S.R. 421/I-95 INTERCHANGE ANALYSIS
Port Orange, Florida

January 2009

Prepared for:
The City of Port Orange

Kimley-Horn
and Associates, Inc.

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1.0 INTRODUCTION

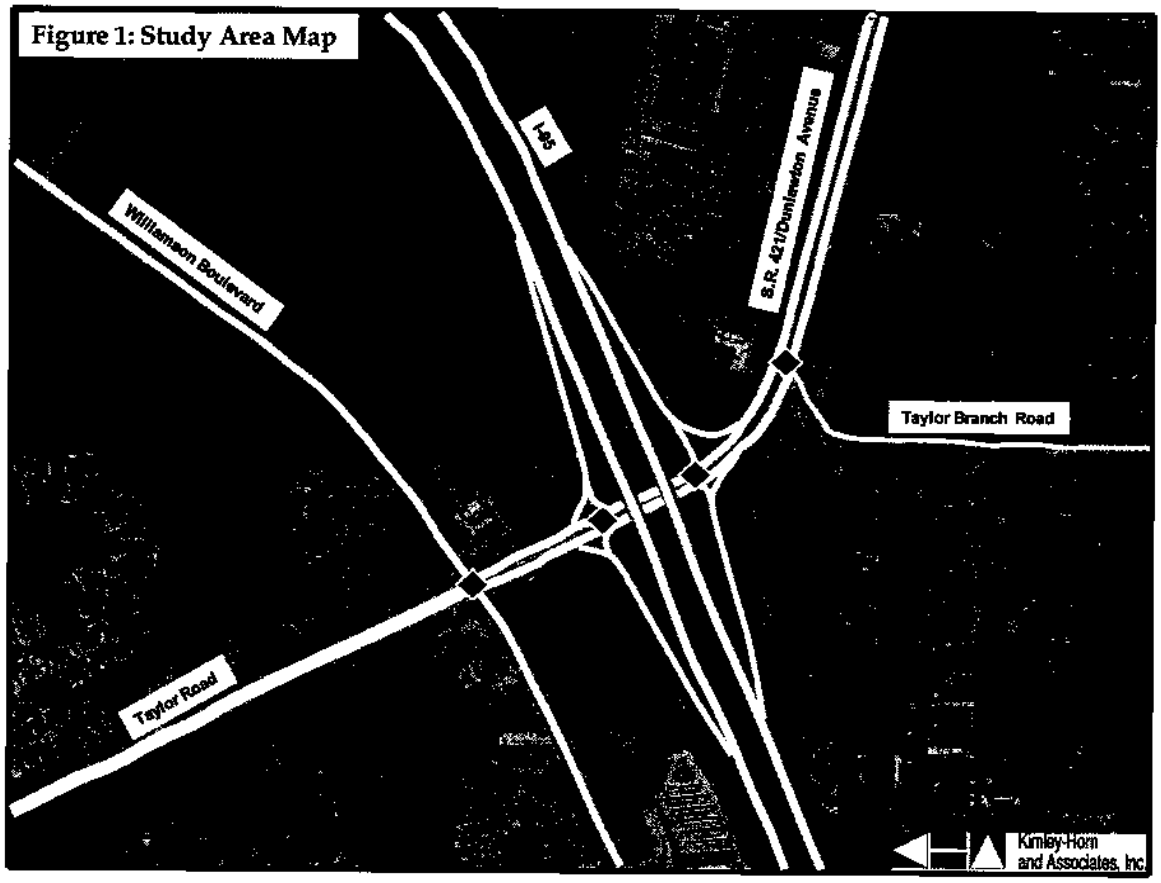
Over the past few years, the City of Port Orange has experienced increased pressure on the transportation system, particularly at the S.R. 421/I-95 interchange. S.R. 421, which carries approximately 33,000 to 37,000 vehicles per day based on 2007 traffic counts, is the primary east/west roadway through the City with the I-95 interchange effectively serving as one of the primary intersection areas along the roadway. Within the City there are only two other east/west roadways, Madeline Avenue and Willow Run Boulevard, that provide relief to S.R. 421 at the vicinity of the interchange. Given the critical nature of the interchange area and the limited number of additional east/west options, the City is currently focusing on the long-term needs of the interchange area. The objective of this report is to evaluate the future traffic operating conditions at the S.R. 421/I-95 interchange area, as shown in ***Figure 1***, for the purposes of defining short-term and long-term transportation improvements needed to enhance its operating conditions. This report also evaluates the degree to which an I-95/Pioneer Trail interchange and a Madeline Avenue overpass at I-95 relieve the S.R. 421/I-95 interchange.

1.1 Study Area

In conducting this analysis, the following intersections and roadway were analyzed:

- Taylor Road at Williamson Boulevard
- Taylor Road/S.R. 421 at I-95 Southbound Ramps
- Taylor Road/S.R. 421 at I-95 Northbound Ramps
- S.R. 421 at Taylor Branch Road
- Williamson Boulevard from Airport Road to Taylor Road

This report defines short-term and long-term improvement needs for the interchange area as well as evaluates the benefits of two alternative improvement scenarios. One alternative improvement scenario is the construction of a new I-95 interchange at Pioneer Trail. The other is the extension of Madeline Avenue from Williamson Boulevard, across I-95 to Tomoka Farms Road.



2.0 EXISTING OPERATING CONDITIONS

The interchange area was analyzed with Synchro Studio 7 which includes Synchro 7 and SimTraffic 7. Synchro Studio 7 was selected over the Highway Capacity Software (HCS) because it not only is based on the signalized intersection capacity analysis as specified in Chapter 16 of the *Highway Capacity Manual 2000* (HCM2000), as prepared by the Transportation Research Board, it also takes into account the interaction between closely spaced intersections whereas the HCM2000 does not as conveyed on page 16-1 of the HCM2000 where it states, *"The methodology does not take into account the potential impact of downstream congestion on intersection operation. Nor does the methodology detect and adjust for the impacts of turn pocket overflows on through traffic and intersection operation."* Given the fact that the four study intersections are all located within a 2,000-foot section of S.R. 421, it was determined that Synchro Studio 7 was the most appropriate analysis tool for the purposes of this study.

As previously stated, Synchro Studio 7 includes Synchro 7, a macroscopic traffic software program that, like the HCM/HCS, represents traffic in terms of aggregate measures for each movement at the study intersections. Synchro 7 was selected due to the fact that it, unlike HCS, easily allows for signal coordination and has the ability to properly account for the actuation of signals. It is important to note that the traditional HCM based models, such as HCS and Synchro 7, do not account for situations where the downstream intersections could possibly back up and block the upstream intersection. Therefore, SimTraffic 7, a microscopic traffic modeling software program, was used because it is has the ability to model the impacts of queuing and blocking from both upstream and downstream intersections and also analyzes impact of queueing on adjacent intersections. Additionally, SimTraffic takes into consideration the impacts of lane assignments with respect to downstream intersections which were critical for this analysis. SimTraffic also incorporates a blend of real-world driver characteristics, such as passiveness and aggressiveness, into one model to better reflect real-world conditions. In the end, Synchro 7 and SimTraffic 7 were used as companion models. Synchro provided inputs for SimTraffic as well as the macro levels-of-service, queues, and delays; SimTraffic was used to simulate the conditions to determine any problems that may not be realized within a macro-level model.

For purposes of this analysis, existing PM peak-hour turning movement counts, as conducted in early May of 2008, were obtained for the study intersections (see ***Figure 2*** and ***Appendix A***). The existing turning movement counts were then balanced between intersections to ensure that the approach and departure volumes between intersections were consistent. The existing geometry (see ***Figure 3***) and existing signal timings as obtained from Volusia County (see ***Appendix B***) were also used in evaluating the operating conditions at the study intersections. The Synchro and SimTraffic printouts are provided in ***Appendix C***.

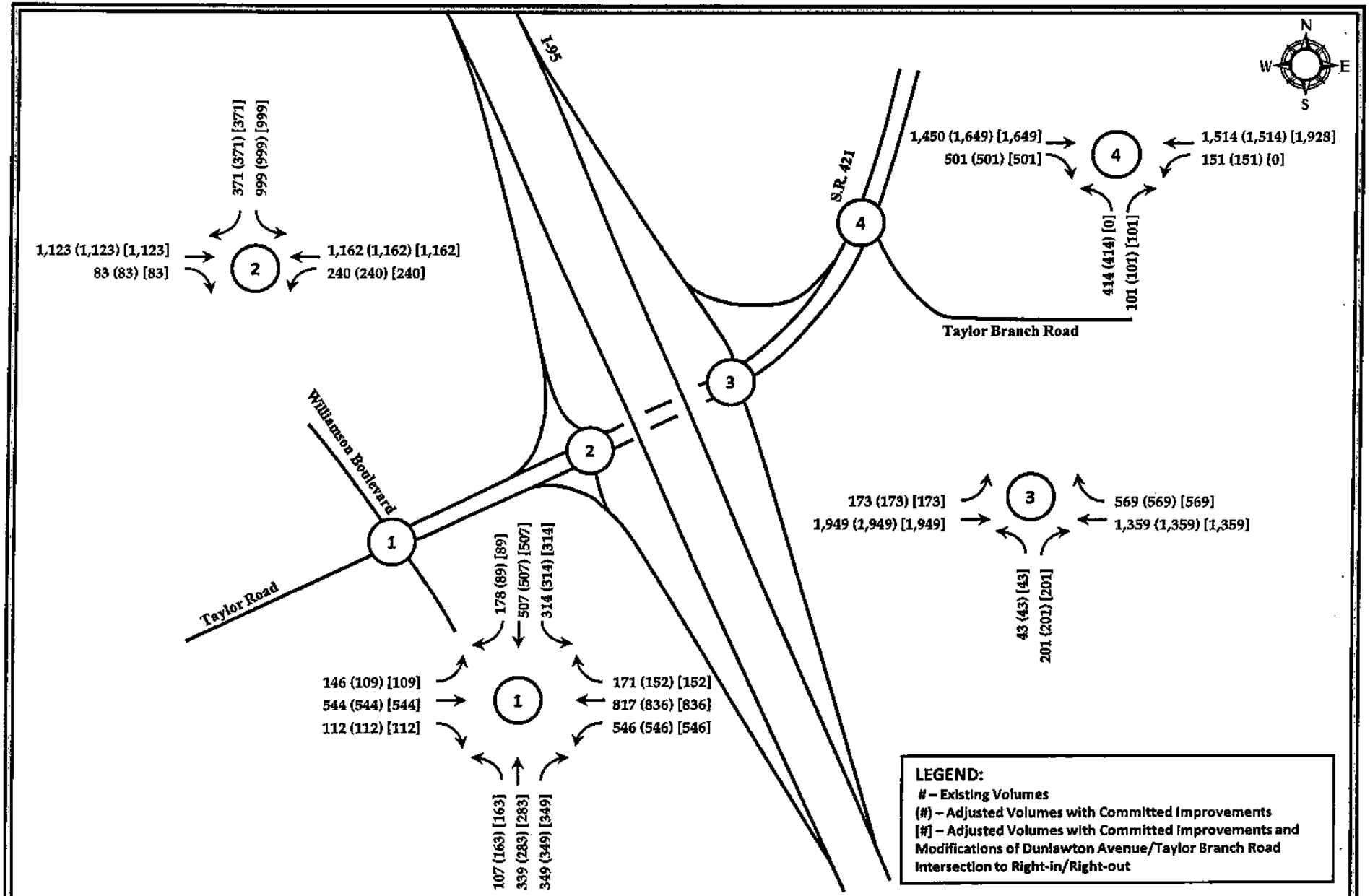


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Figure 2: Existing Volumes (2008)

S.R. 421/I-95 INTERCHANGE ANALYSIS

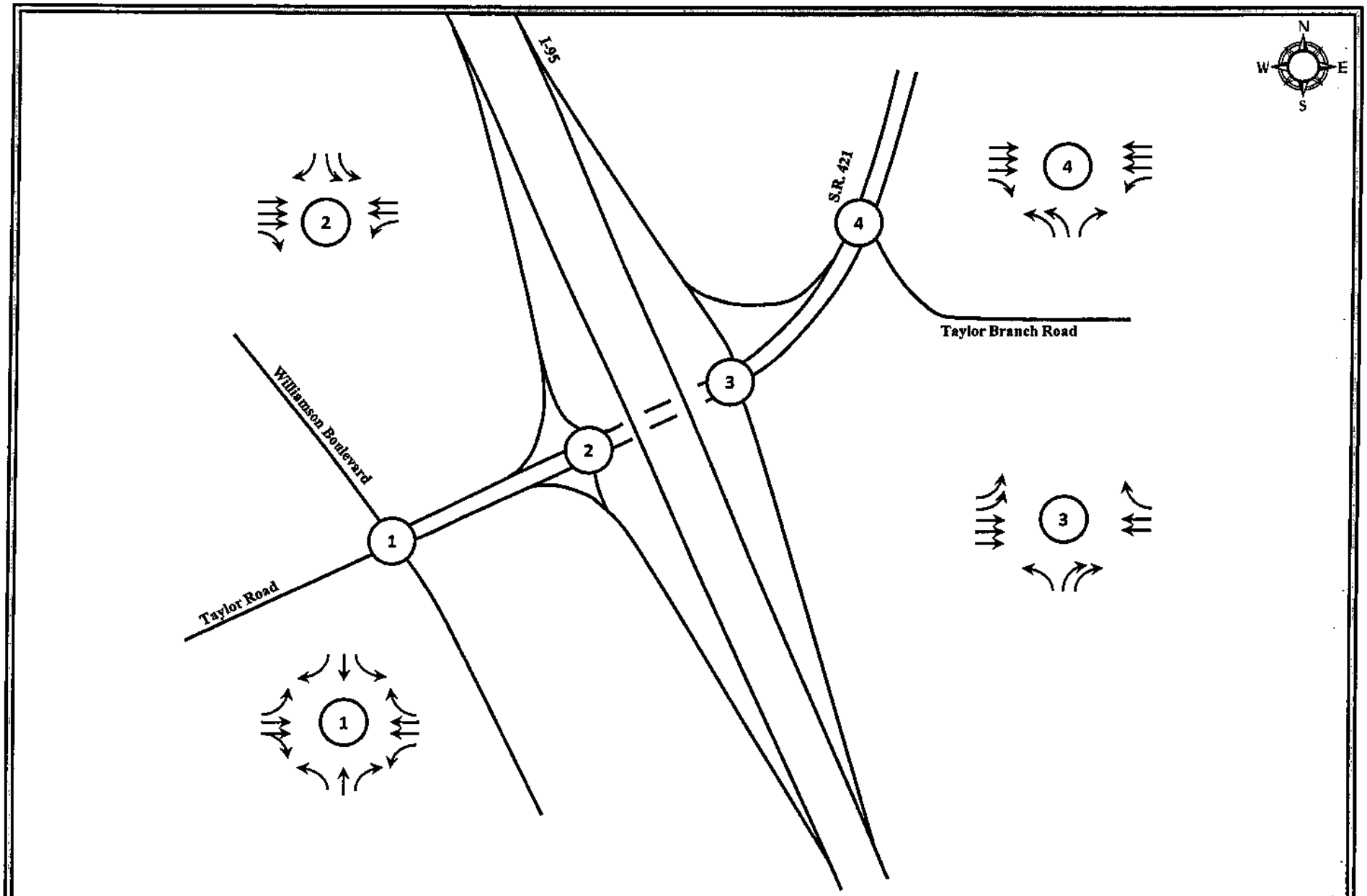

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Figure 3: Existing Geometry

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Several methods have been developed for determining the capacity and level of service at signalized intersections. For purposes of this study, the operating conditions of the intersections are based on the HCM2000. Based on the HCM2000, the level of service is a qualitative measure with letters ranging from A to F and each representing a range of operating conditions and driver's perception of those conditions. The specific level of service for signalized intersections is defined in terms of control delay. More expansive descriptions for each level of service (LOS) grade, as obtained from the HCM2000, are provided below:

LOS A – Describes operations with low control delay, up to 10 seconds per vehicle. This LOS occurs when progression is extremely favorable and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.

LOS B – Describes operations with control delay greater than 10 and up to 20 seconds per vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of delay.

LOS C – Describes operations with control delay greater than 20 and up to 35 seconds per vehicle. These higher delays may result from only fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. Cycle failure occurs when a given green phase does not serve queued vehicles, and overflows occur. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.

LOS D – Describes operations with control delay greater than 35 and up to 55 seconds per vehicle. At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, and high volume-to-capacity (v/c) ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycles failures are noticeable.

LOS E – Describes operations with control delay greater than 55 and up to 80 seconds per vehicle. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent.

LOS F – Describes operations with control delay in excess of 80 seconds per vehicle. This level, considered unacceptable to most drivers, often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of lane groups. It may also occur at high v/c ratios with many individual cycle failures. Poor progression and long cycle lengths may also contribute significantly to high delay levels.

Another measure used in evaluating the operating conditions of signalized intersections is the volume-to-capacity (v/c) ratio. The capacity is given for each movement and is effectively defined as the maximum flow of vehicles that can be processed by the specific movement. V/c ratios in excess of 1.0 indicate that the demand exceeds the capacity. However, values below 1.0 indicate that all vehicles can be accommodated.

The existing operating conditions of the intersections, including the levels of service and v/c ratios as obtained from Synchro, are summarized in ***Table 1***. For comparison purposes, the level of service was also obtained for each movement from the SimTraffic analysis.

Given that the length of turn lanes plays a critical role in the operating conditions of signalized intersections, another performance measure used to evaluate the operating conditions of signalized intersections is the back-of-queue measurement. When evaluating turn lane lengths, this analysis focused on the 95th-percentile queue length which effectively represents the length of queue that has a probability of five percent or less of being exceeded. A summary of the existing 95th-percentile queue lengths for each intersection movement is provided in ***Table 2***.

