



## MEMORANDUM

**DATE:** October 4, 2019  
**To:** David Atwater, Senior Environmental Planner  
**FROM:** Ken Wilhelm, Principal Transportation  
**SUBJECT:** Coto de Caza - Oak Grove Residential Traffic Assessment

The following traffic assessment evaluates the potential impacts of the addition of 13 single family dwelling units on the site of a former private elementary school within Coto de Caza, County of Orange.

The County's Transportation Implementation Manual (March 1994, amended October 2012) outlines the requirements and methodologies for traffic impact studies within unincorporated areas of the County. Based on these guidelines, any development on an existing lot resulting in a total daily traffic generation of less than 200 trips would be exempt from preparing a full traffic impact analysis.

Table A (attached) describes the trip generation of the project based on the trip rates provided in the Institute of Transportation Engineers' (ITE) *Trip Generation Manual*, 10th Edition (2017). The proposed 13 single family dwelling units would generate 123 average daily trips (ADT), including 10 trips in the a.m. peak hour (2 inbound and 8 outbound) and 13 trips in the p.m. peak hour (8 inbound and 5 outbound).

As the trip generation of the proposed residential project is less than the County's threshold for requiring a traffic study, a full traffic impact analysis is not required. However, to demonstrate the effects of the project traffic on the nearest primary intersections, an existing and existing plus project assessment has been conducted at the intersections of Coto de Caza Drive/Vista del Verde and Vista del Verde/Via Pajaro.

The gated Coto de Caza community can be accessed at two locations; via Antonio Parkway to the north or Oso Parkway to the south. As the project site is within the northerly portion of the private community, it is anticipated that most of the traffic will enter via Antonio Parkway, drive southbound along Coto de Caza Drive and turn left onto Vista del Verde towards the project site. In the reverse, residents from the project site will travel westbound on Vista del Verde, turn right on Coto de Caza Drive and exit the community onto Antonio Parkway. It is assumed that there will be

some traffic entering/exiting the project site via Vista del Verde and access the south gate on Oso Parkway.

Existing peak hour traffic counts at the intersections of Coto de Caza Drive/Vista del Verde and Vista del Verde/Via Pajaro were conducted by an independent count company (Counts Unlimited) on a typical weekday (September 18, 2019). The traffic counts are provided as an attachment.

The *Highway Capacity Manual* (HCM 6th Edition) methodology was used to determine the levels of service (LOS) at the unsignalized intersections. The HCM 6th Edition unsignalized intersection methodology presents LOS in terms of total intersection delay and approach delay of the major and minor streets (in seconds per vehicle). The resulting delay is expressed in terms of LOS. The relationship of delay to LOS is demonstrated in the following table:

Levels of Service	Unsignalized Intersection Delay (seconds)
A	≤10.0
B	>10.0 and ≤15.0
C	>15.0 and ≤25.0
D	>25.0 and ≤35.0
E	>35.0 and ≤50.0
F	>50.0

A project impact occurs in the County unincorporated areas when the intersection in question exceeds the acceptable LOS (LOS D) and the project volume results in a 1% increase in volume/capacity ratio of the sum of all critical movements. This threshold, however, is based on a signalized intersection. The impact of an unsignalized intersection would be significant if the project adds 1.0 seconds of delay (which is the County’s significance threshold) to an intersection operating at LOS E or LOS F.

Based on this methodology and the existing peak hour traffic counts collected, both intersections currently operate at satisfactory LOS during both peak hours. Table B (attached) shows the results of the existing peak-hour LOS analysis. The HCM worksheets (existing LOS) are provided as an attachment.

