fine-tuned timing plan. A fine-tuned timing plan was not developed because it was not the purpose of the study to perform a design level operational analysis of the intersection. For the purpose of the study, the overall LOS D served as a proof of concept and demonstrated the signal could handle future traffic volumes and improve traffic circulation in the road network.

To address the reviewer's comment, a revised analysis has been performed to reflect a cycle length of 180 seconds, Attachment C. The intersection maintains overall LOS D, does not fail on any approach, and the eastbound approach delay is reduced to 78.9 seconds. This amount of delay is comparable to the eastbound approach delay at US 41/ Coconut Road. This suggests that the eastbound approach volumes at the two intersections are at a balance point in terms of trip loading and resultant delay.

The request for a comparison of travel times using the two different routes, one for each signal and using a variety of origins and destinations of the background traffic exceeds the County requirements.

Drivers on Coconut Road perceive the intersection at US 41 to be failing, but since there are no alternative routes, they continue to use the traffic signal because it gives them a dedicated green phase which they feel is the safest way to navigate across US 41. A signal at US 41/ Pelican Colony Boulevard would provide the alternative many drivers would like to have so they can avoid traffic issues at Coconut Road. If there is not a significant diversion following the new signalization, this would suggest the operations at US 41/ Coconut Road are not as severe as residents perceive it to be.

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Nonetheless, the planned signal at US 41/ Pelican Colony Boulevard intersection should not be misconstrued as a mandate to divert Project traffic away from the US 41/ Coconut Road intersection. In fact, no diversion of traffic generated from existing and future developments situated on the north side of Coconut Road were included as part of the traffic diversion from the US 41/ Coconut Road intersection to the US 41/ Pelican Colony Boulevard intersection in order to proceed north on US 41.

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Attachment A

City of Bonita Springs Development Review Comments

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EXCEEDING
CLIENT
EXPECTATIONS

Staff has reviewed the spreadsheet supplied in the February 3, 2017 submittal against the Neighborhood Directory provided on the Pelican Landing website. Staff has the following comments:

- The spreadsheet does not list the following neighborhoods: Ascot, Bay Crest, Costa Del Dol, The Cottages, Creekside Crossing, Pinewater Place, The Pointe, The Ridge, and Messina. Please explain the discrepancy or update the spreadsheet with the appropriate neighborhood and dwelling unit count by dwelling unit type. Please provide the associated local development order case number and/or recording instrument for each neighborhood.
- Please identify the location of Parcels M and N.

Please contact Jacqueline Genson, AICP, Planning and Zoning Manager
Phone: 239.444.6163
E-mail: Jacqueline.genson@cityofbonitaspringscd.org

BONITA SPRINGS Transportation Review

2. The table titled "Area-Specific Developments" on page 15 of the TIS lists several developments that are assumed to be contributing to the background traffic for 2024. Please provide a map showing the location of each of these developments, the number and direction of PM peak hour trips assigned for each development to the network and the location that each development has access to the network where these trips are assigned. Include the development parameters and a summary of the PM peak hour trip generation for each development. This information will be used to verify the background traffic volumes.

We are continuing to review the information provided in the response to this comment. Based on this review, we may have additional comments.

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5. Please confirm that the signal timing, including phase length and splits, used for the analysis of the Coconut Road/US 41 signal is consistent with the timing plan currently in operation. The Existing conditions analysis used a cycle length of 180 seconds. The Buildout conditions analysis used a cycle length of 165 seconds. Has FDOT or Lee County DOT indicated that they intend to reduce the cycle length as traffic volumes increase along US 41?

The question asked in the comment was not specifically answered. Has FDOT or Lee County DOT indicated that they intend to reduce the cycle length as traffic volumes increase along US 41?

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destinations as mentioned in the Applicant's response. However, make sure that the begin and end point for each origin and destination pair is the same for each route compared.

Please contact Tom Ross, Transportation Reviewer
Phone: (407) 650-2178
E-mail: tom.ross@ch2m.com

Attachment B

US 41/ Coconut Road
Intersection Capacity Analysis (C=180 s)