Based on a review of ***Tables 1*** and ***2***, the existing conditions analysis indicates that the I-95 northbound ramps intersection and the Taylor Branch Road intersection operate well at levels of service B and C, respectively. Overall, the I-95 southbound ramps intersection operates at level of service D. However, based on the Synchro results, the westbound and southbound left-turn movements are operating poorly. The SimTraffic analysis also indicates that the westbound through movement is also not operating well. This conclusion is consistent with observations as the queue from westbound left-turn movement at the Taylor Road/Williamson Boulevard intersection spills back into the southbound ramps intersection adversely affecting the westbound through movement. The tables also indicate that the overall operating conditions for the Taylor

Table 1 - Summary of Existing Conditions

S.R. 421/I-95 Interchange Analysis

Study Intersections	Approach	Movement	EXISTING GEOMETRY					COMMITTED GEOMETRY					ADDITONAL GEOMETRY CHANGES*				
			V/C	Delay (sec/veh)/LOS				V/C	Delay (sec/veh)/LOS				V/C	Delay (sec/veh)/LOS			
				Movement		Approach	Total		Movement		Approach	Total		Movement		Approach	Total
				Synchro	SimTraffic	(Synchro)	(Synchro)		Synchro	SimTraffic	(Synchro)	(Synchro)		Synchro	SimTraffic	(Synchro)	(Synchro)
Williamson Boulevard at Taylor Road	Eastbound	L	0.70	38.8/D	26.0/C			0.48	63.7/E	72.3/E			0.50	64.0/E	74.8/E		
		T	0.62	42.2/D	54.8/D	41.6/D		0.52	45.5/D	35.9/D	48.1/D		0.45	39.7/D	50.1/D	43.2/D	
		R	n/a	n/a	50.0/D			n/a	n/a	38.2/D			n/a	n/a	33.4/C		
	Westbound	L	1.72	390.4/F	171.8/F			0.63	63.8/E	91.8/F			0.81	40.3/D	52.8/D		
		T	0.82	41.5/D	75.1/E	166.8/F		0.55	14.5/B	29.1/C	35.1/C		0.64	18.4/B	22.5/C	29.1/C	
		R	0.18	51.0/D	18.6/B		90.8/F	0.12	46.0/B	4.3/A		46.9/D	0.12	47.4/D	3.5/A		42.1/D
	Northbound	L	0.63	56.8/E	78.3/E			0.61	65.6/E	65.5/E			0.63	66.6/E	82.3/F		
		T	0.65	47.7/D	50.4/D	45.1/D		0.47	51.9/D	41.8/D	53.1/D		0.65	60.3/E	57.8/E	50.2/D	
		R	0.32	39.1/D	16.6/B			0.13	48.2/D	13.9/B			0.39	34.4/C	32.4/C		
	Southbound	L	1.04	95.7/F	94.2/F			0.76	66.6/E	54.4/D			0.57	53.7/D	44.6/D		
		T	0.69	34.2/C	50.9/D	53.1/D		0.80	56.8/E	48.5/D	60.2/E		0.80	56.5/E	43.6/D	55.5/E	
		R	0.12	32.0/C	21.8/C			n/a	n/a	n/a			n/a	n/a	n/a		
Taylor Road at I-95 SB Ramps	Eastbound	L	n/a	n/a	n/a			n/a	n/a	n/a			n/a	n/a	n/a		
		T	0.73	39.9/D	25.7/C	36.7/D		0.68	39.1/D	36.2/D	36.4/D		0.94	57.6/E	25.2/C	52.9/D	
		R	0.07	0.1/A	7.1/A			0.06	0.1/A	6.4/A			0.07	0.1/A	5.1/A		
	Westbound	L	0.83	79.4/E	75.1/E			0.79	72.4/E	76.1/E			0.82	54.8/D	69.7/E		
		T	0.72	22.2/C	90.6/F	32.2/C		0.62	12.1/B	20.7/C	22.4/C		0.82	23.2/C	24.9/C	28.7/C	
		R	n/a	n/a	n/a		53.1/D	n/a	n/a	n/a		36.0/D	n/a	n/a	n/a		40.0/D
	Northbound	L	n/a	n/a	n/a			n/a	n/a	n/a			n/a	n/a	n/a		
		T	n/a	n/a	n/a	n/a		n/a	n/a	n/a	n/a		n/a	n/a	n/a	n/a	
		R	n/a	n/a	n/a			n/a	n/a	n/a			n/a	n/a	n/a		
	Southbound	L	1.09	103.0/F	108.4/F			0.91	54.7/D	44.2/D			0.90	47.1/D	56.6/E		
		T	n/a	n/a	n/a	95.3/F		n/a	n/a	n/a	52.2/D		n/a	n/a	n/a	41.8/D	
		R	0.30	35.3/D	200.2/F			0.28	34/C	20.9/C			0.10	0.1/A	34.6/C		
Taylor Road at I-95 NB Ramps	Eastbound	L	0.65	97.1/F	75.2/E			0.59	70.3/E	78.7/E			0.64	74.0/E	72.7/E		
		T	0.53	5.4/A	9.8/A	14.5/B		0.51	9.4/A	8.8/A	14.4/B		0.53	1.3/A	8.7/A	8.6/A	
		R	n/a	n/a	n/a			n/a	n/a	n/a			n/a	n/a	n/a		
	Westbound	L	n/a	n/a	n/a			n/a	n/a	n/a			n/a	n/a	n/a		
		T	0.72	22.5/C	34.1/C	16.5/B		0.43	8.2/A	10.6/B	6.0/A		0.50	13.8/B	13.8/B	10.2/B	
		R	0.39	0.6/A	7.0/A		18.6/B	0.39	0.6/A	8/A		13.4/B	0.39	0.7/A	6.2/A		12.9/B
	Northbound	L	0.22	54.4/D	51.5/D			0.23	56.8/E	57.4/E			0.22	54.4/D	51.8/D		
		T	n/a	n/a	n/a	63.2/E		n/a	n/a	n/a	63.0/E		n/a	n/a	n/a	63.2/E	
		R	0.73	64.9/E	68.6/E			0.67	64.4/E	64.2/E			0.73	64.9/E	52.8/D		
	Southbound	L	n/a	n/a	n/a			n/a	n/a	n/a			n/a	n/a	n/a		
		T	n/a	n/a	n/a	n/a		n/a	n/a	n/a	n/a		n/a	n/a	n/a	n/a	
		R	n/a	n/a	n/a			n/a	n/a	n/a			n/a	n/a	n/a		
S.R. 421 at Taylor Branch Road	Eastbound	L	n/a	n/a	n/a			n/a	n/a	n/a			n/a	n/a	n/a		
		T	0.66	27.7/C	32.2/C	20.7/C		0.63	25.0/C	22.3/C	19.3/C		0.36	0	2.8/A	0/A	
		R	0.40	0.7/A	14.1/B			0.34	0.5/A	12.8/B			0.37	0	6.8/A		
	Westbound	L	0.75	69.3/E	121.0/F			0.72	69.1/E	79.2/E			n/a	n/a	n/a		
		T	0.47	8.2/A	24.7/C	13.9/B		0.44	7.9/A	11.3/B	13.2/B		0.33	0	3.3/A	0/A	
		R	n/a	n/a	n/a		22.7/C	n/a	n/a	n/a		21.9/C	n/a	n/a	n/a		0.2/A
	Northbound	L	0.78	60.8/E	58.8/E			0.78	60.9/E	51.9/D			n/a	n/a	n/a		
		T	n/a	n/a	n/a	58.3/E		n/a	n/a	n/a	58.6/E		n/a	n/a	n/a	9.9/A	
		R	0.08	47.5/D	7.1/A			0.07	48.0/D	11.3/B			0.14	9.9/A	7.3/A		
	Southbound	L	n/a	n/a	n/a			n/a	n/a	n/a			n/a	n/a	n/a		
		T	n/a	n/a	n/a	n/a		n/a	n/a	n/a	n/a		n/a	n/a	n/a	n/a	
		R	n/a	n/a	n/a			n/a	n/a	n/a			n/a	n/a	n/a		

* Right-in/Right-out and Unsignalization at S.R. 421/Taylor Branch Road Intersection

Table 2 - Summary of Existing Queue Lengths at the Study Intersections

S.R. 421/I-95 Interchange Analysis

Study Intersections	Approach	Movement	EXISTING GEOMETRY			COMMITTED GEOMETRY			ADDITONAL GEOMETRY CHANGES*		
			Storage Length (feet)	95th Percentile Queue (feet)		Storage Length (feet)	95th Percentile Queue (feet)		Storage Length (feet)	95th Percentile Queue (feet)	
				Synchro	SimTraffic		Synchro	SimTraffic		Synchro	SimTraffic
Williamson Boulevard at Taylor Road	Eastbound	L	154	153	167	250	85	122	250	87	102
		T	-	354	313	-	214	223	-	256	253
		R	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Westbound	L	435	784	546	415	359	370	415	202	306
		T	-	490	616	-	186	249	-	293	226
		R	180	383	201	180	382	64	180	378	72
	Northbound	L	160	173	179	195	121	120	195	151	159
		T	-	410	466	-	167	158	-	186	135
		R	575	134	284	575	44	86	575	158	99
	Southbound	L	250	443	301	600	225	226	600	206	142
		T	-	546	673	-	335	430	-	342	232
		R	675	58	108	n/a	n/a	n/a	n/a	n/a	n/a
									0		
Taylor Road at I-95 SB Ramps	Eastbound	L	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		T	-	415	298	-	431	344	-	491	379
		R	-	n/a	n/a	-	n/a	n/a	-	n/a	n/a
	Westbound	L	370	302	687	950	292	348	950	252	295
		T	-	478	647	-	120	281	-	47	449
		R	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Northbound	L	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		T	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		R	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Southbound	L	475	726	222	475	704	206	475	628	223
		T	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		R	-	180	229	-	176	168	-	0	220
Taylor Road at I-95 NB Ramps	Eastbound	L	370	119	284	370	134	136	370	122	157
		T	-	13	191	-	395	259	-	282	237
		R	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Westbound	L	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		T	-	696	655	-	190	247	-	328	303
		R	-	0	0	-	0	0	-	0	0
	Northbound	L	334	76	92	334	77	90	334	76	103
		T	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		R	334	146	168	334	152	152	334	146	143
	Southbound	L	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		T	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		R	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
S.R. 421 at Taylor Branch Road	Eastbound	L	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		T	-	643	551	-	657	496	-	0	0
		R	270	0	229	270	0	269	270	0	0
	Westbound	L	265	213	273	265	212	238	n/a	n/a	n/a
		T	-	276	647	-	258	264	-	0	0
		R	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Northbound	L	430/280	247	264	430/280	265	245	n/a	n/a	n/a
		T	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		R	-	48	349	-	49	236	-	12	103
	Southbound	L	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		T	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		R	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

* Restriction of northbound and westbound left-turn movements and unsignalization at S.R. 421/Taylor Branch Road intersection

Road/Williamson Boulevard intersection are undesirable as the overall level of service is F. As can be observed in the field, the westbound left-turn movement is operating well over its capacity, thus the resulting queues for this movement are spilling back into the interchange area. This existing conditions analysis also suggests that several other movements at the Taylor Road/Williamson Boulevard intersection are operating near capacity. However, as discussed in the next section, several improvements are currently under construction at this intersection, including a second westbound left-turn lane, which are expected to significantly enhance the operating conditions of this intersection, thereby, also likely eliminating the spillback issue into the interchange area.

3.0 EXISTING OPERATING CONDITIONS UNDER COMMITTED IMPROVEMENTS

Additional analyses were conducted for the purposes of understanding how various committed roadway improvements will affect the existing operating conditions at the S.R. 421/I-95 interchange area. The following are the improvements for which construction funding is committed:

- Taylor Road – four lane from Summer Trees Road to Williamson Boulevard
- Williamson Boulevard – four lane from Sabal Creek Boulevard to approximately 700 feet north of the Summer Trees Road extension.
- Williamson Boulevard at Taylor Road
    - Northbound – 2 left-turn lanes, 2 through lanes, 2 right-turn lanes
    - Southbound – 2 left-turn lanes, 1 through lane, 1 shared through/right-turn lane
    - Eastbound – 2 left-turn lanes, 2 through lanes, 1 shared through/right-turn lane
    - Westbound – 2 left-turn lanes, 2 through lanes, 1 right-turn lane
- S.R. 421 at I-95 Northbound Ramps – provide 3rd westbound through lane which feeds the westbound left-turn lane at the I-95 southbound ramps intersection
- Williamson Boulevard at Publix driveway – convert the sidestreet movements from full access to right-in/right-out operation

The committed geometry is shown in ***Figure 4***.

For purposes of conducting the committed improvements analysis, the existing turning movement volumes at the study intersections were adjusted, as shown in ***Figure 2*** and ***Appendix D***, to account for the following:

Publix on the northwest corner of Williamson Boulevard/Taylor Road Intersection – The northern full-access driveway to Publix on Williamson Boulevard is proposed to be converted to right-in/right-out access. Therefore, the northbound left-turning vehicles at the northern driveway on Williamson Boulevard were re-assigned through the Williamson Boulevard/Taylor Road intersection to the driveways on Taylor Road (for example, a northbound through vehicle at the Williamson/Taylor intersection was reassigned to make a left onto Taylor Road).

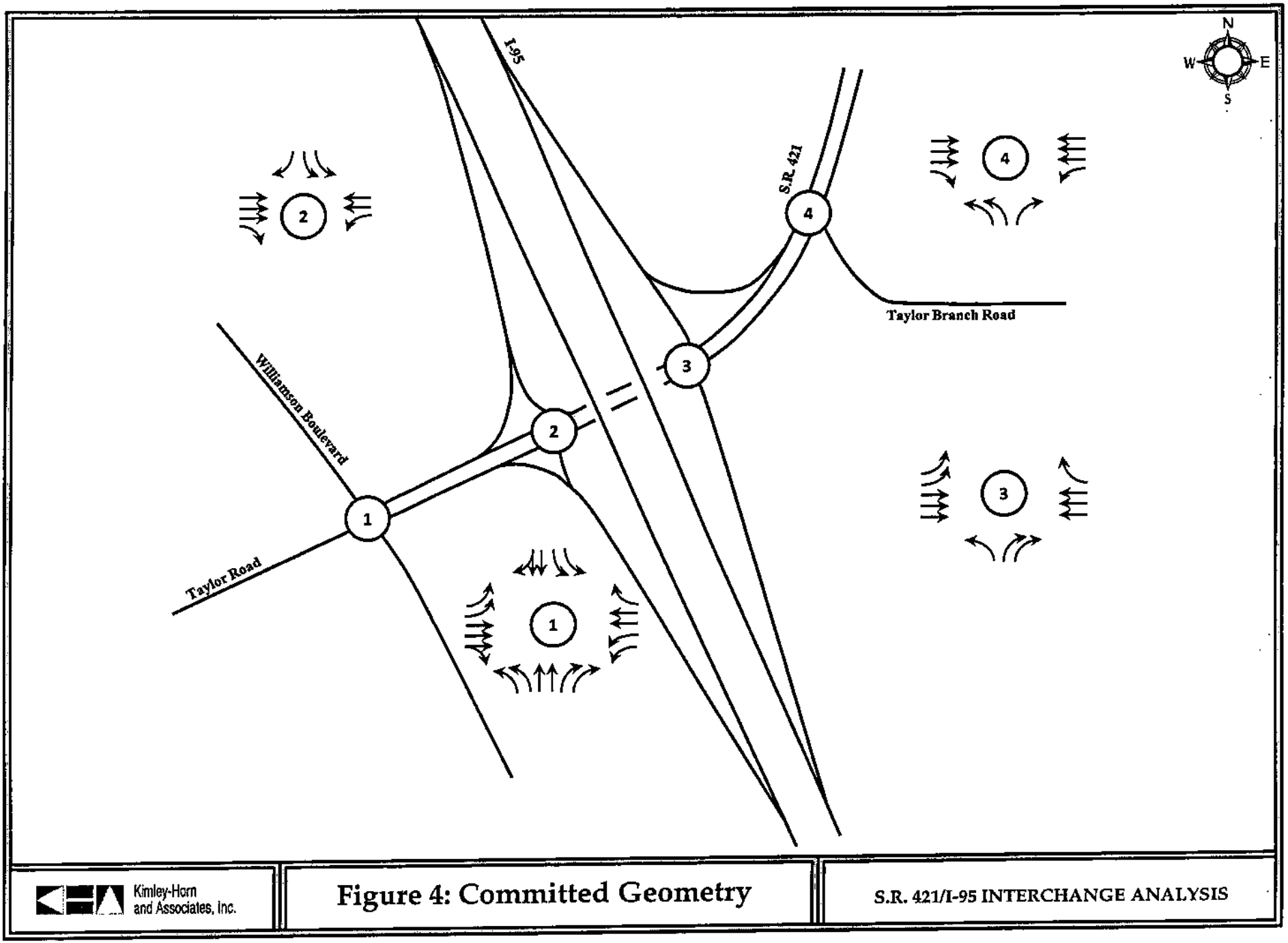

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Figure 4: Committed Geometry

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Summer Trees Road Extension – Traffic patterns at the Taylor Road/Williamson Boulevard intersection are expected to change with the extension of Summer Trees Road from Taylor Road to Williamson Boulevard. More specifically, a portion of the eastbound left-turning vehicles and the southbound right-turning vehicles at the Williamson Boulevard/Taylor Road intersection will shift to Summer Trees Road to avoid traveling through this intersection. Thus, eastbound left-turn and southbound right-turn volumes were reduced by 25 and 50 percent, respectively.

The PM peak-hour operating conditions of the S.R. 421/I-95 interchange area were then analyzed based on the committed geometry and adjusted PM peak-hour turning movement counts provided in ***Appendix D***. The Synchro and SimTraffic printouts are provided in ***Appendix C***. The existing operating conditions of the intersections with the committed improvements, as summarized in ***Tables 1*** and ***2***, effectively indicate that the interchange area will greatly benefit from the additional westbound left-turn lane at the Taylor Road/Williamson Boulevard intersection as all movements at the interchange area are projected to operate at level of service E or better and with v/c ratios of less than 1.0 based on the Synchro analyses. The overall level of service for the Taylor Road/Williamson Boulevard intersection improves from F (90.8 seconds per vehicle) to D (46.9 seconds per vehicle) and the 95th-percentile queues for the westbound left-turn movement is shown to be less than the storage length. A similar improvement is achieved at the I-95 southbound ramps intersection as the overall intersection delay is projected to drop from 53.1 seconds per vehicle to 36.0 seconds per vehicle. The I-95 northbound ramps intersection also experiences improved conditions with the addition of the third westbound through which will feed the westbound left-turn lane at the I-95 southbound ramps. Also, with the committed improvements most all of queue lengths are projected to be less than the storage lengths for the respective movements.