As stated above, to present a conservative analysis, 80% of the project traffic was assigned to travel westbound right (6 outbound trips in the a.m. peak hour and 4 outbound trips in the p.m. peak hour) and southbound left (2 inbound trips in the a.m. peak hour and 6 inbound trips in the p.m. peak hour) at Coto de Caza Drive/Vista del Verde. 20% of the project traffic was assigned to travel southbound through (2 outbound trips in the a.m. peak hour and 1 outbound trips in the p.m. peak hour) and northbound through (0 inbound trips in the a.m. peak hour and 2 inbound trips in the p.m. peak hour) at Vista del Verde/Via Pajaro. As shown in Table B, both intersections operate at satisfactory LOS during both peak hours in the existing plus project condition. The HCM worksheets (existing plus project LOS) are provided as an attachment.

Both study intersections meet the acceptable LOS in the a.m. and p.m. peak hours for both the existing and existing plus project conditions. Although the project would add 1.1 seconds of delay to the intersection of Coto de Caza Drive/Vista del Verde during the a.m. peak hour, this intersection would continue to operate at satisfactory LOS (LOS D). As a result, the addition of project traffic from the development of 13 single family dwelling units would not cause a significant impact at the study intersections for the project within the Coto de Caza community.

Attachments: Table A – Trip Generation Summary  
Table B - Existing Plus Project Intersection Level of Service Summary  
Counts Unlimited Traffic Counts  
HCM LOS Worksheets

**Table A: Trip Generation Summary**

Land Use	Size	Unit	ADT	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
<b>Trip Rates<sup>1</sup></b>									
Single-Family Detached Housing		DU	9.44	0.19	0.55	0.74	0.62	0.37	0.99
<b>Project Trip Generation</b>									
Single-Family Detached Housing	13	DU	123	2	8	10	8	5	13
<b>Total Trip Generation</b>			<b>123</b>	<b>2</b>	<b>8</b>	<b>10</b>	<b>8</b>	<b>5</b>	<b>13</b>

<sup>1</sup> Trip rates referenced from the Institute of Transportation Engineers (ITE) *Trip Generation* Manual, 10th Edition (2017).

Land Use Code 210 - Single-Family Detached Housing

ADT = average daily trips

DU = dwelling unit

**Table B: Existing Plus Project Intersection Level of Service Summary**

Intersection	Peak Hour	Existing		Existing plus Project		Project Impact	
		Delay	LOS	Delay	LOS	$\Delta$ Delay	Yes/No
Coto de Caza Drive/Vista del Verde	AM	28.4	D	29.5	D	1.1	No
	PM	23.3	C	24.1	C	0.8	No
Vista del Verde/Via Pajaro	AM	9.5	A	9.5	A	0.0	No
	PM	10.3	B	10.3	B	0.0	No

$\Delta$  = change

Delay is reported in seconds.

County of Orange  
 N/S: Coto De Caza Drive  
 E/W: Vista Del Verde  
 Weather: Clear

File Name : 01\_ORC\_Coto De Caza\_Vista Del Verde AM  
 Site Code : 00319614  
 Start Date : 9/18/2019  
 Page No : 1

Groups Printed- Total Volume

Start Time	Coto De Caza Drive Southbound				Vista Del Verde Westbound				Coto De Caza Drive Northbound				Vista Del Verde Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:00 AM	32	19	1	52	3	0	82	85	1	95	2	98	0	0	0	0	235
07:15 AM	34	35	0	69	7	2	96	105	6	116	4	126	6	1	3	10	310
07:30 AM	43	51	1	95	5	0	105	110	0	126	1	127	0	0	0	0	332
07:45 AM	60	58	0	118	10	0	77	87	1	123	5	129	0	0	0	0	334
Total	169	163	2	334	25	2	360	387	8	460	12	480	6	1	3	10	1211
08:00 AM	55	60	0	115	9	0	90	99	0	86	7	93	0	0	0	0	307
08:15 AM	48	46	0	94	10	1	76	87	0	115	6	121	0	0	0	0	302
08:30 AM	36	44	0	80	7	0	83	90	0	148	7	155	0	0	0	0	325
08:45 AM	46	73	0	119	3	0	72	75	0	99	1	100	0	0	0	0	294
Total	185	223	0	408	29	1	321	351	0	448	21	469	0	0	0	0	1228
Grand Total	354	386	2	742	54	3	681	738	8	908	33	949	6	1	3	10	2439
Apprch %	47.7	52	0.3		7.3	0.4	92.3		0.8	95.7	3.5		60	10	30		
Total %	14.5	15.8	0.1	30.4	2.2	0.1	27.9	30.3	0.3	37.2	1.4	38.9	0.2	0	0.1	0.4	