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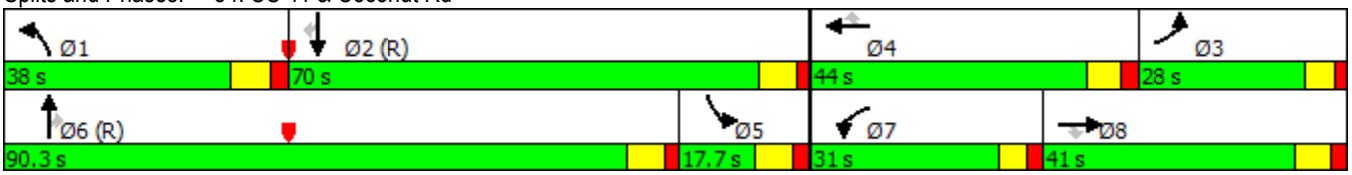
Timings
54: US 41 & Coconut Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	341	181	149	530	135	70	83	2458	506	82	1658	200
Future Volume (vph)	496	395	259	535	432	132	349	2525	509	262	1922	313
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8			4			6			2
Detector Phase	3	8	8	7	4	4	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	26.0	26.0	7.0	26.0	26.0
Minimum Split (s)	13.0	25.2	25.2	13.0	17.2	17.2	14.6	33.1	33.1	14.6	33.1	33.1
Total Split (s)	28.0	41.0	41.0	31.0	44.0	44.0	38.0	90.3	90.3	17.7	70.0	70.0
Total Split (%)	15.6%	22.8%	22.8%	17.2%	24.4%	24.4%	21.1%	50.2%	50.2%	9.8%	38.9%	38.9%
Yellow Time (s)	4.0	4.7	4.7	4.0	4.7	4.7	5.1	5.1	5.1	5.1	5.1	5.1
All-Red Time (s)	2.0	2.5	2.5	2.0	2.5	2.5	2.5	2.0	2.0	2.5	2.0	2.0
Lost Time Adjust (s)	-2.0	-3.2	-3.2	-2.0	-3.2	-3.2	-3.6	-3.1	-3.1	-3.6	-3.1	-3.1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary

Cycle Length: 180
Actuated Cycle Length: 180
Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated

Splits and Phases: 54: US 41 & Coconut Rd



HCM 2010 Signalized Intersection Summary
54: US 41 & Coconut Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	341	181	149	530	135	70	83	2458	506	82	1658	200
Future Volume (veh/h)	496	395	259	535	432	132	349	2525	509	262	1922	313
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)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	511	407	267	552	445	136	360	2603	525	270	1981	323
Adj No. of Lanes	2	1	1	2	1	1	1	3	1	2	3	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	1	1	2	2	2	2	2	2	2	2	2
Cap, veh/h	463	399	339	516	414	352	335	2438	759	1344	3450	1074
Arrive On Green	0.13	0.21	0.21	0.15	0.22	0.22	0.19	0.48	0.48	0.39	0.68	0.68
Sat Flow, veh/h	3476	1881	1599	3442	1863	1583	1774	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	511	407	267	552	445	136	360	2603	525	270	1981	323
Grp Sat Flow(s),veh/h/ln	1738	1881	1599	1721	1863	1583	1774	1695	1583	1721	1695	1583
Q Serve(g_s), s	24.0	38.2	28.4	27.0	40.0	13.2	34.0	86.3	54.7	9.3	36.9	19.4
Cycle Q Clear(g_c), s	24.0	38.2	28.4	27.0	40.0	13.2	34.0	86.3	54.7	9.3	36.9	19.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	463	399	339	516	414	352	335	2438	759	1344	3450	1074
V/C Ratio(X)	1.10	1.02	0.79	1.07	1.08	0.39	1.07	1.07	0.69	0.20	0.57	0.30
Avail Cap(c_a), veh/h	463	399	339	516	414	352	335	2438	759	1344	3450	1074
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	78.0	70.9	67.0	76.5	70.0	59.6	73.0	46.9	50.6	36.3	15.3	20.1
Incr Delay (d2), s/veh	72.7	50.1	11.6	59.4	65.8	0.7	70.4	39.4	5.1	0.1	0.7	0.7
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(95%),veh/ln	29.2	45.7	19.8	30.8	50.7	9.8	41.8	88.8	33.2	7.9	24.3	13.6
LnGrp Delay(d),s/veh	150.7	121.0	78.7	135.9	135.8	60.3	143.4	86.3	55.7	36.3	16.0	20.8
LnGrp LOS	F	F	E	F	F	E	F	F	E	D	B	C
Approach Vol, veh/h		1185			1133			3488			2574	
Approach Delay, s/veh		124.3			126.8			87.6			18.7	
Approach LOS		F			F			F			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	38.0	128.3	29.2	44.0	76.0	90.3	31.0	42.2
Change Period (Y+Rc), s	7.6	* 7.6	7.2	* 7.2	7.6	7.1	6.0	7.2
Max Green Setting (Gmax), s	30.4	* 63	22.0	* 37	10.1	83.2	25.0	33.8
Max Q Clear Time (g_c+I1), s	36.0	38.9	26.0	42.0	11.3	88.3	29.0	40.2
Green Ext Time (p_c), s	0.0	22.1	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	76.9
HCM 2010 LOS	E