4.0 EXISTING OPERATING CONDITIONS WITH MODIFICATIONS TO THE S.R. 421/TAYLOR BRANCH ROAD INTERSECTION

The City is currently working towards extending Yorktowne Boulevard from Taylor Branch Road to S.R. 421. With this improvement, the S.R. 421/Taylor Branch Road intersection will be converted to an unsignalized intersection with the elimination of the westbound and northbound left-turn movements (see ***Figure 5***). Thus, an additional evaluation of the traffic conditions at the S.R. 421/I-95 interchange area was conducted with the existing volumes to evaluate the impacts of this additional improvement.

To account for the restriction of the northbound left-turn movement at S.R. 421/Taylor Branch Road intersection due to the extension of Yorktowne Boulevard, the northbound left-turn vehicles (447 vehicles) at the S.R. 421/Taylor Branch Road intersection were re-assigned to the westbound through movement at the S.R. 421/Taylor Branch Road intersection as those vehicles will likely travel to S.R. 421 via the Yorktowne Boulevard extension. Additionally, the existing plus committed geometry was modified to remove the northbound and westbound left-turn lanes at the S.R. 421/Taylor Branch Road intersection.

The existing PM peak-hour operating conditions of the study intersections were then reevaluated with the adjusted turning movement counts as shown in ***Figure 2*** and ***Appendix D***. The Synchro and SimTraffic printouts are provided in ***Appendix C***. The existing operating conditions of the intersections under this scenario are summarized in ***Tables 1*** and ***2***. Based on review of the results, the modifications to the S.R. 421/Taylor Branch Road intersection eliminate the possibility of the eastbound through vehicles spilling back into the I-95 northbound ramps intersection. In fact, under the committed geometry scenario, the 95th-percentile queue is showing to be in 500 feet or greater suggesting that this may be a reality if the signal at this location is not eliminated. Additionally, the westbound left-turn queue at the S.R. 421/Taylor Branch Road intersection extends nearly the length of the turn lane without these modifications. Thus, there is the potential that without this modification the westbound left-turn queue could extend into the westbound through lanes adversely effecting westbound flow on S.R. 421.

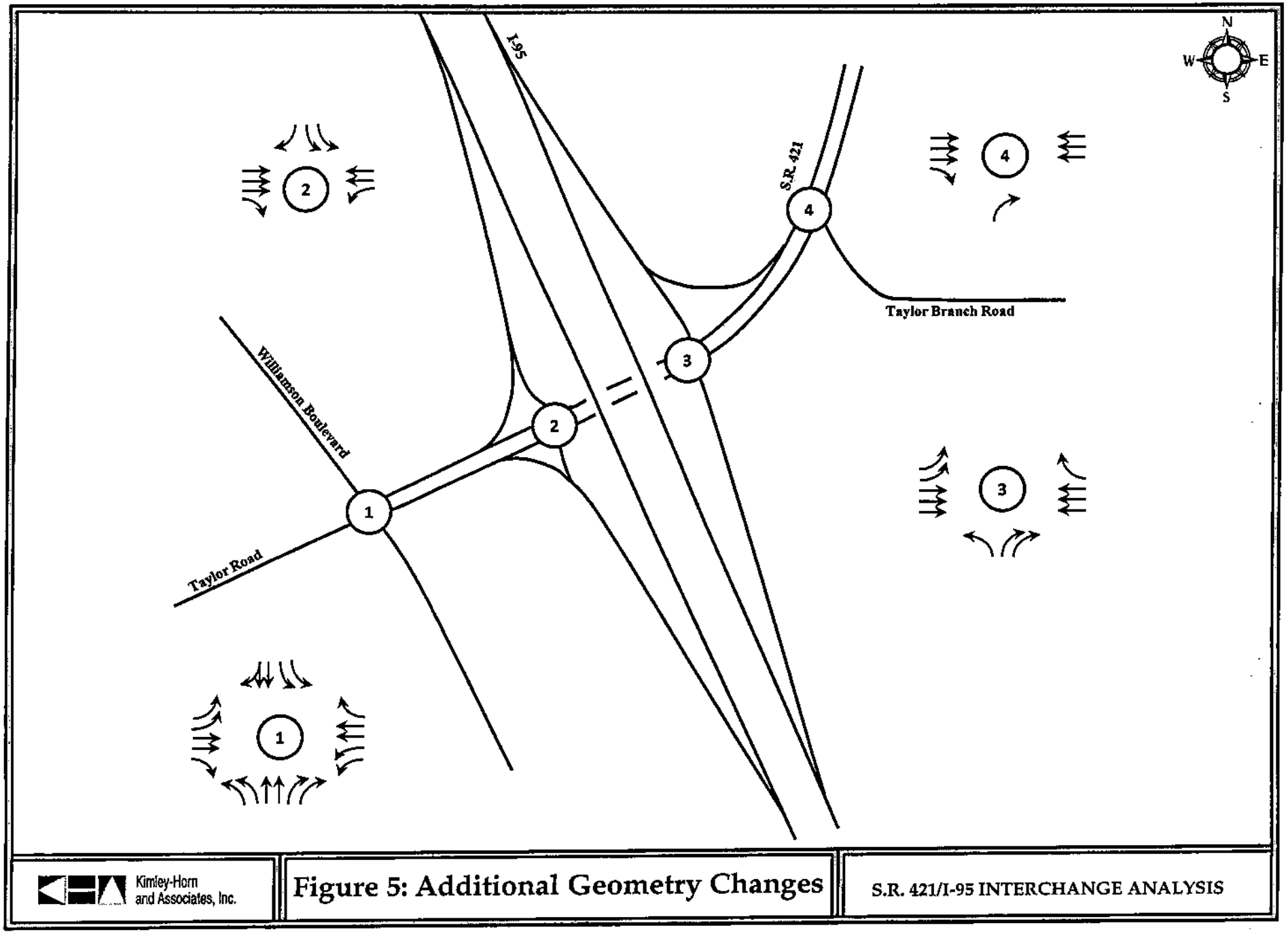

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Figure 5: Additional Geometry Changes

S.R. 421/I-95 INTERCHANGE ANALYSIS

5.0 YEAR 2025 ANALYSIS

Recognizing that S.R. 421 is an east/west roadway through the City of Port Orange, the primary purpose of this study is to understand how the interchange area will function in the future without any improvements. This analysis then utilizes these results to identify short-term and long-term improvements for the interchange area. This analysis then goes one step further to evaluate how the construction of an I-95/Pioneer Trail interchange or a Madeline Avenue overpass across I-95 will affect the operating conditions at the S.R. 421/I-95 interchange area.

For the purposes of this analysis, the traffic operating conditions for the S.R. 421/I-95 interchange area and Williamson Boulevard were evaluated for year 2025.

5.1 No-Build Scenario

Before defining improvement needs at the interchange area, it was first necessary to understand how the interchange will function in year 2025 without any additional improvements. The development of year 2025 volume projections for the "no-build" analysis required the assistance of the Central Florida Regional Planning Model, version 4.10. The model is an analysis tool that considers the trip generating tendencies of geographical areas and how those trips impact the roadway network by balancing trip productions and attractions and routing traffic from the production to the attraction via the most convenient path. Below is a discussion of the development of the "no build" 2025 model as utilized for this analysis.

5.1.1 Network Changes

The 2025 CFRPM roadway network, which reflects all improvements identified in the Volusia County Metropolitan Planning Organization's (MPO) 2025 long-range cost-feasible transportation plan, was modified such that in the vicinity of the study area the roadway network reflected existing lanes plus committed improvements including those identified in sections 3.0 and 4.0. The year 2025 "no build" model network included the following:

1. Four-laning of Williamson Boulevard from Sabal Creek Boulevard to just north of Summer Trees Road extension
2. Prohibition of northbound and westbound left-turn movements at S.R. 421/Taylor Branch Road intersection (removal of signal)

3. Three-laning of eastbound Taylor Road from Williamson Boulevard to I-95 SB Ramps
4. Extension of Yorktowne Boulevard from Taylor Branch Road to Willow Run Boulevard
5. Extension of Summer Trees Road from Taylor Road to Williamson Boulevard
6. Construction of Coraci Boulevard from Taylor Road to Town West Boulevard
7. Replacement of the Pioneer Trail/I-95 overpass with an interchange
8. Four-laning of Williamson Boulevard from Pioneer Trail to Airport Road
9. Four-laning of Taylor Road from Summer Trees Road to Williamson Boulevard

5.1.2 Socio-Economic Data Adjustments

In addition to the network refinements, it was also necessary to review the development information, otherwise known as the socio-economic data, within the year 2025 "no build" model. The City of Port Orange recently participated in the development of a model for the Southeast Volusia Regional Transportation Study (SEVRTS) in which the city provided a thorough review and projection of development for year 2025. Thus, the 2025 socio-economic data for this analysis was developed starting with the SEVRTS model files. These files were then reviewed in detail and refined even further in order to appropriately reflect various new and existing developments in the vicinity of the study area. Detailed discussions of the modifications made to the socio-economic data are provided below (a TAZ map is provided in ***Appendix E***):

Kohl's and Publix – Traffic Analysis Zone (TAZ) 1001 was added on the northwest corner of Taylor Road and Williamson Boulevard intersection to include 174,193 square feet of retail to represent the existing Publix and proposed Kohl's. The centroid connectors were connected to Summer Trees Road, Taylor Road, and Williamson Boulevard. It should be noted that because TAZ 2401 accounted for a portion of this development, a corresponding reduction was made to TAZ 2401 to account for the moving of this development into TAZ 1001.

Williamson Business Park – Williamson Business Park (also known as Thompson Pump) will be located on the southern quadrant of the Williamson Boulevard/I-95 overpass. TAZ 1006 was added to include 335,000 square-feet of industry and 40,000 square-feet of office. Additionally, the existing 140,000-plus square feet of existing industrial development on the east side of Williamson Boulevard was incorporated into this same TAZ. The centroid connector ties into Williamson Boulevard.

Pavilion at Port Orange and Port Orange West – Pavilion at Port Orange and Port Orange West will be located on Williamson Boulevard north of Taylor Road. Combined the two developments will total more than 845,000 square feet of retail and 45,000 square feet of office, which was added to TAZ 1006.

Altamira and Holub – A new TAZ 1002 was added on the east corner of the S.R. 421/Taylor Branch Road intersection to include 315,000 square-feet of commercial and 10,000 square-feet of office. This development did not appear to be reflected in the socio-economic for TAZ 2243, thus the socio-economic for TAZ 2243 was maintained. TAZ 1002 was connected directly to the Yorktowne Boulevard extension, S.R. 421, and Taylor Branch Road.

Target and Lowe's – These existing developments are located on S.R. 421 between Yorktowne Boulevard and I-95. Upon comparing the SEVRTS' socio-economic with the MPO's 2025 CFRPM socio-economic for TAZ 2228 located to the east of Yorktowne Boulevard, it appears that the socio-economic for this TAZ as included in the SEVRTS was refined to account for this development. However, the location of TAZ 2228 did not appear to be an appropriate location for this development. Thus, TAZ 1000 was added between I-95 and Yorktowne Boulevard to include approximately 350,000 square feet of retail uses to represent the Target, Lowe's, and Panera Bread retail area. Also, a corresponding reduction was made to the commercial data in TAZ 2228.

Woodhaven – The proposed maximum intensities as allowed by the currently proposed future land use designations for Woodhaven were included in TAZs 1003, 1005 and 2232 based on the information obtained from Ghyabi & Associates, Inc. Accordingly, 384 single-family and 1,230 multi-family units were assigned to TAZ 1003, 1,387,386 square-feet retail was assigned to TAZ 1005 and 548 single-family, 160 multi-family, and 381,150 square-feet retail was assigned to TAZ 2232.

Planned Community One – Planned Community One will be located mostly north of Town West Boulevard between Tomoka Farms Road and Williamson Boulevard. The development potential of this area was established based on information provided in the City of Port Orange's Comprehensive Plan for Planned Community One and included into TAZ 1001. Additionally, development programs proposed for Port Orange Plantation and Coquina Cove were also used to

establish the amount of development to be incorporated into TAZ 1004. It should be noted that Planned Community One also includes the Port Orange West development as previously discussed. Thus, Port Orange West was not included within TAZ 1004 as it was already included within TAZ 1006. Ultimately, TAZ 1001 included 747 single family units, 1,800 multi-family units, 245,000 square feet of industrial development, 915,000 square feet of commercial development, and 235,000 square feet of office development.

TAZ 2401 – Approximately 1,450 residential units are currently built out to the east of Tomoka Farms Road, between Taylor Road and Town West Boulevard. Thus, TAZ 2401 was adjusted to include 1,080 single-family and 370 multi-family units.

TAZ 2226 – This TAZ was modified to include Nautica Lake's single and multi-family units.

5.1.3 Year 2025 Traffic Volume Projections

In forecasting the future volumes for year 2025, an annual growth rate was applied to the existing PM peak-hour volumes. In identifying annual growth rates to be applied, annual growth rates were first developed by comparing the model volume projections from the year 2025 "no build" model to the model volumes from the Volusia County MPO's adopted year 2000 validation model. The resulting annual growth rates obtained from the model are summarized in ***Table 3***. The model data used to calculate the model annual growth rates is summarized in ***Appendix E***.

Where available, historical data was obtained for the roadway segment legs and historical annual growth rates calculated to provide a comparison between the historical and model growth rates. For purposes of calculating a historical growth rate that is appropriate for consideration in a long-term analysis, a detailed assessment of the historical data was conducted looking at all historical data dating back to 1997 and using engineering judgment. The historical data and calculated historical annual growth rates are summarized in ***Table 4***.

Then, upon reviewing the model growth rates and historical growth rates, an applied annual growth rate was identified for each leg of the study intersections and applied to the existing adjusted PM peak-hour approach and departure volumes to calculate the 2025 PM peak-hour approach and departure volumes. Because the model growth rates better reflect the potential for

Table 3 - Model Growth Rate Calculations
S.R. 421/I-95 Interchange Analysis

Roadway Segments	Model Volumes		Volume Growth		Model Growth Rate
	2000	2025	2000-2025	Vol. x MOCF*	
Taylor Road					
West of Williamson Boulevard	14,587	22,297	7,710	7,325	2.1%
Williamson Boulevard to I-95 SB Ramps	26,663	76,849	50,186	47,677	7.5%
South of Dunlawton Avenue	11,890	8,509	-3,381	-3,212	-1.1%
Williamson Boulevard					
South of Taylor Road	12,802	41,250	28,448	27,026	8.9%
North of Taylor Road	340	25,762	25,422	24,151	299.1%
Taylor Road/I-95 Interchange					
SB Off-Ramp	13,699	16,932	3,233	3,071	0.9%
SB On-Ramp	6,964	14,110	7,146	6,789	4.1%
NB Off-Ramp	7,559	14,057	6,498	6,173	3.4%
NB On-Ramp	13,986	18,119	4,133	3,926	1.2%
Dunlawton Avenue					
I-95 NB Ramps to Taylor Road	51,139	85,795	34,656	32,923	2.7%
Taylor Road to Yorktowne Boulevard	46,170	79,705	33,535	31,858	2.9%

* MOCF - Model Output Conversion Factor

Table 4 - Historical Annual Growth Rate Calculations
S.R. 421/I-95 Interchange Analysis

Roadway Segments	Historical Data*											Historical Growth Rates	
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Annual Growth Rate	Years Used
Taylor Road													
West of Williamson Boulevard	12,840	13,671	15,670	15,633	15,697	18,580	17,160	16,980	20,590	20,960	20,330	1.9%	2002-2007
Williamson Boulevard to I-95 SB Ramps	17,492	24,057	25,520	27,102	28,955	34,660	30,940	30,510	37,390	38,740	37,180	1.5%	2002-2007
South of Dunlawton Avenue	8,972	10,220	10,100	10,628	11,491	11,250	12,010	11,880	14,200	14,520	12,780	2.7%	2002-2007
Williamson Boulevard													
South of Taylor Road	7,691	8,196	10,910	11,792	14,666	15,690	17,660	17,250	19,810	19,780	18,900	4.8%	2001-2007
North of Taylor Road	5,930	6,180	6,420	6,390	9,609	9,480	11,190	11,280	13,160	13,070	14,270	8.1%	2001-2007
Taylor Road/I-95 Interchange													
SB Off-Ramp	-	7,100	8,700	7,700	8,600	8,100	9,500	8,500	10,000	9,900	9,900	4.4%	1998-2007
SB On-Ramp	-	2,900	3,600	3,800	4,000	4,400	4,700	4,200	4,600	4,200	4,400	2.8%	1999-2007
NB Off-Ramp	-	2,800	3,600	3,600	3,900	4,000	4,300	3,600	4,200	3,900	-	1.2%	1999-2006
NB On-Ramp	-	7,400	7,100	8,500	9,700	8,600	10,000	9,400	11,000	11,000	-	2.7%	2001-2006
Dunlawton Avenue													
I-95 NB Ramps to Taylor Road	25,500	24,000	28,000	23,500	27,000	26,000	33,500	34,500	37,500	35,500	36,500	2.2%	2003-2007
Taylor Road to Yorktowne Boulevard	25,500	24,000	28,000	23,500	27,000	26,000	33,500	34,500	37,500	35,500	36,500	2.2%	2003-2007
Pioneer Trail													
Williamson Boulevard to I-95 SB Ramps	2,153	2,331	3,077	2,205	2,440	1,780	3,090	3,040	3,380	3,590	2,700	2.5%	1997-2007
I-95 SB Ramps to I-95 NB Ramps	2,153	2,331	3,077	2,205	2,440	1,780	3,090	3,040	3,380	3,590	2,700	2.5%	1997-2007
I-95 NB Ramps to Turnbull Bay Road	2,153	2,331	3,077	2,205	2,440	1,780	3,090	3,040	3,380	3,590	2,700	2.5%	1997-2007

* Traffic data obtained from Volusia County

future development/growth opportunities and also reflect a lack of growth due to the potential of certain areas being built out, in nearly all cases, the applied annual growth rate was the model annual growth rate or two percent, whichever was greater. The calculated model annual growth rates, the historical annual growth rates, the applied growth rates, and the 2025 PM peak-hour directional volumes are summarized in ***Table 5***.