Start Time	Coto De Caza Drive Southbound				Vista Del Verde Westbound				Coto De Caza Drive Northbound				Vista Del Verde Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	34	35	0	69	7	2	96	105	6	116	4	126	6	1	3	10	310
07:30 AM	43	51	1	95	5	0	105	110	0	126	1	127	0	0	0	0	332
07:45 AM	60	58	0	118	10	0	77	87	1	123	5	129	0	0	0	0	334
08:00 AM	55	60	0	115	9	0	90	99	0	86	7	93	0	0	0	0	307
Total Volume	192	204	1	397	31	2	368	401	7	451	17	475	6	1	3	10	1283
% App. Total	48.4	51.4	0.3		7.7	0.5	91.8		1.5	94.9	3.6		60	10	30		
PHF	.800	.850	.250	.841	.775	.250	.876	.911	.292	.895	.607	.921	.250	.250	.250	.250	.960

County of Orange  
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Start Time	Coto De Caza Drive Southbound				Vista Del Verde Westbound				Coto De Caza Drive Northbound				Vista Del Verde Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:00 PM	85	82	2	169	4	0	48	52	0	74	3	77	0	1	1	2	300
04:15 PM	81	108	0	189	1	0	66	67	0	80	4	84	0	0	1	1	341
04:30 PM	74	74	0	148	4	1	54	59	1	61	8	70	0	0	0	0	277
04:45 PM	76	90	0	166	7	0	56	63	0	84	6	90	0	0	1	1	320
Total	316	354	2	672	16	1	224	241	1	299	21	321	0	1	3	4	1238
05:00 PM	93	110	1	204	2	1	53	56	0	77	7	84	0	1	0	1	345
05:15 PM	73	122	0	195	11	1	62	74	0	76	6	82	2	0	1	3	354
05:30 PM	74	117	0	191	5	0	57	62	1	73	9	83	1	0	1	2	338
05:45 PM	85	118	0	203	3	0	65	68	0	67	4	71	0	0	0	0	342
Total	325	467	1	793	21	2	237	260	1	293	26	320	3	1	2	6	1379
Grand Total	641	821	3	1465	37	3	461	501	2	592	47	641	3	2	5	10	2617
Apprch %	43.8	56	0.2		7.4	0.6	92		0.3	92.4	7.3		30	20	50		
Total %	24.5	31.4	0.1	56	1.4	0.1	17.6	19.1	0.1	22.6	1.8	24.5	0.1	0.1	0.2	0.4	

Start Time	Coto De Caza Drive Southbound				Vista Del Verde Westbound				Coto De Caza Drive Northbound				Vista Del Verde Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	93	110	1	204	2	1	53	56	0	77	7	84	0	1	0	1	345
05:15 PM	73	122	0	195	11	1	62	74	0	76	6	82	2	0	1	3	354
05:30 PM	74	117	0	191	5	0	57	62	1	73	9	83	1	0	1	2	338
05:45 PM	85	118	0	203	3	0	65	68	0	67	4	71	0	0	0	0	342
Total Volume	325	467	1	793	21	2	237	260	1	293	26	320	3	1	2	6	1379
% App. Total	41	58.9	0.1		8.1	0.8	91.2		0.3	91.6	8.1		50	16.7	33.3		
PHF	.874	.957	.250	.972	.477	.500	.912	.878	.250	.951	.722	.952	.375	.250	.500	.500	.974