Notes

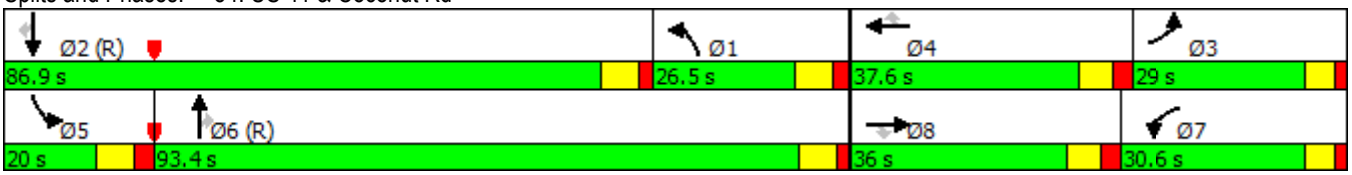
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Timings
54: US 41 & Coconut Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	180	161	119	530	135	70	53	2619	506	82	1658	200
Future Volume (vph)	252	259	119	535	432	132	178	2769	509	262	1825	313
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8			4			6			2
Detector Phase	3	8	8	7	4	4	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	26.0	26.0	7.0	26.0	26.0
Minimum Split (s)	13.0	25.2	25.2	13.0	17.2	17.2	14.6	33.1	33.1	16.7	33.1	33.1
Total Split (s)	29.0	36.0	36.0	30.6	37.6	37.6	26.5	93.4	93.4	20.0	86.9	86.9
Total Split (%)	16.1%	20.0%	20.0%	17.0%	20.9%	20.9%	14.7%	51.9%	51.9%	11.1%	48.3%	48.3%
Yellow Time (s)	4.0	4.7	4.7	4.0	4.7	4.7	5.1	5.1	5.1	5.1	5.1	5.1
All-Red Time (s)	2.0	2.5	2.5	2.0	2.5	2.5	2.5	2.0	2.0	2.5	2.0	2.0
Lost Time Adjust (s)	-2.0	-3.2	-3.2	-2.0	-3.2	-3.2	-3.6	-3.1	-3.1	-3.6	-3.1	-3.1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 180
Offset: 21 (12%), Referenced to phase 2:SBT and 6:NBT, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated

Splits and Phases: 54: US 41 & Coconut Rd



HCM 2010 Signalized Intersection Summary
54: US 41 & Coconut Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	180	161	119	530	135	70	53	2619	506	82	1658	200
Future Volume (veh/h)	252	259	119	535	432	132	178	2769	509	262	1825	313
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)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	260	267	123	552	445	136	184	2855	525	270	1881	323
Adj No. of Lanes	2	1	1	2	1	1	1	3	1	2	3	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	1	1	2	2	2	2	2	2	2	2	2
Cap, veh/h	451	317	270	509	348	296	238	2558	797	306	2342	729
Arrive On Green	0.13	0.17	0.17	0.15	0.19	0.19	0.27	1.00	1.00	0.18	0.92	0.92
Sat Flow, veh/h	3476	1881	1599	3442	1863	1583	1774	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	260	267	123	552	445	136	184	2855	525	270	1881	323
Grp Sat Flow(s),veh/h/ln	1738	1881	1599	1721	1863	1583	1774	1695	1583	1721	1695	1583
Q Serve(g_s), s	12.7	24.8	12.5	26.6	33.6	10.9	17.2	0.0	0.0	13.8	20.2	4.9
Cycle Q Clear(g_c), s	12.7	24.8	12.5	26.6	33.6	10.9	17.2	0.0	0.0	13.8	20.2	4.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	451	317	270	509	348	296	238	2558	797	306	2342	729
V/C Ratio(X)	0.58	0.84	0.46	1.09	1.28	0.46	0.77	1.12	0.66	0.88	0.80	0.44
Avail Cap(c_a), veh/h	483	334	284	509	348	296	238	2558	797	306	2342	729
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)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	73.7	72.5	67.4	76.7	73.2	40.9	63.3	0.0	0.0	73.1	4.6	4.0
Incr Delay (d2), s/veh	1.5	16.7	1.2	65.0	146.3	1.1	14.5	58.2	4.3	24.6	3.0	1.9
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(95%),veh/ln	10.3	20.6	9.5	31.0	56.6	8.5	14.4	24.8	1.7	12.1	13.9	4.3
LnGrp Delay(d),s/veh	75.2	89.2	68.6	141.7	219.5	42.0	77.8	58.2	4.3	97.7	7.7	6.0
LnGrp LOS	E	F	E	F	F	D	E	F	A	F	A	A
Approach Vol, veh/h		650			1133			3564			2474	
Approach Delay, s/veh		79.7			160.3			51.3			17.3	
Approach LOS		E			F			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	28.2	86.9	27.3	37.6	20.0	95.1	30.6	34.3
Change Period (Y+Rc), s	7.6	7.1	6.0	7.2	7.6	* 7.6	6.0	7.2
Max Green Setting (Gmax), s	18.9	79.8	23.0	30.4	12.4	* 86	24.6	28.8
Max Q Clear Time (g_c+I1), s	19.2	22.2	14.7	35.6	15.8	2.0	28.6	26.8
Green Ext Time (p_c), s	0.0	45.2	2.0	0.0	0.0	82.0	0.0	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	58.7
HCM 2010 LOS	E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Attachment C