These PM peak-hour link volumes were then converted to 2025 PM peak-hour intersection turning movement projections using the following steps:

1) The 2025 segment volumes as provided in Table 4 were compared against the existing approach and departure volumes for each intersection to calculate the growth in the approach and departure volumes.

2) Two different procedures (approach-based and departure-based) were then used in calculating the growth in the peak-hour turning movements. As an example,

   In approach-based analysis:

$$\text{EBL Volume} = \text{EB Approach Growth} \times \frac{\text{NB Departure Growth}}{\text{NB Departure Growth} + \text{EB Departure Growth} + \text{SB Departure Growth}}$$

   In departure-based analysis:

$$\text{EBL Volume} = \text{NB Departure Growth} \times \frac{\text{EB Approach Growth}}{\text{NB Approach Growth} + \text{EB Approach Growth} + \text{SB Approach Growth}}$$

3) An average of the two procedures from step 2 was used as the volume growth for each turning movement at the each intersection.

4) The growth for each turning movement as obtained from step 3 was added to the existing turning movement counts to obtain the future total PM peak-hour turning movement volumes.

Detailed worksheets for each intersection are contained in ***Appendix D*** and the resulting 2025 turning movement projections are provided in ***Figure 6***.

Table 5 - 2025 PM Peak-Hour Volume Projections
S.R. 421/I-95 Interchange Analysis

Roadway Segments	Existing PM Peak-Hour Volume			Annual Growth Rate			2025 PM Peak-Hour Volume	
	EB/NB	WB/SB	Year	Historical Rate	Model Rate	Applied Rate	EB/NB	WB/SB
Taylor Road								
West of Williamson Boulevard	765	1,088	2008	1.9%	2.1%	2.1%	1,040	1,479
Williamson Boulevard to I-95 SB Ramps	1,207	1,534	2008	1.5%	7.5%	7.5%	2,752	3,497
South of Dunlawton Avenue	101	501	2008	2.7%	-1.1%	2.0%	135	671
Williamson Boulevard								
South of Taylor Road	795	1,165	2008	4.8%	8.9%	8.9%	1,996	2,925
North of Taylor Road	544	910	2008	8.1%	299.1%	*	1,140	1,907
Taylor Road/I-95 Interchange								
SB Off-Ramp	-	1,370	2008	4.4%	0.9%	2.0%	-	1,836
SB On-Ramp	-	323	2008	2.8%	4.1%	4.1%	-	548
NB Off-Ramp	244	-	2008	1.2%	3.4%	3.4%	387	-
NB On-Ramp	742	-	2008	2.7%	1.2%	2.0%	994	-
Dunlawton Avenue								
I-95 NB Ramps to Taylor Road	2,150	1,928	2008	2.2%	2.7%	2.7%	3,141	2,816
Taylor Road to Yorktowne Boulevard	1,750	1,928	2008	2.2%	2.9%	2.9%	2,614	2,880

* For this segment of Williamson Boulevard, model calculated growth rate was unreasonable due to a low 2000 model volume, thus 2025 Volume Projections were made using the following steps:

Model Volume Growth (2000-2025) = 24,151 (Please refer to *Table 3*)

Model Volume Growth (2008-2025) = 16,423

K-Factor = 9.70%

D-Factor = 62.6% (SB)

PM Peak-Hour Volume Growth (2008-2025) = 16,423 x 0.097 x 0.626 = 997 SB

16,423 x 0.097-997 = 596 NB

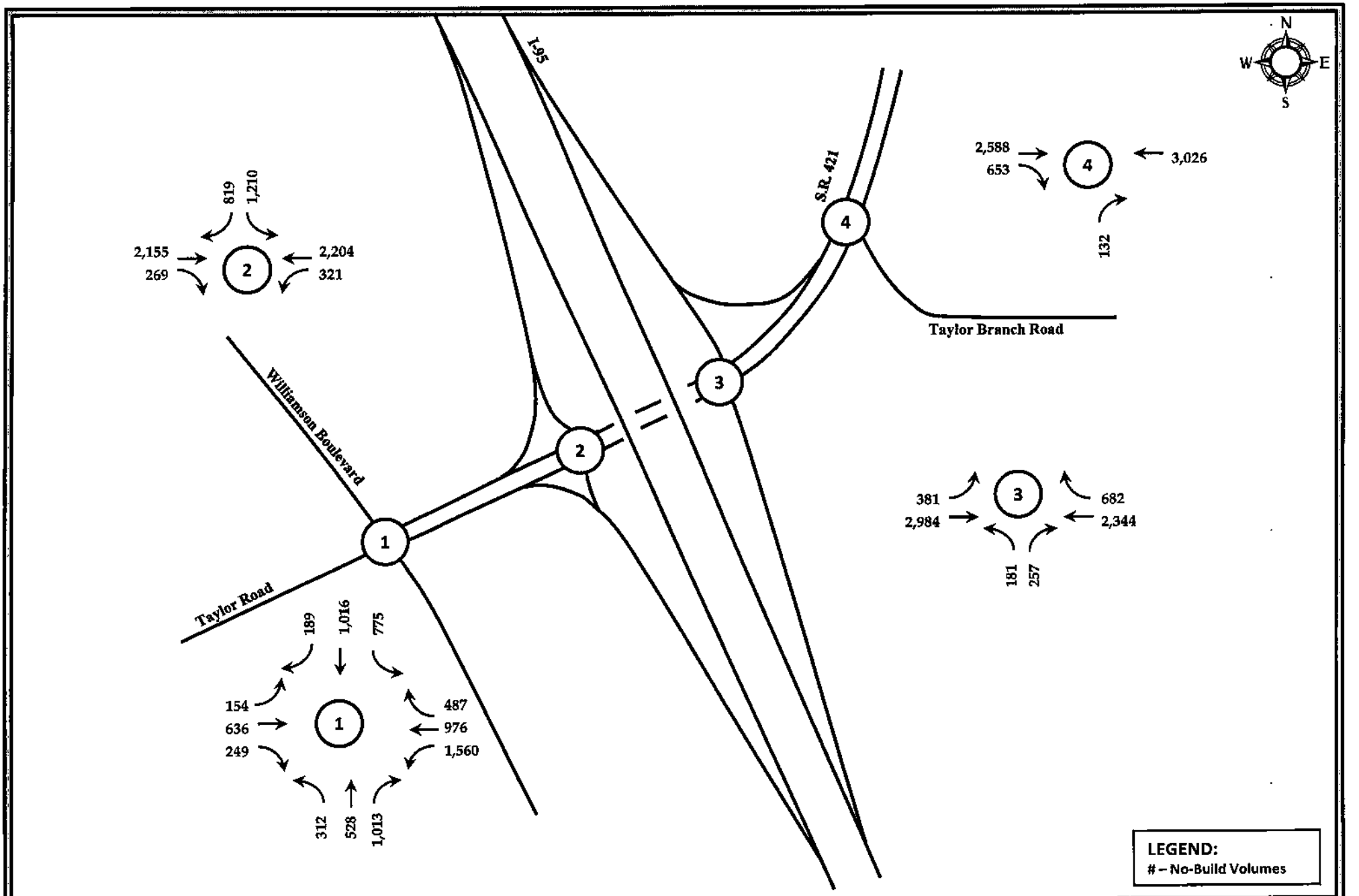

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Figure 6: Year 2025 No-Build PM Peak-Hour Volumes

S.R. 421/I-95 INTERCHANGE ANALYSIS

5.1.4 Year 2025 Operating Conditions

The future PM peak-hour operating conditions of the S.R. 421/I-95 interchange area were evaluated for the "no build" condition with the projected turning movement counts using Synchro and SimTraffic. The Synchro and SimTraffic reports are provided in ***Appendix F***. As summarized in ***Tables 6*** and *7*, it can be seen that vehicles at the Williamson Boulevard intersection will experience excessive delays as the overall average delay is projected to be 150.1 seconds per vehicle. As a result, several movements are projected to have 95th-percentile queues that exceed the storage length. These results are not unexpected given the amount of development still anticipated to occur west of I-95 along Williamson Boulevard.

Vehicles at the I-95 southbound ramps intersection are also projected to experience excessive delays with an average overall delay of 132.8 seconds per vehicle, although the Williamson Boulevard intersection is projected to be more problematic. It should be noted that these results suggest that the extension of the westbound left-turn lane from the I-95 southbound ramps intersection back to the Taylor Branch Road intersection, as currently committed, is a beneficial improvement as the queue length for this movement is projected to extend back into the I-95 northbound ramps intersection.

Based on the Synchro analysis and in reviewing the volume projections, the I-95 northbound ramps intersection is projected to have acceptable operating conditions with an average delay of 22.3 seconds per vehicle. However, given the expected delays at the other two intersections to the west, it is highly likely that westbound vehicles will queue back through the northbound ramps intersection. In fact, this very concern is validated by the projected delays shown with the SimTraffic results. A similar affect is experienced today where the westbound left-turn movement at the Williamson Boulevard intersection spills back through the interchange area thus creating the perception that the Taylor Branch Road intersection does not operate acceptably. However, the reality is that the Taylor Branch Road intersection would operate acceptably if queues from the downstream intersections did not back into the intersection.

Based on a comparison of the existing volumes to the 2025 volume projections, considering a straight-line interpolation between the two years, and considering the capacity of the intersections within the interchange area, it could generally be concluded that the interchange area should function acceptably for six to seven more years before an improvement is needed beyond the improvements defined in sections 3.0 and 4.0. However, there are numerous developments either approved or currently going through the City's development approval process. Thus, the point at which additional improvements are needed will essentially be dictated by the rate at which these developments are constructed, as well as the type (retail, residential, etc.) and size of such future developments.

Williamson Boulevard

The PM peak-hour volumes on Williamson Boulevard between Airport Road and Taylor Road were directly obtained from the turning movement worksheets as shown in ***Appendix D***. The 2025 operating conditions of the roadway segment were evaluated by comparing the volumes to a peak-hour peak-directional generalized service volume of 1,860. In 2025, the projected PM peak-hour volumes on Williamson Boulevard between Airport Road and Taylor Road will be 1,853 northbound and 2,825 southbound. This volume is expected to dissipate further south down Williamson Boulevard. However, given the magnitude of the southbound volume, there is likely to be significant congestion on Williamson Boulevard during the PM peak hour. Now, it should be noted that these volume projections account for substantial future development south of Taylor Road, including sizable retail developments. Perhaps the projected volumes are overstated in that the potential retail development along Pioneer Trial will not be of the magnitude currently anticipated in this analysis if additional access, such as an I-95 interchange at Pioneer Trail, is not provided.

Table 6 - Future Intersection Conditions (With and Without Improvements - Year 2025)

S.R.421/I-95 Interchange Analysis

Study Intersections	Approach	Movement	NO-BUILD EVALUATION V/C	NO-BUILD EVALUATION Delay (sec/veh)/LOS Movement Synchro	Movement SimTraffic	Approach (Synchro)	Total (Synchro)	INTERIM IMPROVEMENTS EVALUATION Movement	V/C	Delay (sec/veh)/LOS Movement Synchro	Movement SimTraffic	Approach (Synchro)	Total (Synchro)	ULTIMATE IMPROVEMENTS EVALUATION Movement	V/C	Delay (sec/veh)/LOS Movement Synchro	Movement SimTraffic	Approach (Synchro)	Total (Synchro)
Williamson Boulevard at Taylor Road	Eastbound	L	0.80	84.2/F	145.0/F	159.2/F	150.1/F	L	n/a	n/a	n/a	71.7/E	118.9/F	L	n/a	n/a	n/a	81.0/F	107.1/F
		T	1.22	172.3/F	356.1/F			T	0.89	73.3/E	878.0/F			T	0.95	83.2/F	72.7/F		
		R	n/a	n/a	534.5/F			R	0.63	67.9/E	1386.9/F			R	0.87	75.5/E	36.9/D		
	Westbound	L	1.40	214.4/F	119.0/F	119.8/F		L	1.40	207.5/F	123.6/F	109.4/F		L	1.30	177.6/F	93.8/F	97.0/F	
		T	0.76	20.1/C	34.2/C			T	0.62	6.7/A	26.8/C			T	0.55	15.6/B	15.3/B		
		R	0.42	16.4/B	10.7/B			R	0.38	1.2/A	3.6/A			R	0.33	2.8/A	6.8/A		
	Northbound	L	1.28	218/F	111.6/F	77.6/E		L	1.28	218.0/F	206.8/F	77.6/E		L	1.24	197.8/F	295.2/F	88.6/F	
		T	0.98	89.6/F	112.1/F			T	0.98	89.6/F	124.3/F			T	1.14	143.1/F	121.7/F		
		R	0.74	28.2/C	91.3/F			R	0.74	28.1/C	270.5/F			R	0.74	26.7/C	57.1/D		
	Southbound	L	1.45	270.7/F	273.3/F	259.6/F		L	1.45	270.7/F	616.3/F	200.9/F		L	1.24	175.8/F	153.8/F	156.3/F	
		T	1.43	252.5/F	196.7/F			T	1.19	147.7/F	140.6/F			T	1.18	141.4/F	134.4/F		
		R	n/a	n/a	192.2/F			R	n/a	n/a	n/a			R	n/a	n/a	n/a		
Taylor Road at I-95 SB Ramps	Eastbound	L	n/a	n/a	n/a	157.2/F	132.8/F	L	n/a	n/a	n/a	182.1/F	120.1/F	L	n/a	n/a	n/a	31.7/C	28.1/C
		T	1.31	176.8/F	47.2/D			T	1.36	204.8/F	41.5/D			TR	0.84	31.7/C	39.6/D		
		R	0.18	0.0/A	28.6/C			R	0.18	0.0/A	26.0/C			R	n/a	n/a	28.3/C		
	Westbound	L	0.91	96.0/F	81.9/F	82.9/F		L	1.11	132.6/E	126.2/F	67.8/E		L	0.58	60.0/E	50.2/E	10.8/B	
		T	1.12	80.9/F	72.5/E			T	1.09	54.7/D	106.1/F			T	0.66	3.6/A	95.0/F		
		R	n/a	n/a	n/a			R	n/a	n/a	n/a			R	n/a	n/a	n/a		
	Northbound	L	n/a	n/a	n/a	n/a		L	n/a	n/a	n/a	n/a		L	n/a	n/a	n/a	n/a	
		T	n/a	n/a	n/a			T	n/a	n/a	n/a			T	n/a	n/a	n/a		
		R	n/a	n/a	n/a			R	n/a	n/a	n/a			R	n/a	n/a	n/a		
	Southbound	L	1.21	150.7/F	97.2/F	168.0/F		L	0.88	53.4/D	125.8/F	113.9/F		L	0.75	40.8/D	58.4/E	46.1/D	
		T	n/a	n/a	n/a			T	n/a	n/a	n/a			T	n/a	n/a	n/a		
		R	1.31	198.4/F	3,134.3/F			R	1.36	220.3/F	9509/F			R	0.91	54.0/D	45.6/E		
Taylor Road at I-95 NB Ramps	Eastbound	L	0.82	78.5/B	68.3/E	18.3/B	22.3/C	L	0.81	30.8/C	46.9/D	12.5/B	19.6/B	L	0.71	32.8/C	51.7/E	14.6/B	21.3/C
		T	0.81	10.6/A	7.8/A			T	0.81	10.2/B	9.9/A			T	0.83	12.2/B	18.7/B		
		R	n/a	n/a	n/a			R	n/a	n/a	n/a			R	n/a	n/a	n/a		
	Westbound	L	n/a	n/a	n/a	20.2/C		L	n/a	n/a	n/a	20.5/C		L	n/a	n/a	n/a	22.7/C	
		T	0.83	25.8/C	83.6/F			T	0.84	26.1/C	87.9/F			TR	0.70	22.7/C	76.7/E		
		R	0.46	1.0/A	7.5/A			R	0.46	1.0/A	8.5/A			R	n/a	n/a	21.0/C		
	Northbound	L	0.80	75.1/E	411.3/F	67.3/E		L	0.80	75.1/E	275.0/F	67.3/E		L	0.79	70.9/E	60.4/E	63.9/E	
		T	n/a	n/a	n/a			T	n/a	n/a	n/a			T	n/a	n/a	n/a		
		R	0.69	61.7/E	137.0/F			R	0.69	61.7/E	113.7/F			R	0.67	58.9/E	41.6/D		
	Southbound	L	n/a	n/a	n/a	n/a		L	n/a	n/a	n/a	n/a		L	n/a	n/a	n/a	n/a	
		T	n/a	n/a	n/a			T	n/a	n/a	n/a			T	n/a	n/a	n/a		
		R	n/a	n/a	n/a			R	n/a	n/a	n/a			R	n/a	n/a	n/a		
S.R. 421 at Taylor Branch Road	Eastbound	L	n/a	n/a	n/a	0.0/A	0.2/A	L	n/a	n/a	n/a	0.0/A	0.2/A	L	n/a	n/a	n/a	0.0/A	0.3/A
		T	0.55	0.0/A	2.5/A			T	0.55	0.0/A	2.0/A			T	0.55	0.0/A	3.8/A		
		R	0.41	0.0/A	5.8/A			R	0.41	0.0/A	5.0/A			R	0.41	0.0/A	7.7/A		
	Westbound	L	n/a	n/a	n/a	0.0/A		L	n/a	n/a	n/a	0.0/A		L	n/a	n/a	n/a	0.0/A	
		T	0.48	0.0/A	85.9/F			T	0.48	0.0/A	335.0/F			T	0.48	0.0/A	52.0/E		
		R	n/a	n/a	n/a			R	n/a	n/a	n/a			R	n/a	n/a	n/a		
	Northbound	L	n/a	n/a	n/a	12.0/B		L	n/a	n/a	n/a	12.0/B		L	n/a	n/a	n/a	12.3/B	
		T	n/a	n/a	n/a			T	n/a	n/a	n/a			T	n/a	n/a	n/a		
		R	0.22	12.0/B	18.1/B			R	0.22	12.0/B	9.9/A			R	0.22	12.3/B	31.2/C		
	Southbound	L	n/a	n/a	n/a	n/a		L	n/a	n/a	n/a	n/a		L	n/a	n/a	n/a	n/a	
		T	n/a	n/a	n/a			T	n/a	n/a	n/a			T	n/a	n/a	n/a		
		R	n/a	n/a	n/a			R	n/a	n/a	n/a			R	n/a	n/a	n/a		