County of Orange  
 N/S: Vista Del Verde  
 E/W: Via Pajaro  
 Weather: Clear

File Name : 02\_ORC\_Vista Del Verde\_Via Pajaro AM  
 Site Code : 00319614  
 Start Date : 9/18/2019  
 Page No : 1

Groups Printed- Total Volume

Start Time	Vista Del Verde Southbound			Via Pajaro Westbound			Vista Del Verde Northbound			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
07:00 AM	16	16	32	3	39	42	43	2	45	119
07:15 AM	13	22	35	1	40	41	53	4	57	133
07:30 AM	19	22	41	3	54	57	55	2	57	155
07:45 AM	39	28	67	8	40	48	43	3	46	161
Total	87	88	175	15	173	188	194	11	205	568
08:00 AM	31	24	55	3	48	51	48	1	49	155
08:15 AM	34	19	53	6	35	41	41	4	45	139
08:30 AM	27	20	47	8	37	45	50	3	53	145
08:45 AM	18	28	46	5	34	39	35	4	39	124
Total	110	91	201	22	154	176	174	12	186	563
Grand Total	197	179	376	37	327	364	368	23	391	1131
Apprch %	52.4	47.6		10.2	89.8		94.1	5.9		
Total %	17.4	15.8	33.2	3.3	28.9	32.2	32.5	2	34.6	

Start Time	Vista Del Verde Southbound			Via Pajaro Westbound			Vista Del Verde Northbound			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
07:30 AM	19	22	41	3	<b>54</b>	<b>57</b>	<b>55</b>	2	<b>57</b>	155
07:45 AM	<b>39</b>	<b>28</b>	<b>67</b>	<b>8</b>	40	48	43	3	46	<b>161</b>
08:00 AM	31	24	55	3	48	51	48	1	49	155
08:15 AM	34	19	53	6	35	41	41	<b>4</b>	45	139
Total Volume	123	93	216	20	177	197	187	10	197	610
% App. Total	56.9	43.1		10.2	89.8		94.9	5.1		
PHF	.788	.830	.806	.625	.819	.864	.850	.625	.864	.947

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:30 AM



County of Orange  
 N/S: Vista Del Verde  
 E/W: Via Pajaro  
 Weather: Clear

File Name : 02\_ORC\_Vista Del Verde\_Via Pajaro PM  
 Site Code : 00319614  
 Start Date : 9/18/2019  
 Page No : 1

Groups Printed- Total Volume

Start Time	Vista Del Verde Southbound			Via Pajaro Westbound			Vista Del Verde Northbound			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
04:00 PM	47	45	92	5	31	36	31	7	38	166
04:15 PM	36	52	88	5	33	38	38	4	42	168
04:30 PM	33	38	71	4	23	27	30	3	33	131
04:45 PM	51	36	87	6	38	44	22	5	27	158
Total	167	171	338	20	125	145	121	19	140	623
05:00 PM	46	40	86	3	22	25	28	5	33	144
05:15 PM	39	38	77	8	29	37	41	6	47	161
05:30 PM	36	43	79	7	37	44	23	5	28	151
05:45 PM	49	40	89	6	29	35	34	10	44	168
Total	170	161	331	24	117	141	126	26	152	624
Grand Total	337	332	669	44	242	286	247	45	292	1247
Apprch %	50.4	49.6		15.4	84.6		84.6	15.4		
Total %	27	26.6	53.6	3.5	19.4	22.9	19.8	3.6	23.4	

Start Time	Vista Del Verde Southbound			Via Pajaro Westbound			Vista Del Verde Northbound			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	46	40	86	3	22	25	28	5	33	144
05:15 PM	39	38	77	<b>8</b>	29	37	<b>41</b>	6	<b>47</b>	161
05:30 PM	36	<b>43</b>	79	7	<b>37</b>	<b>44</b>	23	5	28	151
05:45 PM	<b>49</b>	40	<b>89</b>	6	29	35	34	<b>10</b>	44	<b>168</b>
Total Volume	170	161	331	24	117	141	126	26	152	624
% App. Total	51.4	48.6		17	83		82.9	17.1		
PHF	.867	.936	.930	.750	.791	.801	.768	.650	.809	.929