US 41/ Pelican Colony Boulevard
Intersection Capacity Analysis (C=180 s)

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FORT MYERS, FLORIDA 33901
TELEPHONE: 239 332-2617, FAX: 239 332-2645
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Timings
57: US 41 & Pelican Colony Blvd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	172	20	119	17	1	13	116	3012	46	14	2245	35
Future Volume (vph)	264	171	216	140	70	72	246	3164	97	42	2488	52
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4	5	3	8	1	5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	5	3	8	1	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.0	24.0	11.0	11.0	24.0	11.0	11.0	24.0	24.0	11.0	24.0	24.0
Total Split (s)	20.0	24.4	24.0	31.6	36.0	11.0	24.0	113.0	113.0	11.0	100.0	100.0
Total Split (%)	11.1%	13.6%	13.3%	17.6%	20.0%	6.1%	13.3%	62.8%	62.8%	6.1%	55.6%	55.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	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	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary

Cycle Length: 180
Actuated Cycle Length: 180
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated

Splits and Phases: 57: US 41 & Pelican Colony Blvd

HCM 2010 Signalized Intersection Summary
57: US 41 & Pelican Colony Blvd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	172	20	119	17	1	13	116	3012	46	14	2245	35
Future Volume (veh/h)	264	171	216	140	70	72	246	3164	97	42	2488	52
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1792	1792	1792	1776	1776	1776	1845	1845	1845	1827	1827	1827
Adj Flow Rate, veh/h	272	176	223	144	72	74	254	3262	100	43	2565	54
Adj No. of Lanes	2	1	1	2	1	1	2	3	1	2	3	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	6	6	6	7	7	7	3	3	3	4	4	4
Cap, veh/h	385	203	319	222	115	286	328	3050	949	421	3162	984
Arrive On Green	0.12	0.11	0.11	0.07	0.06	0.06	0.10	0.61	0.61	0.25	1.00	1.00
Sat Flow, veh/h	3312	1792	1524	3281	1776	1509	3408	5036	1568	3375	4988	1553
Grp Volume(v), veh/h	272	176	223	144	72	74	254	3262	100	43	2565	54
Grp Sat Flow(s),veh/h/ln	1656	1792	1524	1640	1776	1509	1704	1679	1568	1688	1663	1553
Q Serve(g_s), s	14.2	17.4	19.9	7.7	7.1	0.0	13.1	109.0	4.8	1.8	0.0	0.0
Cycle Q Clear(g_c), s	14.2	17.4	19.9	7.7	7.1	0.0	13.1	109.0	4.8	1.8	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	385	203	319	222	115	286	328	3050	949	421	3162	984
V/C Ratio(X)	0.71	0.87	0.70	0.65	0.63	0.26	0.77	1.07	0.11	0.10	0.81	0.05
Avail Cap(c_a), veh/h	385	203	319	503	316	457	379	3050	949	421	3162	984
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	76.6	78.5	44.5	81.8	82.1	62.2	79.4	35.5	15.0	59.8	0.0	0.0
Incr Delay (d2), s/veh	5.8	30.2	6.6	3.2	5.5	0.5	8.4	38.7	0.2	0.1	2.4	0.1
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(95%),veh/ln	11.1	15.6	13.9	6.5	6.6	5.7	10.8	110.1	3.9	1.5	1.3	0.1
LnGrp Delay(d),s/veh	82.4	108.7	51.1	85.0	87.6	62.7	87.8	74.2	15.2	59.9	2.4	0.1
LnGrp LOS	F	F	D	F	F	E	F	F	B	E	A	A
Approach Vol, veh/h		671			290			3616			2662	
Approach Delay, s/veh		78.9			80.0			73.5			3.3	
Approach LOS		E			E			E			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	26.4	113.0	16.2	24.4	21.3	118.1	24.9	15.6
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	107.0	25.6	18.4	18.0	94.0	14.0	30.0
Max Q Clear Time (g_c+I1), s	3.8	111.0	9.7	21.9	15.1	2.0	16.2	9.1
Green Ext Time (p_c), s	0.0	0.0	0.5	0.0	0.2	50.1	0.0	0.5

Intersection Summary	
HCM 2010 Ctrl Delay	48.4
HCM 2010 LOS	D