Table 7 - Summary of Queue Lengths Comparison (With and Without Improvements - Year 2025)

S.R. 421/I-95 Interchange Analysis

Study Intersections	Approach	Movement	NO-BUILD EVALUATION			INTERIM IMPROVEMENTS			ULTIMATE IMPROVEMENTS		
			Storage Length (feet)	95th Percentile Queue (feet)		Storage Length (feet)	95th Percentile Queue (feet)		Storage Length (feet)	95th Percentile Queue (feet)	
				Synchro	SimTraffic		Synchro	SimTraffic		Synchro	SimTraffic
Williamson Boulevard at Taylor Road	Eastbound	L	250	138	224	n/a	n/a	n/a	n/a	n/a	n/a
		T	-	465	1,322	-	295	1,956	-	240	624
		R	n/a	n/a	n/a	200	236	170	200	254	270
	Westbound	L	415	971	487	530	980	511	530	1,128	560
		T	-	400	459	-	139	495	-	307	399
		R	180	80	110	180	10	157	180	0	104
	Northbound	L	195	300	353	195	300	320	195	287	377
		T	-	397	604	-	397	2,820	-	425	771
		R	575	481	366	575	269	334	575	458	361
	Southbound	L	600	661	398	600	661	342	600	595	392
		T	-	978	2,241	-	767	2,273	-	740	1,944
		R	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Taylor Road at I-95 SB Ramps	Eastbound	L	950	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		T	-	823	447	-	921	455	-	405	658
		R	-	n/a	n/a	-	n/a	n/a	-	n/a	n/a
	Westbound	L	320	412	530	320	593	556	320	158	673
		T	-	1,414	661	-	1,196	628	-	64	711
		R	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Northbound	L	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		T	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		R	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Southbound	L	475	879	263	475	450	290	475	407	608
		T	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		R	-	1,129	194	-	1,129	196	-	543	732
Taylor Road at I-95 NB Ramps	Eastbound	L	370	155	226	320	150	186	320	165	246
		T	-	298	378	-	265	256	-	359	466
		R	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Westbound	L	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		T	-	778	711	-	778	728	-	491	744
		R	-	0	542	-	0	533	-	0	n/a
	Northbound	L	334	258	417	334	258	370	334	253	300
		T	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		R	334	188	1,134	334	188	450	334	181	171
	Southbound	L	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		T	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		R	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
S.R. 421 at Taylor Branch Road	Eastbound	L	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		T	-	0	0	-	0	0	-	0	14
		R	270	0	0	270	0	0	270	0	0
	Westbound	L	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		T	-	0	1,481	-	0	1,913	-	0	928
		R	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Northbound	L	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		T	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		R	-	20	136	-	20	106	-	21	186
	Southbound	L	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		T	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		R	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

6.0 S.R. 421/I-95 INTERCHANGE IMPROVEMENT NEEDS

Given the projected adverse operating conditions for the S.R. 421/I-95 interchange area under the "no build" scenario, additional analyses were conducted for the purposes of identifying and evaluating improvement alternatives for year 2025. Upon conducting this analysis, interim and ultimate improvements, as shown in ***Figure 7***, were identified.

6.1 Interim Improvements

The S.R. 421/I-95 interchange area was upgraded in 2007 with the construction of various improvements which essentially maximized the clearance under the existing I-95 overpass almost to the point that there are no other cost-feasible improvements left to be made. However, upon evaluating the interchange area further, two other potential modifications were identified which could provide temporary relief to the interchange area. The interim improvements are summarized below:

- Eliminate the eastbound left-turn and southbound right-turn movements at the Taylor Road/Williamson Boulevard intersection
- Provide a third southbound left-turn lane at the I-95 southbound ramps intersection

The Summer Trees Road extension, from Taylor Road to Williamson Boulevard, was recently completed. This roadway effectively provides an alternative method for vehicles to travel between Taylor Road, west of Williamson Boulevard, and Williamson Boulevard, north of Taylor Road, thereby providing limited relief to the eastbound left-turn and southbound right-turn movements at the Taylor Road/Williamson Boulevard intersection. Based on the "no build" analysis, it is clear that this intersection will be the most problematic in the future. Thus, it is recommended that these two movements, the eastbound left-turn and southbound right-turn movements, be prohibited at the Taylor Road/Williamson Boulevard intersection. This will effectively force vehicles to use Summer Trees Road to avoid this intersection. As a result, the operating conditions of the southbound through movement will be enhanced. Additionally, the elimination of the eastbound left-turn movement enables the eastbound approach to be restriped from two through lanes and one shared through/right-turn lane to three through lanes and one right-turn lane. Also, the elimination of the eastbound

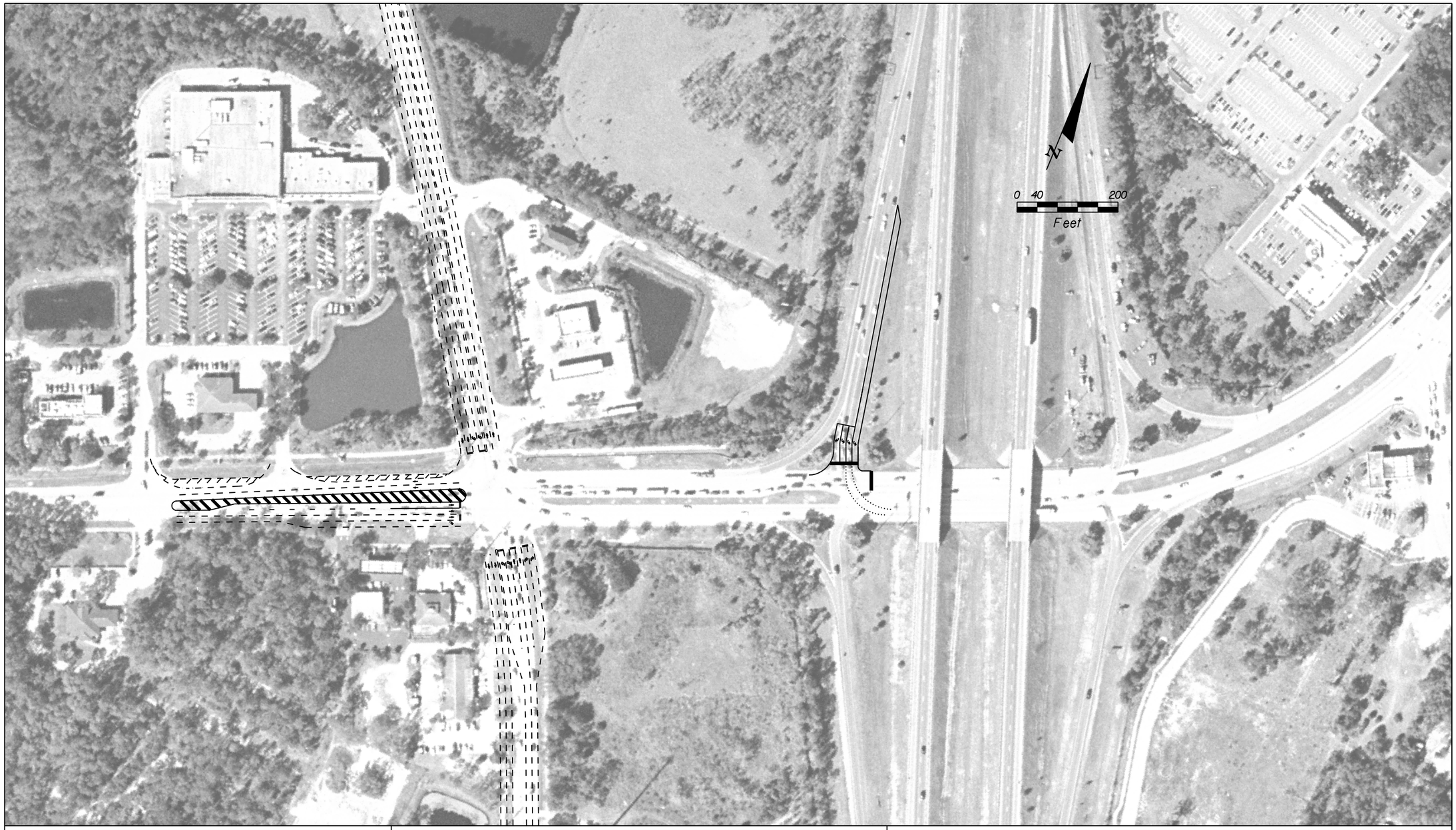

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Figure 7: Interim Improvement Concept

S.R. 421/I-95 INTERCHANGE ANALYSIS

left-turn movement enables additional green time to be allocated to other movements. As a result, it can be seen in ***Table 6*** that the overall intersection delay at the Taylor Road/Williamson Boulevard intersection decreases from 150.1 seconds per vehicle to 118.9 seconds per vehicle in 2025. In prohibiting these movements, a more detailed analysis should be conducted at the Taylor Road/Summer Trees Road and Williamson Boulevard/Summer Trees Road intersections to understand if the additional turning vehicles will require enhancements such as extending turn lanes.

In addition, consideration should be given to providing a third southbound left-turn lane at the I-95 southbound ramps intersection. This is an improvement that has been contemplated in various traffic studies prepared for both new developments as well as for the City of Port Orange. Triple left-turn lanes are gradually becoming more common, although triple left-turn lanes do not currently exist anywhere within Volusia County. With this additional southbound left-turn lane, the overall intersection delay for the I-95 southbound ramps intersection will improve from 132.8 seconds per vehicle to 120.1 seconds per vehicle in 2025 (see ***Table 6***). Additionally, depending on the amount of greentime ultimately allocated to the southbound approach, this improvement could substantially reduce the potential queue length on the I-95 southbound off-ramp (see ***Table 7***).

It is clear that even with these interim improvements, the Williamson Boulevard intersection and possibly the I-95 southbound ramps intersection will have undesirable operating conditions in year 2025. However, these interim improvements will provide a slight enhancement to the capacity at the S.R. 421/I-95 interchange area, possibly allowing for the interchange area to operate acceptably for an additional year or two beyond the life of the currently committed improvements.

Consideration was given in this analysis to providing a third southbound left-turn lane at the Taylor Road/Williamson Boulevard intersection. However, upon further examination of the 2025 turning movement volume projections, it was determined that this movement was not critical and thus such an improvement would provide little overall benefit to the intersection. But, as development continues west of I-95 and traffic volumes change, this movement should be monitored. In the event that this movement does become critical, then consideration should be given to providing a third southbound left-turn lane because a third receiving lane already exists.

Additionally, the treatment of the southbound right-turn lanes at the I-95 southbound off-ramps intersection will not be ideal in the future. As volumes increase there will ultimately be concerns regarding the weaving between those westbound vehicles coming from east of I-95 that need to turn right to go north on Williamson Boulevard and those southbound right-turning vehicles from the southbound off-ramp that wish to proceed west through the Taylor Road/Williamson Boulevard intersection. Consideration should be given to bringing both of the southbound right-turn lanes at the I-95 southbound ramps intersection under signalized control and eliminate the free-flowing southbound right-turn lane. Given that this improvement will not necessarily enhance capacity at the interchange area, but rather provide improved operating conditions, it was deferred to the ultimate improvement in this analysis.

Design Considerations – The prohibition of the eastbound left-turn at the Taylor Road/Williamson Boulevard intersection will effectively require restriping the eastbound approach and removal of the left-turn signal heads. Similarly, the pavement marking for the southbound shared through/right-turn lane will need to be revised to eliminate the right-turn movement. These lane modifications will also likely require some milling and resurfacing such that the pavement markings are clear and the aesthetics of the intersection are not compromised.

As for the triple left-turn lanes, the Florida Department of Transportation has not adopted formal design standards for triple left-turn lanes. However, a report titled *Left-Turn Lanes at Signalized Intersections* was prepared for FDOT in December of 2002 which provides recommended minimum design standards for triple left-turn lanes. Based on this information, the interim improvement concept was prepared with the inclusion of a third southbound left-turn lane at the I-95 southbound ramps intersection. It is important to note that FDOT evaluates the design of triple left-turn lanes on a case-by-case basis taking into consideration many factors such as operational benefits, safety concerns, downstream destinations which may affect lane assignment, truck traffic, etc. Should this improvement be considered for design and construction, then additional analyses will likely be required to determine if the concept provided herein is appropriate.

Recognizing that truck traffic is an important consideration for triple left-turn lanes, it is possible that overhead signage may be requested to restrict trucks to certain lanes to enhance the flow of the triple lefts through the intersection and minimize adverse operational impacts and/or safety concerns. Similarly, overhead signage is often a consideration for any triple left-turn location as it may be very helpful for the purposes directing motorists to one of the three specific left-turn lanes taking into consideration the downstream destination. Although S.R. 421 is a six-lane facility for two miles and there are no immediate destinations immediately east of the intersection that would drastically affect lane assignment, overhead signage was included within the opinion of probable cost.

Opinion of Probable Cost – Using the improvement concept, an opinion of probable cost was developed for the interim improvement. The total cost of the improvement is estimated to be approximately $621,165 based on ***Table 8***, including engineering, surveying, permitting, construction, and post-engineering. It should be noted that this opinion of probable cost also includes costs pertaining to signalization modification as well as overhead signage for the triple southbound left-turn lanes at the I-95 southbound ramps intersection.

TABLE 8 - ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COSTS

S.R. 421 at I-95 INTERCHANGE IMPROVEMENTS

INTERIM GEOMETRY

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNITS	UNIT COST*	TOTAL
101-1	MOBILIZATION	1	LS	$51,037.19	$51,037
102-1	MAINTENANCE OF TRAFFIC (15%)	1	LS	$44,380.17	$44,380
104-13-1	TYPE III SILT FENCE	950	LF	$1.07	$1,017
110-1-1	CLEARING AND GRUBBING	0.4	AC	$19,261.29	$7,897
110-4	REMOVAL OF EXISTING CONCRETE PAVEMENT	7	SY	$23.93	$160
160-4	STABILIZATION TYPE B (12")	1363	SY	$4.12	$5,616
285-709	BASE OPTIONAL (GROUP 1)	334	SY	$10.94	$3,654
285-709	BASE OPTIONAL (GROUP 9)	967	SY	$17.98	$17,381
334-1-14	SUPERPAVE ASPHALTIC CONCRETE (TRAFFIC D)	225	TN	$101.93	$22,934
337-7-7	ASPHALTIC CONCRETE FC-5 (RUBBER) (1")	53	TN	$117.41	$6,270
400-1-15	CONCRETE CLASS I (MISC)	5	CY	$627.91	$3,140
520-5-11	TRAFFIC SEPARATOR CONC. (TYPE I) (4' WIDE)	2	LF	$32.64	$65
570-1-2	PERFORMANCE TURF	833	SY	$3.14	$2,617
711-11-121	THERMOPLASTIC, STD., SOLID WHITE (6")	1050	LF	$1.42	$1,491
711-11-125	THERMOPLASTIC, STD., SOLID WHITE (24")	95	LF	$3.77	$358
711-11-131	THERMOPLASTIC, STA., WHITE SKIP (6")	285	LF	$1.38	$393
711-11-170	THERMOPLASTIC, STD., WHITE, ARROW	7	EA	$50.22	$352
700-44077	SGN LT'D OH TR, T 121 TO 140, S 601-700	1	AS	$147,525.00	$147,525
	SIGNAL MODIFICATION	1	EA	$75,000.00	$75,000
				SUBTOTAL	**$391,285**
				25% CONTINGENCY	**$97,821**
				TOTAL CONSTRUCTION COST	**$489,106**
				DESIGN (15%)	**$73,366**
				C.E.I. (12%)	**$58,693**
				TOTAL COST	**$621,165**

*THIS VALUE WAS OBTAINED FROM THE FDOT ESTIMATES OFFICE WEBSITE UNDER THE ITEM AVERAGE UNIT COSTS FOR JANUARY 2007 - DECEMBER 31, 2007.

NOTE:

THE ENGINEER HAS NO CONTROL OVER THE COST OF LABOR, MATERIALS, EQUIPMENT, OR OVER THE CONTRACTOR'S METHODS OF DETERMINING PRICES OR OVER COMPETITIVE BIDDING OR MARKET CONDITIONS. OPINIONS OF PROBABLE COSTS PROVIDED HEREIN ARE BASED ON THE INFORMATION KNOWN TO THE ENGINEER AT THIS TIME AND REPRESENT ONLY THE ENGINEER'S JUDGMENT AS A DESIGN PROFESSIONAL FAMILIAR WITH THE CONSTRUCTION INDUSTRY. THE ENGINEER CANNOT AND DOES NOT GUARANTEE THAT PROPOSALS, BIDS, OR ACTUAL CONSTRUCTION COSTS WILL NOT VARY FROM ITS OPINIONS OF PROBABLE COSTS.