Intersection	
Intersection Delay, s/veh	28.4
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Traffic Vol, veh/h	6	1	3	31	2	368	7	451	17	192	204	1
Future Vol, veh/h	6	1	3	31	2	368	7	451	17	192	204	1
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	1	4	36	2	433	8	531	20	226	240	1
Number of Lanes	0	1	0	0	1	1	1	2	0	1	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	1
HCM Control Delay	12.9	40.6	27.4	17.8
HCM LOS	B	E	D	C

Lane	NBLn1	NBLn2	NBLn3	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	60%	94%	0%	100%	0%	0%
Vol Thru, %	0%	100%	90%	10%	6%	0%	0%	100%	99%
Vol Right, %	0%	0%	10%	30%	0%	100%	0%	0%	1%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	7	301	167	10	33	368	192	136	69
LT Vol	7	0	0	6	31	0	192	0	0
Through Vol	0	301	150	1	2	0	0	136	68
RT Vol	0	0	17	3	0	368	0	0	1
Lane Flow Rate	8	354	197	12	39	433	226	160	81
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.019	0.78	0.43	0.032	0.092	0.878	0.542	0.361	0.183
Departure Headway (Hd)	8.458	7.943	7.869	9.836	8.485	7.304	8.646	8.13	8.119
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	422	453	457	366	422	494	416	440	440
Service Time	6.238	5.722	5.648	7.536	6.254	5.073	6.43	5.912	5.902
HCM Lane V/C Ratio	0.019	0.781	0.431	0.033	0.092	0.877	0.543	0.364	0.184
HCM Control Delay	11.4	33.8	16.5	12.9	12.1	43.2	21.3	15.5	12.7
HCM Lane LOS	B	D	C	B	B	E	C	C	B
HCM 95th-tile Q	0.1	6.8	2.1	0.1	0.3	9.5	3.1	1.6	0.7

Intersection	
Intersection Delay, s/veh	9.5
Intersection LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	177	187	10	123	93
Future Vol, veh/h	20	177	187	10	123	93
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	192	203	11	134	101
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	9.1	9.5	10
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	10%	57%
Vol Thru, %	95%	0%	43%
Vol Right, %	5%	90%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	197	197	216
LT Vol	0	20	123
Through Vol	187	0	93
RT Vol	10	177	0
Lane Flow Rate	214	214	235
Geometry Grp	1	1	1
Degree of Util (X)	0.278	0.265	0.312
Departure Headway (Hd)	4.674	4.462	4.788
Convergence, Y/N	Yes	Yes	Yes
Cap	767	803	749
Service Time	2.721	2.504	2.835
HCM Lane V/C Ratio	0.279	0.267	0.314
HCM Control Delay	9.5	9.1	10
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1.1	1.1	1.3




Intersection	
Intersection Delay, s/veh	23.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕	↗	↖	↕		↖	↕	
Traffic Vol, veh/h	3	1	2	21	2	237	1	293	26	325	467	1
Future Vol, veh/h	3	1	2	21	2	237	1	293	26	325	467	1
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	1	2	25	2	279	1	345	31	382	549	1
Number of Lanes	0	1	0	0	1	1	1	2	0	1	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	1
HCM Control Delay	12.4	20	17.2	27
HCM LOS	B	C	C	D

Lane	NBLn1	NBLn2	NBLn3	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	50%	91%	0%	100%	0%	0%
Vol Thru, %	0%	100%	79%	17%	9%	0%	0%	100%	99%
Vol Right, %	0%	0%	21%	33%	0%	100%	0%	0%	1%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	1	195	124	6	23	237	325	311	157
LT Vol	1	0	0	3	21	0	325	0	0
Through Vol	0	195	98	1	2	0	0	311	156
RT Vol	0	0	26	2	0	237	0	0	1
Lane Flow Rate	1	230	145	7	27	279	382	366	184
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.003	0.514	0.319	0.019	0.066	0.589	0.803	0.717	0.361
Departure Headway (Hd)	8.559	8.046	7.896	9.438	8.776	7.61	7.559	7.048	7.044
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	418	448	455	378	408	474	478	513	511
Service Time	6.318	5.805	5.654	7.222	6.537	5.37	5.31	4.799	4.794
HCM Lane V/C Ratio	0.002	0.513	0.319	0.019	0.066	0.589	0.799	0.713	0.36
HCM Control Delay	11.3	19.1	14.3	12.4	12.2	20.8	34.6	25.8	13.7
HCM Lane LOS	B	C	B	B	B	C	D	D	B
HCM 95th-tile Q	0	2.9	1.4	0.1	0.2	3.7	7.5	5.8	1.6

Intersection	
Intersection Delay, s/veh	10.3
Intersection LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	24	117	126	26	170	161
Future Vol, veh/h	24	117	126	26	170	161
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	26	127	137	28	185	175
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	8.9	8.9	11.5
HCM LOS	A	A	B

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	17%	51%
Vol Thru, %	83%	0%	49%
Vol Right, %	17%	83%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	152	141	331
LT Vol	0	24	170
Through Vol	126	0	161
RT Vol	26	117	0
Lane Flow Rate	165	153	360
Geometry Grp	1	1	1
Degree of Util (X)	0.211	0.199	0.458
Departure Headway (Hd)	4.599	4.663	4.586
Convergence, Y/N	Yes	Yes	Yes
Cap	778	768	784
Service Time	2.643	2.706	2.624
HCM Lane V/C Ratio	0.212	0.199	0.459
HCM Control Delay	8.9	8.9	11.5
HCM Lane LOS	A	A	B
HCM 95th-tile Q	0.8	0.7	2.4




Intersection	
Intersection Delay, s/veh	29.5
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕	↗	↖	↕		↖	↕	
Traffic Vol, veh/h	6	1	3	31	2	374	7	451	17	194	204	1
Future Vol, veh/h	6	1	3	31	2	374	7	451	17	194	204	1
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	1	4	36	2	440	8	531	20	228	240	1
Number of Lanes	0	1	0	0	1	1	1	2	0	1	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	1
HCM Control Delay	12.9	43.2	27.8	18.1
HCM LOS	B	E	D	C

Lane	NBLn1	NBLn2	NBLn3	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	60%	94%	0%	100%	0%	0%
Vol Thru, %	0%	100%	90%	10%	6%	0%	0%	100%	99%
Vol Right, %	0%	0%	10%	30%	0%	100%	0%	0%	1%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	7	301	167	10	33	374	194	136	69
LT Vol	7	0	0	6	31	0	194	0	0
Through Vol	0	301	150	1	2	0	0	136	68
RT Vol	0	0	17	3	0	374	0	0	1
Lane Flow Rate	8	354	197	12	39	440	228	160	81
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.019	0.785	0.433	0.032	0.092	0.895	0.551	0.363	0.184
Departure Headway (Hd)	8.504	7.988	7.915	9.894	8.506	7.325	8.688	8.171	8.161
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	419	453	453	364	420	493	413	438	438
Service Time	6.287	5.771	5.697	7.594	6.278	5.097	6.474	5.956	5.946
HCM Lane V/C Ratio	0.019	0.781	0.435	0.033	0.093	0.892	0.552	0.365	0.185
HCM Control Delay	11.5	34.4	16.7	12.9	12.1	45.9	21.7	15.6	12.8
HCM Lane LOS	B	D	C	B	B	E	C	C	B
HCM 95th-tile Q	0.1	6.9	2.1	0.1	0.3	10	3.2	1.6	0.7