6.2 Ultimate Improvements

Despite the two other potential modifications identified above, a more substantial improvement will be needed for the S.R. 421/I-95 interchange area to accommodate additional growth in the area based on the 2025 volume projections. In December of 2005, URS/HNTB prepared *I-95 System Operational Analysis Report* for the Florida Department of Transportation in which was included the *S.R. 421 Interchange Concept Report*. This report provided a conceptual ultimate improvement layout along with an opinion of probable cost for the S.R. 421/I-95 interchange area. This resource was used as an initial guide in evaluating the long-term needs of the interchange area. However, upon evaluating the improvement needs in greater detail, it was clear there were several refinements required. Thus, the ultimate improvement identified herein, as shown in ***Figure 8***, was effectively developed independently of the SOAR report and includes the following:

- Eliminate the eastbound left-turn and southbound right-turn movements at the Taylor Road/Williamson Boulevard intersection
- At the Taylor Road/Williamson Boulevard intersection, utilize the striped-out area from the eastbound left-turn lanes to provide an eastbound approach which includes four eastbound through lanes and one right-turn lane.
- Provide a third southbound left-turn lane at the I-95 southbound ramps intersection
- Extend one of the eastbound left-turn lanes from the I-95 northbound ramps intersection to the Taylor Road/Williamson Boulevard intersection. Similarly, provide a shorter extension of the inside eastbound left-turn from the I-95 northbound ramps intersection back to approximately 300 feet west of the I-95 southbound ramps intersection.
- Provide an eastbound right-turn lane at the I-95 southbound ramps intersection
- Construct a second westbound left-turn lane at the I-95 southbound ramps intersection and provide a second receiving lane on the I-95 southbound on-ramp to accommodate traffic from the second left-turn lane.
- Provide third and fourth westbound travel lanes from approximately 500 feet east of the I-95 northbound ramps intersection to the I-95 southbound ramps intersection. Then, have the two inside westbound through lanes at the I-95 southbound ramps intersection feed the dual westbound left-turn lanes at the Taylor Road/Williamson Boulevard intersection

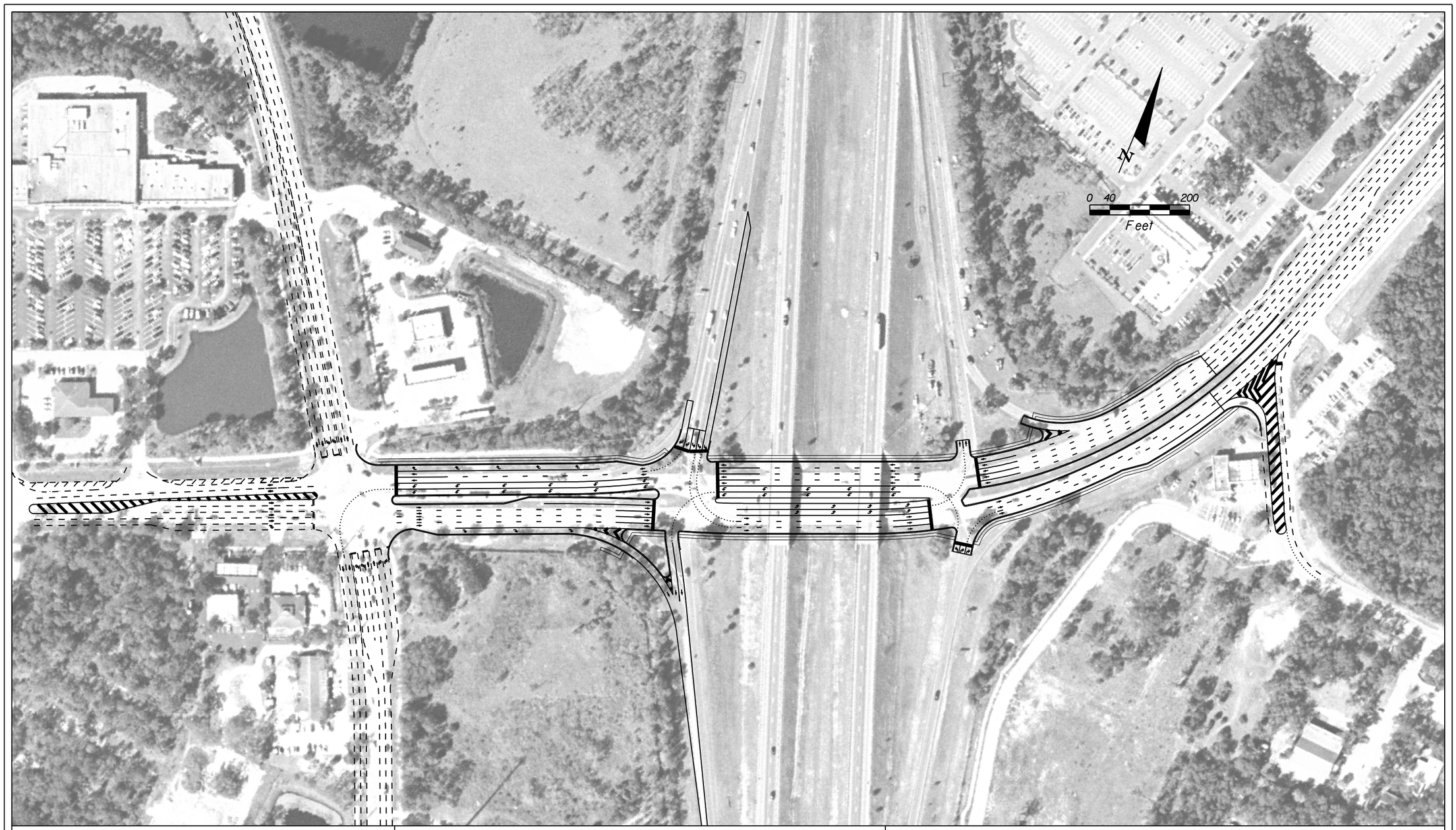

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Figure 8: Ultimate Improvement Concept

S.R. 421/I-95 INTERCHANGE ANALYSIS

- Modify the free-flow southbound right-turn lane at the I-95 southbound ramps intersection such that it operates under signalized control, thereby providing dual right-turn lanes under signalized control.
- Replace each single-span I-95 bridge with two steel 100-foot span bridges and construct a median on S.R. 421 to the accommodate bridge piers

The first three improvements identified above are effectively consistent with the interim improvements with the exception that the interim improvements identify three eastbound through lanes at the Taylor Road/Williamson Boulevard intersection whereas the ultimate improvement identifies four eastbound through lanes. In providing a fourth eastbound through lane, it is also necessary to provide a fourth receiving lane which is effectively the extension of the eastbound left-turn lane from the I-95 northbound ramps intersection. Additionally, the northernmost eastbound left-turn lane at the I-95 northbound ramps intersection is also extended back to approximately 300 feet west of the I-95 southbound ramps, thus effectively allowing for five eastbound through lanes at the I-95 southbound ramps intersection. Consideration was given to providing an additional eastbound lane that serve as a fourth lane through the interchange area from Williamson Boulevard to Taylor Branch Road, however it was determined that this additional lane is not required from a capacity perspective.

Relative to the westbound direction, the heaviest turning movement within the interchange area is projected to be the westbound left-turn movement at the Taylor Road/Williamson Boulevard intersection. The SimTraffic analysis was useful in determining that two westbound through lanes at the I-95 southbound ramps intersection need to feed the two westbound left-turn lanes at the Williamson Boulevard intersection. Otherwise, if the volume of traffic were consolidated into westbound through lane at the I-95 southbound ramps intersection it would substantially impact the westbound flow through the interchange area. Two additional westbound through lanes are also needed at the I-95 southbound ramps intersection, resulting in a total of four westbound through lanes at the I-95 southbound ramps intersection. In order for these lanes to be utilized effectively, they should be extended eastward to approximately 500 feet east of the I-95 northbound ramps intersection, perhaps further. As a result, five westbound through lanes will be provided at the I-95 northbound ramps intersection with the southernmost lane feeding the westbound left-turn lanes at the I-95 southbound ramps intersection.

Other improvements include a second westbound left-turn lane at the I-95 southbound ramps along with an additional receiving lane on the I-95 southbound on-ramp. Additionally, it is suggested to modify the southbound right-turn treatment at the I-95 southbound ramps to two right-turn lanes under signalized control. The reasoning behind this recommendation, as mentioned in the interim improvement discussion, is to eliminate potential safety issues that may result from weaving movements required under the current geometry.

Similar to the interim improvements, a third southbound left-turn lane at the Williamson Boulevard intersection was considered but was not ultimately recommended as the volume projections do not show this movement to be critical. However, should this movement become critical at a point in the future, then this improvement may be desirable particularly given that there are sufficient eastbound departing lanes on S.R. 421 to accommodate the additional left-turn lane. At the same, there are some utility constraints on the north side of Taylor Road on the west side of Williamson Boulevard that would likely cause the cost of such an improvement to be substantial.

With these improvements, it can be seen from ***Tables 6*** and *7* that vehicles at the Taylor Road/Williamson Boulevard intersection will still experience excessive delays despite that the overall delay drops to 107.1 seconds per vehicle as compared to 150.1 seconds per vehicle under the "no build" scenario. As a result, even with these improvements the operating conditions of this intersection by year 2025 will likely cause queues to spillback into the interchange area thus adversely affecting the flow of westbound traffic on S.R. 421 through the interchange area.

The overall intersection delays for all three other intersections show that these intersections should operate well in 2025 with the ultimate improvements. The primary concern is, again, the spillback of traffic from the Williamson Boulevard intersection. In fact, upon comparing the Synchro and SimTraffic results for these other three intersections, the SimTraffic results effectively account for these spillback effects whereas Synchro does not. As can be seen in ***Table 6***, the average delay for the westbound through movements at both the I-95 southbound ramps and I-95 northbound ramps intersections is relatively high based on the SimTraffic results as compared to the Synchro results.

Given the constraints that limit opportunities for physically improving the Taylor Road/Williamson Boulevard intersection, consideration should be given to providing alternative routes such that vehicles do not need to travel through the S.R. 421/I-95 interchange area. Such alternative facilities may include but are not necessarily limited to the construction of a new interchange at Pioneer Trail and I-95, the construction of a new Madeline Avenue overpass across I-95, the extension of Coraci Boulevard from Town West Boulevard to Taylor Road, and the extension of Yorktowne Boulevard from Taylor Branch Road to Willow Run Boulevard.

It should be noted that this analysis does not take into consideration other factors that may influence the growth of traffic volumes through the interchange such as the recently increased fuel costs and/or consideration/promotion of alternative modes of transportation. Another consideration is that this analysis assumes a substantial amount of retail development along Pioneer Trail. However, without a new interchange at Pioneer Trail and I-95, there is a question of whether or not such magnitudes of retail development would actually occur.

Design Considerations – As discussed under the interim improvement, the prohibition of the eastbound left-turn at the Taylor Road/Williamson Boulevard intersection will effectively require restriping the eastbound approach. Similarly, the pavement marking for the southbound shared through/right-turn lane will need to be revised to eliminate the right-turn movement. These lane modifications will also likely require some milling and resurfacing such that the pavement markings are clear and the aesthetics of the intersection are not compromised.

As for the triple left-turn lanes at the I-95 southbound off-ramps, the improvement concept is based on recommended minimum design standards included in the Florida Department of Transportation's report titled *Left-Turn Lanes at Signalized Intersections*. As previously mentioned, FDOT evaluates the design of triple left-turn lanes on a case-by-case basis taking into consideration many factors such as operational benefits, safety concerns, downstream destinations which may affect lane assignment, truck traffic, etc. Should this improvement be considered for design and construction, then additional analyses will likely be required to determine if the concept provided herein is appropriate. Additionally, overhead signage for the I-95 southbound off-ramp was included within the opinion of probable cost.

In developing the improvement concept, the eastbound approaching and westbound departing lanes at the Taylor Road/Williamson Boulevard intersection and the eastbound departing and westbound approaching lanes at the Taylor Branch Road intersection were effectively held in place. A key consideration was the alignment of approaching lanes with the departing lanes on the opposite side of intersections. In the end, given the unique challenges of this particular interchange area, the ultimate improvement concept required that certain approaches be slightly offset from the departure lanes. However, any offsets included within the ultimate improvement concept are within typically allowable ranges.

Another critical component of the improvement concept is the I-95 bridge. The current bridge does not provide sufficient lateral clearance to accommodate the ultimate improvement concept and thus would need to be replaced. The cost of a new bridge is governed by many factors. One important factor was the fact that a single span bridge with a length of 200 feet or more that completely crosses S.R. 421 would require a bridge with a substantial structure depth (perhaps six feet or greater). Thus, the deck of the bridge would potentially be a few feet higher than the current bridge deck. As such, a considerable amount of work on mainline I-95 would be required to raise the interstate up to the elevation of the new bridge deck. For the purposes of limiting such potential costs, the improvement concept utilizes two 100-foot span bridges. The short spans reduce the overall structure depth thus marginally raising the bridge deck from its current elevation, thereby minimizing the construction costs to alter I-95. However, as reflected in the improvement concept, S.R. 421 below I-95 will require a median to accommodate bridge piers to support the bridges. It should also be noted that the current vertical clearance between S.R. 421 and the bottoms of the I-95 bridge beams is sub-standard at approximately 14.8 feet. The construction of the new bridge will bring the vertical clearance up to the minimum desirable clearance of 16.5 feet. Last, the new bridges included in the concept will accommodate the future six-laning of I-95.

Opinion of Probable Cost – Using the improvement concept, an opinion of probable cost was developed for the ultimate improvement. The total cost of the improvement is estimated to be approximately $15,701,089 based on ***Table 9***, including engineering, surveying, permitting, construction, and post-engineering. It should be noted that this opinion of probable cost also reflects costs pertaining to extensive maintenance of traffic requirements needed for constructing the new bridges, new traffic signals at the Williamson Boulevard, I-95 southbound ramps, and I-95 northbound ramps intersections, as well as overhead signage for the triple southbound left-turn lanes at the I-95 southbound ramps intersection.

TABLE 9 - ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COSTS

S.R. 421 at I-95 INTERCHANGE IMPROVEMENTS

ULTIMATE GEOMETRY

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNITS	UNIT COST*	TOTAL
101-1	MOBILIZATION	1	LS	$1,290,058.70	$1,290,059
102-1	MAINTENANCE OF TRAFFIC	1	LS	$1,121,790.18	$1,121,790
104-13-1	TYPE III SILT FENCE	6000	LF	$1.07	$6,420
104-16	ROCK BAGS	600	EA	$8.32	$4,992
110-1-1	CLEARING AND GRUBBING	6.5	AC	$19,261.29	$125,584
110-4	REMOVAL OF EXISTING CONCRETE PAVEMENT	1222	SY	$23.93	$29,248
120-1	REGULAR EXCAVATION	300	CY	$6.35	$1,905
120-6	EMBANKMENT	1485	CY	$11.06	$16,424
160-4	STABILIZATION TYPE B (12")	29410	SY	$4.12	$121,169
285-709	BASE OPTIONAL (GROUP 9)	29125	SY	$17.98	$523,668
334-1-13	SUPERPAVE ASPHALTIC CONCRETE (TRAFFIC C)	4800	TN	$90.24	$433,152
337-7-7	ASPHALTIC CONCRETE FC-5 (RUBBER) (1")	1600	TN	$117.41	$187,856
400-1-15	CONCRETE CLASS I (MISC)	5	CY	$627.91	$3,140
425-1-311	INLET (CURB) (TYPE P-1) (<10')	24	EA	$4,340.95	$104,183
425-1-321	INLET (CURB) (TYPE P-2) (<10')	6	EA	$5,114.99	$30,690
430-171-101	PIPE CULVERT OPTIONAL MATERIAL (ROUND) (0-24" SS)	3700	LF	$72.68	$268,916
520-1-7	CONCRETE CURB & GUTTER (TYPE E)	2940	LF	$18.15	$53,361
520-1-10	CONCRETE CURB & GUTTER (TYPE F)	3410	LF	$20.69	$70,553
520-5-11	TRAFFIC SEPARATOR CONC. (TYPE I) (4' WIDE)	1540	LF	$32.64	$50,266
522-1	CONC. SIDEWALK (4" THICK)	1910	SY	$44.02	$84,078
570-1-2	PERFORMANCE TURF	6500	SY	$3.14	$20,410
711-11-121	THERMOPLASTIC, STD., SOLID WHITE (6")	8650	LF	$1.42	$12,283
711-11-124	THERMOPLASTIC, STD., SOLID WHITE (18")	808	LF	$2.77	$2,238
711-11-125	THERMOPLASTIC, STD., SOLID WHITE (24")	420	LF	$3.77	$1,583
711-11-131	THERMOPLASTIC, STA., WHITE SKIP (6")	1.9	GM	$1,053.10	$1,950
711-11-170	THERMOPLASTIC, STD., WHITE, ARROW	40	EA	$50.22	$2,009
700-44077	SGN LTD OH TR, T 121 TO 140, S 601-700	1	AS	$147,525.00	$147,525
	BRIDGES	2	EA	$2,250,000.00	$4,500,000
	SIGNALS	3	EA	$225,000.00	$675,000
				SUBTOTAL	**$9,890,450**
				25% CONTINGENCY	**$2,472,613**
				TOTAL CONSTRUCTION COST	**$12,363,063**
				DESIGN (15%)	**$1,854,459**
				C.E.I. (12%)	**$1,483,568**
				TOTAL COST	**$15,701,089**

*THIS VALUE WAS OBTAINED FROM THE FDOT ESTIMATES OFFICE WEBSITE UNDER THE ITEM AVERAGE UNIT COSTS FOR JANUARY 2007 - DECEMBER 31, 2007.

NOTE:
THE ENGINEER HAS NO CONTROL OVER THE COST OF LABOR, MATERIALS, EQUIPMENT, OR OVER THE CONTRACTOR'S METHODS OF DETERMINING PRICES OR OVER COMPETITIVE BIDDING OR MARKET CONDITIONS. OPINIONS OF PROBABLE COSTS PROVIDED HEREIN ARE BASED ON THE INFORMATION KNOWN TO THE ENGINEER AT THIS TIME AND REPRESENT ONLY THE ENGINEER'S JUDGMENT AS A DESIGN PROFESSIONAL FAMILIAR WITH THE CONSTRUCTION INDUSTRY. THE ENGINEER CANNOT AND DOES NOT GUARANTEE THAT PROPOSALS, BIDS, OR ACTUAL CONSTRUCTION COSTS WILL NOT VARY FROM ITS OPINIONS OF PROBABLE COSTS.

7.0 ALTERNATIVE CORRIDOR EVALUATION

Based on the previous analyses, it is clear that even with additional improvements the S.R. 421/I-95 interchange area will experience potentially undesirable levels of congestion by year 2025, particularly as it relates to the Taylor Road/Williamson Boulevard intersection. As previously mentioned, one way to enhance the operating conditions at the interchange area is to provide alternative routes. Therefore, this section evaluates how construction of a new interchange at I-95 and Pioneer Trail or the construction of a new Madeline Avenue overpass across I-95 might impact operating conditions at the S.R. 421/I-95 interchange area.

7.1 I-95/Pioneer Trail Interchange

Because the next I-95 interchange south of S.R. 421 is approximately seven miles south at S.R. 44 and that there is substantially more destinations and attractions north of the City of Port Orange then south of the City, many of the trips to/from existing and future development west of I-95, between S.R. 44 and S.R. 421, are projected to travel north up Williamson Boulevard to the S.R. 421/I-95 interchange area. Pioneer Trail currently crosses over I-95 between S.R. 44 and S.R. 421 and serves as a logical location for a future interchange, particularly given potential development opportunities along Pioneer Trail. In fact, the Volusia County MPO's adopted 2025 Long Range Transportation Plan includes this interchange. Although it seems logical that such an interchange would provide a degree of relief to both Williamson Boulevard as well as the S.R. 421/I-95 interchange area, it is unclear as to just how much benefit it would provide. Therefore, an analysis was conducted to better understand how a new interchange at I-95 and Pioneer Trail impacts the S.R. 421/I-95 interchange area as well as Williamson Boulevard just south of Taylor Road.

7.1.1 Year 2025 Volume Projections

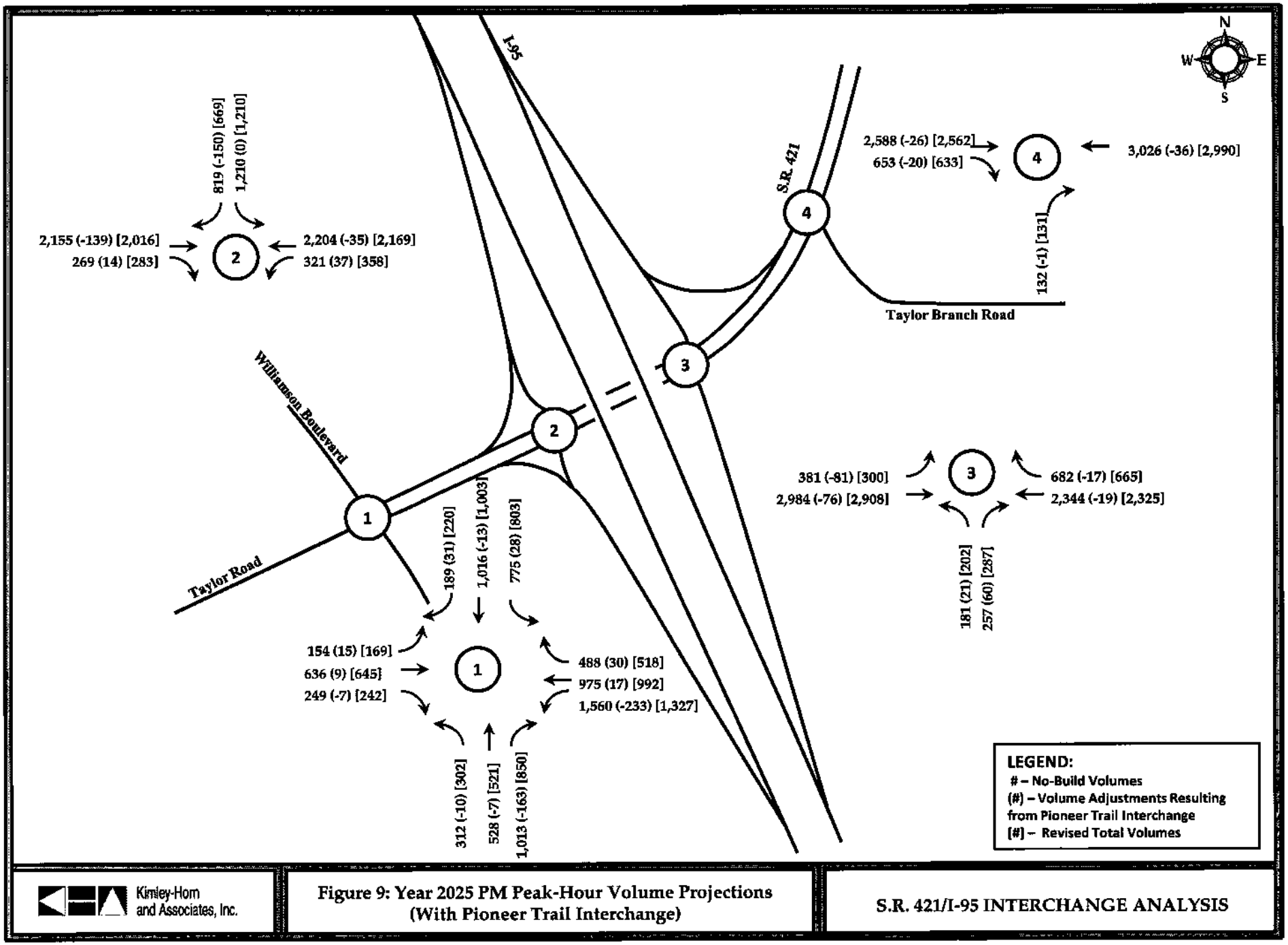
Although one can assume that the addition of the Pioneer Trail/I-95 interchange will provide a more convenient access point to I-95 for developments along Pioneer Trail; the model enables the analyst to better quantify such benefits. Thus, for the first step of the analysis, it was necessary to modify the year 2025 "no build" model to include the I-95/Pioneer Trail interchange. Year 2025 model volume projections were then obtained through the S.R. 421/I-95 interchange area and compared against the model volume projections from the 2025 "no build" model. The difference between these volumes effectively represents the impact of Pioneer Trail/I-95 interchange on the

S.R. 421/I-95 interchange area and Williamson Boulevard. However, it should be noted the results of both models were reviewed thoroughly to gain an in-depth understanding as to why the model volumes changed in the manner that they did. Based on this volume comparison and the review, adjustments to the "no build" PM peak-hour turning movement projections were made to reflect the interchange at the I-95 and Pioneer Trail.

Upon reviewing the volumes from both models, it was clear that the model was suggesting that the Pioneer Trail interchange will result in two impacts to the S.R. 421/I-95 interchange area. First, many of those vehicles traveling between development near Pioneer Trail and locations north of S.R. 421 via Williamson Boulevard to I-95 will now use the new interchange in place of traveling through the S.R. 421/I-95 interchange area. Thus, based on the model volume comparisons, the eastbound left-turn PM peak-hour volume at the I-95 northbound ramps intersection was reduced by 81 vehicles. Similarly, the southbound right-turn PM peak-hour volume at the I-95 southbound ramps intersection was reduced by 150 vehicles. These volume adjustments are reflected in ***Figure 9*** and the volume worksheets provided in ***Appendix D***.

The other impact of the Pioneer Trail interchange at the S.R. 421/I-95 interchange area pertains to those vehicles that are projected to travel between development along Pioneer Trail and areas along S.R. 421 east of I-95. Without the Pioneer Trail interchange, such trips will occur via Williamson Boulevard through the S.R. 421/I-95 interchange area. However, with the Pioneer Trail interchange, a portion of these vehicles will utilize I-95 in place of Williamson Boulevard. As a result, based on the model volume comparisons, the eastbound through PM peak-hour volume at the I-95 northbound ramps intersection was reduced by 76 vehicles. This decrease was effectively offset by the addition of 60 vehicles to the northbound right-turn movement at the I-95 northbound ramps intersection.

These two impacts are more noticeable at the Williamson Boulevard intersection as the westbound left-turn and northbound right-turn volumes were reduced by 233 vehicles and 163 vehicles, respectively. However, a corresponding increase of 125 vehicles was applied to the westbound left-turn movement at the I-95 southbound ramps intersection. These volume adjustments are reflected in ***Figure 9*** and the volume worksheets provided in ***Appendix D***.



Kimley-Horn and Associates, Inc.

Figure 9: Year 2025 PM Peak-Hour Volume Projections (With Pioneer Trail Interchange)

S.R. 421/I-95 INTERCHANGE ANALYSIS

Other minor volume adjustments also occurred at other various movements, however, these additional adjustments had a marginal affect on the overall volume projections.

For informational purposes, year 2025 PM peak-hour turning movement projections were also calculated for the Pioneer Trail intersections with the I-95 ramps. These volume projections are provided in ***Appendix D.***

7.1.2 Year 2025 Operating Conditions with I-95/Pioneer Trail Interchange

Using Synchro and SimTraffic, the future PM peak-hour operating conditions of the study intersections were evaluated with the projected turning movement volumes as shown in ***Appendix D***. The Synchro and SimTraffic printouts are provided in ***Appendix E*** and the future operating conditions of the study intersections are summarized in ***Table 10*** and ***Table 11***. In reviewing ***Table 10***, it can be seen that the Taylor Road/Williamson Boulevard intersection will benefit the most with a new I-95 interchange at Pioneer Trail as the overall intersection delay is reduced by nearly 15 percent from 150.1 seconds per vehicle under the year 2025 "no-build" condition to 127.7 seconds per vehicle. Although the Pioneer Trail interchange will cause volume reductions for several movements at the I-95 southbound ramps intersection, these benefits are countered by volume increases to other critical movements, particularly the westbound left-turn movement. Thus, the projected operating conditions at the I-95 southbound ramps intersection are not expected to benefit much from the Pioneer Trail interchange. Similarly, the other two intersections at the interchange area are not projected to benefit from a new I-95/Pioneer Trail interchange. However, the I-95 southbound ramps, I-95 northbound ramps, and Taylor Branch

Table 10 - Comparison of Intersection Conditions (with Pioneer Trail Interchange or Madeline Avenue Overpass - Year 2025)

S.R.421/I-95 Interchange Analysis

Study Intersections	Approach	Movement	NO-BUILD EVALUATION					PIONEER TRAIL/I-95 INTERCHANGE					MADELINE AVENUE EXTENSION				
			V/C	Delay (sec/veh)/LOS				V/C	Delay (sec/veh)/LOS				V/C	Delay (sec/veh)/LOS			
				Movement		Approach	Total		Movement		Approach	Total		Movement		Approach	Total
				Synchro	SimTraffic	(Synchro)	(Synchro)		Synchro	SimTraffic	(Synchro)	(Synchro)		Synchro	SimTraffic	(Synchro)	(Synchro)
Williamson Boulevard at Taylor Road	Eastbound	L	0.80	84.2/F	145.0/F			0.80	84.2/F	85.7/F			0.5	64.9/E	49.1/D		
		T	1.22	172.3/F	356.1/F	159.2/F		1.08	111.5/F	183.7/F	107.5/F		1.09	123.4/F	96.2/F	114.4/F	
		R	n/a	n/a	534.5/F			n/a	n/a	318.5/F			n/a	n/a	145.9/F		
	Westbound	L	1.4	214.4/F	119.0/F			1.36	196.3/F	107.6/F			1.56	295.8/F	583.0/F		
		T	0.76	20.1/C	34.2/C	119.8/F		0.81	24.8/C	30.1/C	102.1/E		0.83	35.4/D	423.1/F	169.0/F	
		R	0.42	16.4/B	10.7/B			0.47	8.9/A	8.0/A			0.46	11.6/B	288.0/F		
	Northbound	L	1.28	218/F	111.6/F		150.1/F	1.25	202.8/F	128.2/F		127.7/F	1.16	173.2/F	161.8/F		142.4/F
		T	0.98	89.6/F	112.1/F	77.6/E		0.96	87.5/F	108.8/F	78.9/E		0.93	83.2/F	87.6/F	71.7/E	
		R	0.74	28.2/C	91.3/F			0.68	26.6/C	72.5/E			0.78	34.4/C	78.7/F		
	Southbound	L	1.45	270.7/F	273.3/F			1.34	218.0/F	226.4/F			1.22	173.8/F	540.5/F		
		T	1.43	252.5/F	196.7/F	259.6/F		1.34	211.8/F	168.3/F	214.3/F		1.29	189.4/F	180.9/F	183.3/F	
		R	n/a	n/a	192.2/F			n/a	n/a	146.6/F			n/a	n/a	146.6/F		
Taylor Road at I-95 SB Ramps	Eastbound	L	n/a	n/a	n/a			n/a	n/a	n/a			n/a	n/a	n/a		
		T	1.31	176.8/F	47.2/D	157.2/F		1.17	112.5/F	49.9/D	98.7/F		1.42	232.9/F	71.0/E	206.5/F	
		R	0.18	0.0/A	28.6/C			0.19	0.0/A	25.9/C			0.18	0.0/A	35.1/C		
	Westbound	L	0.91	96.0/F	81.9/F			1.06	120.5/F	167.4/F			0.92	94.9/F	66.5/E		
		T	1.12	80.9/F	72.5/E	82.9/F		1.10	56.7/E	68.8/E	65.8/E		1.19	98.2/F	151.6/F	97.8/F	
		R	n/a	n/a	n/a			n/a	n/a	n/a			n/a	n/a	n/a		
	Northbound	L	n/a	n/a	n/a		132.8/F	n/a	n/a	n/a		98.4/F	n/a	n/a	n/a		139.9/F
		T	n/a	n/a	n/a	n/a		n/a	n/a	n/a	n/a		n/a	n/a	n/a	n/a	
		R	n/a	n/a	n/a			n/a	n/a	n/a			n/a	n/a	n/a		
	Southbound	L	1.21	150.7/F	97.2/F			1.19	143.3/F	63.6/E			1.02	79.3/E	65.0/E		
		T	n/a	n/a	n/a	168.0/F		n/a	n/a	n/a	145.3/F		n/a	n/a	n/a	111.4/F	
		R	1.31	198.4/F	3,134.3/F			1.18	149.7/F	57.8/E			1.24	168.9/F	75.8/E		
Taylor Road at I-95 NB Ramps	Eastbound	L	0.82	78.5/E	68.3/E			0.75	27.2/C	20.3/C			0.75	37.4/D	27.2/C		
		T	0.81	10.6/A	7.8/A	18.3/B		0.84	12.6/B	12.6/B	14.0/B		0.81	10.7/B	14.1/B	13.7/B	
		R	n/a	n/a	n/a			n/a	n/a	n/a			n/a	n/a	n/a		
	Westbound	L	n/a	n/a	n/a			n/a	n/a	n/a			n/a	n/a	n/a		
		T	0.83	25.8/C	83.6/F	20.2/C		0.87	29.5/C	69.4/E	23.1/C		0.85	30.1/C	161.4/F	23.4/C	
		R	0.46	1.0/A	7.5/A			0.45	0.9/A	11.4/B			0.46	1.0/A	11.6/B		
	Northbound	L	0.8	75.1/E	411.3/F		22.3/C	0.71	66.6/E	93.0/F		21.5/C	0.72	75.3/E	534.4/F		21.7/C
		T	n/a	n/a	n/a	67.3/E		n/a	n/a	n/a	61.6/E		n/a	n/a	n/a	69.3/E	
		R	0.69	61.7/E	137.0/F			0.61	58.0/E	54.6/D			0.62	65.1/E	205.9/F		
	Southbound	L	n/a	n/a	n/a			n/a	n/a	n/a			n/a	n/a	n/a		
		T	n/a	n/a	n/a	n/a		n/a	n/a	n/a	n/a		n/a	n/a	n/a	n/a	
		R	n/a	n/a	n/a			n/a	n/a	n/a			n/a	n/a	n/a		
S.R. 421 at Taylor Branch Road	Eastbound	L	n/a	n/a	n/a			n/a	n/a	n/a			n/a	n/a	n/a		
		T	0.55	0.0/A	2.5/A	0.0/A		0.54	0.0/A	3.0/A	0.0/A		0.53	0.0/A	3.6/A	0.0/A	
		R	0.41	0.0/A	5.8/A			0.40	0.0/A	6.9/A			0.41	0.0/A	6.7/A		
	Westbound	L	n/a	n/a	n/a			n/a	n/a	n/a			n/a	n/a	n/a		
		T	0.48	0.0/A	85.9/F	0.0/A		0.47	0.0/A	197.8/F	0.0/A		0.47	0.0/A	376.6/F	0.0/A	
		R	n/a	n/a	n/a			n/a	n/a	n/a			n/a	n/a	n/a		
	Northbound	L	n/a	n/a	n/a		0.2/A	n/a	n/a	n/a		0.3/A	n/a	n/a	n/a		0.3/A
		T	n/a	n/a	n/a	12.0/B		n/a	n/a	n/a	12.7/B		n/a	n/a	n/a	12.0/B	
		R	0.22	12.0/B	18.1/B			0.23	12.7/B	19.9/B			0.22	12.0/B	11.6/A		
	Southbound	L	n/a	n/a	n/a			n/a	n/a	n/a			n/a	n/a	n/a		
		T	n/a	n/a	n/a	n/a		n/a	n/a	n/a	n/a		n/a	n/a	n/a	n/a	
		R	n/a	n/a	n/a			n/a	n/a	n/a			n/a	n/a	n/a		

Table 11- Summary of Queue Lengths (with Pioneer Trail Interchange or Madeline Avenue Overpass - Year 2025)

S.R. 421/I-95 Interchange Analysis

Study Intersections	Approach	Movement	NO-BUILD EVALUATION			PIONEER TRAIL/I-95 INTERCHANGE			MADELINE AVENUE EXTENSION		
			Storage Length (feet)	95th Percentile Queue (feet)		Storage Length (feet)	95th Percentile Queue (feet)		Storage Length (feet)	95th Percentile Queue (feet)	
				Synchro	SimTraffic		Synchro	SimTraffic		Synchro	SimTraffic
Williamson Boulevard at Taylor Road	Eastbound	L	250	138	224	250	138	340	250	141	289
		T	-	465	1,322	-	431	1,296	-	441	880
		R	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Westbound	L	415	971	487	415	727	493	415	519	484
		T	-	400	459	-	360	452	-	260	514
		R	180	80	110	180	25	152	180	20	369
	Northbound	L	195	300	353	195	289	331	195	304	390
		T	-	397	604	-	388	466	-	402	946
		R	575	481	366	575	409	342	575	312	375
	Southbound	L	600	661	398	600	656	395	600	638	352
		T	-	978	2,241	-	958	2,255	-	984	2,160
		R	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Taylor Road at I-95 SB Ramps	Eastbound	L	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		T	-	823	447	-	735	392	-	997	388
		R	-	n/a	n/a	-	n/a	n/a	-	n/a	n/a
	Westbound	L	320	412	530	320	490	424	320	432	346
		T	-	1,414	661	-	1,378	605	-	1,518	577
		R	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Northbound	L	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		T	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		R	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Southbound	L	475	879	263	475	861	202	475	827	208
		T	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		R	-	1,129	194	-	874	204	-	1,119	200
Taylor Road at I-95 NB Ramps	Eastbound	L	320	155	226	320	134	137	320	149	195
		T	-	298	378	-	342	381	-	238	375
		R	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Westbound	L	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		T	-	778	711	-	752	658	-	773	622
		R	-	0	542	-	0	126	-	0	448
	Northbound	L	334	258	417	334	282	392	334	305	421
		T	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		R	334	188	1,134	334	205	496	334	203	1,208
	Southbound	L	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		T	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		R	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
S.R. 421 at Taylor Branch Road	Eastbound	L	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		T	-	0	0	-	0	0	-	0	15
		R	270	0	0	270	0	0	270	0	0
	Westbound	L	n/a	n/a	n/a	n/a	0	0	n/a	n/a	n/a
		T	-	0	1,481	-	0	1,990	-	0	2,014
		R	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Northbound	L	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		T	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		R	-	20	136	-	22	95	-	21	90
	Southbound	L	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		T	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		R	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Road intersections will experience an indirect benefit from the Pioneer Trail interchange as queues from the Taylor Road/Williamson Boulevard intersection are less likely to spillback into these intersections with the Pioneer Trail interchange as compared to the "no build" scenario. However, based on ***Table 11***, the westbound queues at the Taylor Road/Williamson Boulevard intersection are still projected to be excessive and impede the westbound through movements at the other three intersections based on the westbound through delays from SimTraffic for the other three intersections as summarized in ***Table 10***.