Intersection	
Intersection Delay, s/veh	9.5
Intersection LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	177	187	10	123	95
Future Vol, veh/h	20	177	187	10	123	95
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	192	203	11	134	103
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	9.1	9.5	10
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	10%	56%
Vol Thru, %	95%	0%	44%
Vol Right, %	5%	90%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	197	197	218
LT Vol	0	20	123
Through Vol	187	0	95
RT Vol	10	177	0
Lane Flow Rate	214	214	237
Geometry Grp	1	1	1
Degree of Util (X)	0.278	0.266	0.315
Departure Headway (Hd)	4.677	4.467	4.787
Convergence, Y/N	Yes	Yes	Yes
Cap	764	801	749
Service Time	2.726	2.509	2.836
HCM Lane V/C Ratio	0.28	0.267	0.316
HCM Control Delay	9.5	9.1	10
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1.1	1.1	1.4

Intersection	
Intersection Delay, s/veh	24.1
Intersection LOS	C




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕	↕	↕	↕		↕	↕	
Traffic Vol, veh/h	3	1	2	21	2	241	1	293	26	331	467	1
Future Vol, veh/h	3	1	2	21	2	241	1	293	26	331	467	1
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	1	2	25	2	284	1	345	31	389	549	1
Number of Lanes	0	1	0	0	1	1	1	2	0	1	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	1
HCM Control Delay	12.5	20.5	17.3	28.1
HCM LOS	B	C	C	D

Lane	NBLn1	NBLn2	NBLn3	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	50%	91%	0%	100%	0%	0%
Vol Thru, %	0%	100%	79%	17%	9%	0%	0%	100%	99%
Vol Right, %	0%	0%	21%	33%	0%	100%	0%	0%	1%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	1	195	124	6	23	241	331	311	157
LT Vol	1	0	0	3	21	0	331	0	0
Through Vol	0	195	98	1	2	0	0	311	156
RT Vol	0	0	26	2	0	241	0	0	1
Lane Flow Rate	1	230	145	7	27	284	389	366	184
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.003	0.516	0.321	0.019	0.066	0.601	0.821	0.72	0.362
Departure Headway (Hd)	8.601	8.088	7.938	9.486	8.803	7.637	7.588	7.078	7.073
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	416	446	452	376	406	471	479	509	509
Service Time	6.363	5.85	5.699	7.272	6.564	5.397	5.34	4.829	4.825
HCM Lane V/C Ratio	0.002	0.516	0.321	0.019	0.067	0.603	0.812	0.719	0.361
HCM Control Delay	11.4	19.2	14.4	12.5	12.2	21.3	36.7	26.1	13.8
HCM Lane LOS	B	C	B	B	B	C	E	D	B
HCM 95th-tile Q	0	2.9	1.4	0.1	0.2	3.9	7.9	5.8	1.6



Intersection	
Intersection Delay, s/veh	10.3
Intersection LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	24	117	128	26	170	162
Future Vol, veh/h	24	117	128	26	170	162
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	26	127	139	28	185	176
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	8.9	8.9	11.5
HCM LOS	A	A	B

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	17%	51%
Vol Thru, %	83%	0%	49%
Vol Right, %	17%	83%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	154	141	332
LT Vol	0	24	170
Through Vol	128	0	162
RT Vol	26	117	0
Lane Flow Rate	167	153	361
Geometry Grp	1	1	1
Degree of Util (X)	0.214	0.199	0.46
Departure Headway (Hd)	4.603	4.671	4.588
Convergence, Y/N	Yes	Yes	Yes
Cap	777	766	783
Service Time	2.647	2.715	2.626
HCM Lane V/C Ratio	0.215	0.2	0.461
HCM Control Delay	8.9	8.9	11.5
HCM Lane LOS	A	A	B
HCM 95th-tile Q	0.8	0.7	2.4