Williamson Boulevard

With the I-95/Pioneer Trail interchange, the PM peak-hour volume on Williamson Boulevard between Airport Road and Taylor Road is projected to decrease by more than nine percent from 4,678 (1,853 northbound and 2,825 southbound) to 4,245 (1,673 northbound and 2,572 southbound) vehicles (see ***Figure 9***). Even though the Pioneer Trail interchange is projected to cause a reduction in traffic volumes on Williamson Boulevard, the southbound direction of travel is still likely to have a high degree of congestion during the PM peak-hour within the committed four-lane section.

7.2 Madeline Avenue Overpass

An alternative improvement that might cause a reduction in traffic volumes at the S.R. 421/I-95 interchange area is the extension of Madeline Avenue from Williamson Boulevard across I-95 to Tomoka Farms Road. This improvement would potentially reduce volumes through the interchange area as it would provide an alternative route for those traveling between areas southwest of the interchange essentially along Tomoka Farms Road and areas northeast. Similarly, the Madeline Avenue overpass would provide an alternative route for those traveling between areas northwest of the interchange and southeast of the interchange. Therefore, an analysis was conducted to better understand how the Madeline Avenue overpass will impact the S.R. 421/I-95 interchange area as well as Williamson Boulevard just south of Taylor Road.

7.2.1 Year 2025 Volume Projections

Similar to the Pioneer Trail interchange analysis, it was necessary to modify the year 2025 "no build" model to include the Madeline Avenue overpass. Year 2025 model volume projections were then obtained through the S.R. 421/I-95 interchange area and compared against the model volume projections from the 2025 "no build" model. The difference between these volumes

effectively represents the impact of Madeline Avenue overpass on the S.R. 421/I-95 interchange area and Williamson Boulevard. However, it should be noted the results of both models were reviewed thoroughly to gain an in-depth understanding as to why the model volumes changed in the manner that they did. Based on this volume comparison and the review, adjustments to the "no build" PM peak-hour turning movement projections were made to reflect the Madeline Avenue overpass.

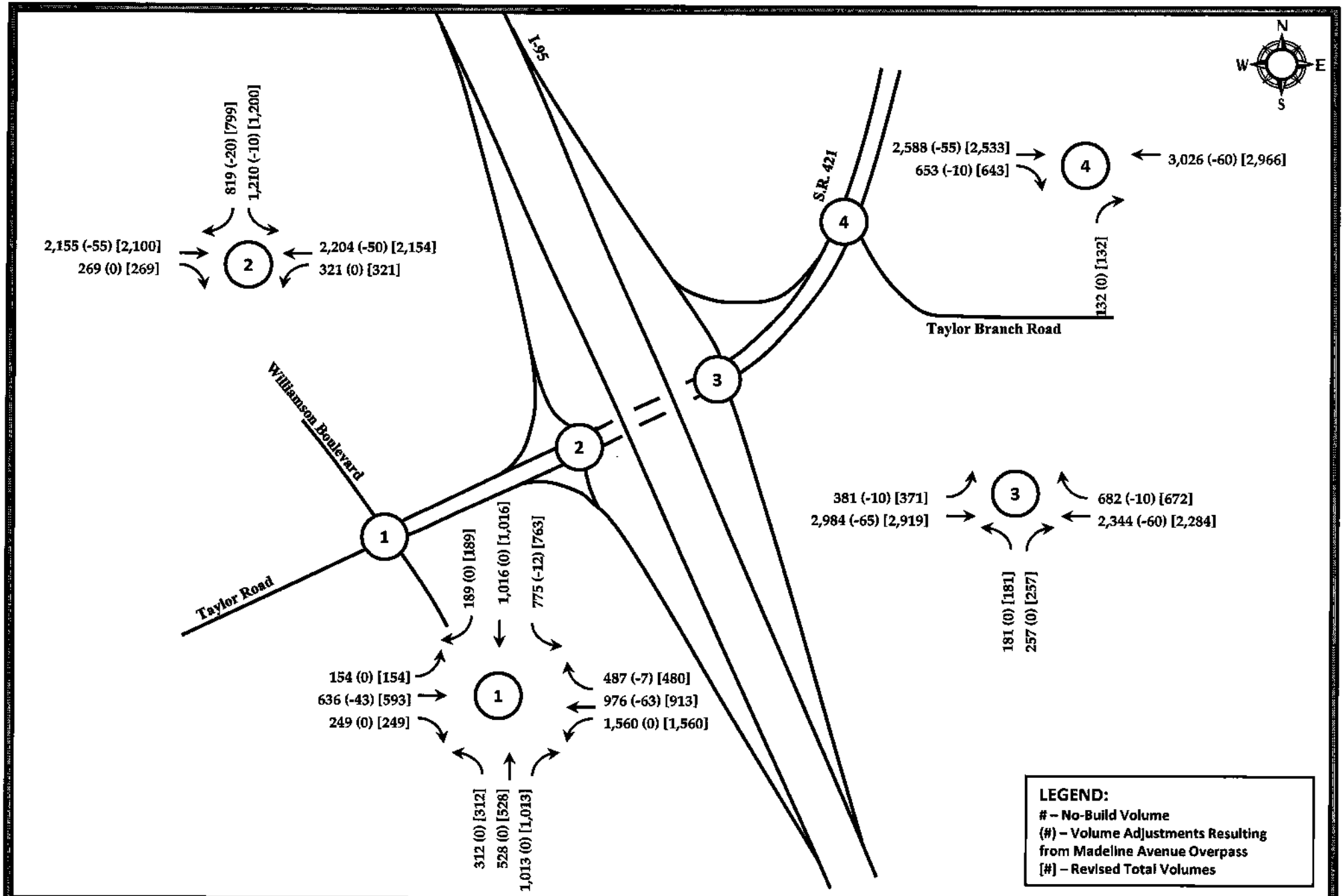
Upon reviewing the volumes from both models, it was concluded that the model was suggesting that the Madeline Avenue overpass will provide a marginal reduction in the traffic volumes through the S.R. 421/I-95 interchange area. The most evident impact, although not substantial, was the reduction of eastbound and westbound through volumes on S.R. 421. The resulting volume adjustments are reflected in ***Figure 10*** and the volume worksheets provided in ***Appendix E***.

7.2.2 Year 2025 Operating Conditions with Madeline Avenue Overpass

Using the projected turning movement volumes as shown in ***Appendix D***, the S.R. 421/I-95 interchange area was again evaluated using Synchro and SimTraffic. The Synchro and SimTraffic printouts are provided in ***Appendix E*** and the future operating conditions of the study intersections are summarized in ***Table 10*** and ***Table 11***. In reviewing ***Table 10***, it can be seen that in comparing the resulting overall intersection delays to those under the year 2025 "no build" scenario, the Taylor Road/Williamson Boulevard intersection will benefit the most with the Madeline Avenue overpass across I-95. However, recognizing that the traffic volume reduction is relatively minor, particularly as compared to the benefit of the Pioneer Trail interchange, the overall benefit to the Taylor Road/Williamson Boulevard intersection delay is also relatively minor as it decreases from 150.1 seconds per vehicle under the "no build" scenario to 142.4 seconds per vehicle. Also, the operating conditions at the other three intersections are not projected to experience any significant benefit from the Madeline Avenue overpass.

Williamson Boulevard

Based on ***Figure 10***, Williamson Boulevard between Airport Road and Taylor Road is not projected to benefit from the Madeline Avenue overpass as the volume on Williamson Boulevard is projected to remain the same. Thus, with the year 2025 PM peak-hour volume projections of 4,678 vehicles (1,853 northbound and 2,825 southbound), the southbound direction of travel is likely to have a high degree of congestion during the PM peak-hour within the committed four-lane section.



Kimley-Horn and Associates, Inc.

Figure 10: Year 2025 PM Peak-Hour Volume Projections (With Madeline Avenue Overpass)

S.R. 421/I-95 INTERCHANGE ANALYSIS

8.0 CONCLUSIONS AND RECOMMENDATIONS

The purpose of this analysis was to evaluate the existing and year 2025 operating conditions of the S.R. 421/I-95 interchange area as well as Williamson Boulevard between Airport Road and Taylor Road.

Based on the existing conditions analysis and the existing geometry within the interchange area, the I-95 northbound ramps intersection and the Taylor Branch Road intersection operate well. Overall, the I-95 southbound ramps intersection operates acceptably, however, the westbound and southbound left-turn movements are operating poorly. The overall operating conditions for the Taylor Road/Williamson Boulevard intersection are also undesirable and the westbound left-turn movement is operating well over its capacity. Thus the resulting queues for this movement are spilling back into the interchange area. The existing conditions analysis also suggests that several other movements at the Taylor Road/Williamson Boulevard intersection are operating near capacity.

Based on the existing PM peak-hour volumes at the interchange area, it is clear the interchange area, particularly the Taylor Road/Williamson Boulevard intersection, will experience improved operating conditions with the construction of the committed improvements. More specifically, the analysis concludes that the interchange area will greatly benefit from the additional westbound left-turn lane at the Taylor Road/Williamson Boulevard intersection. A similar improvement is achieved at the I-95 southbound ramps intersection as the overall intersection delay is reduced. The I-95 northbound ramps intersection also experiences improved conditions with the addition of the third westbound through which will feed the westbound left-turn lane at the I-95 southbound ramps. Also, with the committed improvements most all of queue lengths are projected to be less than the storage lengths for the respective movements.

This analysis also evaluated how the interchange area will benefit from extending Yorktowne Boulevard from Taylor Branch Road to S.R. 421 and converting the S.R. 421/Taylor Branch Road intersection to an unsignalized intersection with the elimination of the westbound and northbound left-turn movements. Based on this analysis, the modifications to the S.R. 421/Taylor Branch Road intersection eliminate the possibility of the eastbound through vehicles spilling back into the I-95 northbound ramps intersection. Additionally, the westbound left-turn queue at the

S.R. 421/Taylor Branch Road intersection extends nearly the length of the turn lane without these modifications. Thus, there is the potential that without this modification the westbound left-turn queue could extend into the westbound through lanes adversely effecting westbound flow on S.R. 421.

Based on the year 2025 "no build" analysis, the Williamson Boulevard intersection will operate well over capacity. As a result, several movements are projected to have 95th-percentile queues that exceed the storage length. Vehicles at the I-95 southbound ramps intersection are also projected to experience excessive delays although the Williamson Boulevard intersection is projected to be more problematic. These results suggest that the extension of the westbound left-turn lane from the I-95 southbound ramps intersection back to the Taylor Branch Road intersection, as currently committed, is a beneficial improvement as the queue length for this movement is projected to extend back into the I-95 northbound ramps intersection. The I-95 northbound ramps intersection is projected to have acceptable operating conditions however, given the expected delays at the other two intersections to the west, it is highly likely that westbound vehicles will queue back through the northbound ramps intersection. Based on a review of the projected volumes and the analyses, it could generally be concluded that the interchange area should function acceptably for six to seven more years before an improvement is needed beyond those that are currently committed. However, there are numerous developments either approved or currently going through the City's development approval process. Thus, the point at which additional improvements are needed will essentially be dictated by the rate at which these developments are constructed, as well as the type (retail, residential, etc.) and size of such future developments.

Also, in year 2025, the projected PM peak-hour volumes on Williamson Boulevard between Airport Road and Taylor Road indicate there is likely to be significant congestion on Williamson Boulevard during the PM peak hour. Now, it should be noted that these volume projections account for substantial future development south of Taylor Road, including sizable retail developments. Perhaps the projected volumes are overstated in that the potential retail development along Pioneer Trial will not be of the magnitude currently anticipated in this analysis if additional access, such as an I-95 interchange at Pioneer Trail, is not provided.

For purposes of this analysis, the following two interim improvements were identified which are projected to provide temporary relief to the interchange area:

- Eliminate the eastbound left-turn and southbound right-turn movements at the Taylor Road/Williamson Boulevard intersection
- Provide a third southbound left-turn lane at the I-95 southbound ramps intersection

The first improvement will effectively force vehicles to use Summer Trees Road to avoid the Taylor Road/Williamson Boulevard intersection. As a result, the operating conditions of the southbound through movement will be enhanced. Additionally, the elimination of the eastbound left-turn movement enables the eastbound approach to be restriped from two through lanes and one shared through/right-turn lane to three through lanes and one right-turn lane. Also, the elimination of the eastbound left-turn movement enables additional green time to be allocated to other movements. As a result, the overall intersection delay at the Taylor Road/Williamson Boulevard intersection will decrease in year 2025.

In addition, a third southbound left-turn lane is recommended at the I-95 southbound ramps intersection which will reduce the overall delay at this intersection as well as potentially result in a substantial reduction to the potential queue length on the I-95 southbound off-ramp. It is clear that even with these interim improvements, the Williamson Boulevard intersection and possibly the I-95 southbound ramps intersection will have undesirable operating conditions in year 2025. However, these interim improvements will provide a slight enhancement to the capacity at the S.R. 421/I-95 interchange area, possibly allowing for the interchange area to operate acceptably for an additional year or two beyond the life of the currently committed improvements.

The total cost of the interim improvements, including costs pertaining to engineering, surveying, permitting, construction, post-engineering, signalization modification, as well as overhead signage, is estimated to be approximately $621,165.

This analysis also identifies an ultimate improvement concept for the S.R. 421/I-95 interchange area which includes the following:

- Eliminate the eastbound left-turn and southbound right-turn movements at the Taylor Road/Williamson Boulevard intersection
- At the Taylor Road/Williamson Boulevard intersection, utilize the striped-out area from the eastbound left-turn lanes to provide an eastbound approach which includes four eastbound through lanes and one right-turn lane.
- Provide a third southbound left-turn lane at the I-95 southbound ramps intersection
- Extend one of the eastbound left-turn lanes from the I-95 northbound ramps intersection to the Taylor Road/Williamson Boulevard intersection. Similarly, provide a shorter extension of the inside eastbound left-turn from the I-95 northbound ramps intersection back to approximately 300 feet west of the I-95 southbound ramps intersection.
- Provide an eastbound right-turn lane at the I-95 southbound ramps intersection
- Construct a second westbound left-turn lane at the I-95 southbound ramps intersection and provide a second receiving lane on the I-95 southbound on-ramp to accommodate traffic from the second left-turn lane.
- Provide third and fourth westbound travel lanes from approximately 500 feet east of the I-95 northbound ramps intersection to the I-95 southbound ramps intersection. Then, have the two inside westbound through lanes at the I-95 southbound ramps intersection feed the dual westbound left-turn lanes at the Taylor Road/Williamson Boulevard intersection
- Modify the free-flow southbound right-turn lane at the I-95 southbound ramps intersection such that it operates under signalized control, thereby providing dual right-turn lanes under signalized control.
- Replace each single-span I-95 bridge with two steel 100-foot span bridges and construct a median on S.R. 421 to the accommodate bridge piers

With these improvements, vehicles at the Taylor Road/Williamson Boulevard intersection will still experience excessive delays. As a result, even with these improvements the operating conditions of this intersection by year 2025 will likely cause queues to spillback from the Taylor Road/Williamson Boulevard intersection into the interchange area thus adversely affecting the flow of westbound traffic on S.R. 421 through the interchange area. The overall intersection delays for all three other intersections show that these intersections should operate well in 2025 with the ultimate improvements. The primary concern is, again, the spillback of traffic from the Williamson Boulevard intersection.

Given the constraints that limit opportunities for physically improving the Taylor Road/Williamson Boulevard intersection, consideration should be given to providing alternative routes such that vehicles do not need to travel through the S.R. 421/I-95 interchange area. Such alternative facilities may include but are not necessarily limited to the construction of a new interchange at Pioneer Trail and I-95, the construction of a new Madeline Avenue overpass across I-95, the extension of Coraci Boulevard from Town West Boulevard to Taylor Road, and the extension of Yorktowne Boulevard from Taylor Branch Road to Willow Run Boulevard.

The total cost of the improvement, including costs for engineering, surveying, permitting, construction, post-engineering, extensive maintenance of traffic requirements, new traffic signals, and overhead signage, is estimated to be approximately $15,701,089.

Analyses were also conducted to evaluate how construction of a new interchange at I-95 and Pioneer Trail or the construction of a new Madeline Avenue overpass across I-95 might impact operating conditions at the S.R. 421/I-95 interchange area. Based on the analyses, the Taylor Road/Williamson Boulevard intersection will benefit the most with a new I-95 interchange at Pioneer Trail. The projected operating conditions at the other three intersections within the S.R. 421/I-95 interchange area are not projected to benefit from a new I-95/Pioneer Trail interchange. However, the I-95 southbound ramps, I-95 northbound ramps, and Taylor Branch Road intersections will experience an indirect benefit from the Pioneer Trail interchange as queues from the Taylor Road/Williamson Boulevard intersection are less likely to spillback into these intersections with the Pioneer Trail interchange as compared to the "no build" scenario. Additionally, with the I-95/Pioneer Trail interchange, the PM peak-hour volume on Williamson Boulevard between Airport Road and Taylor Road is projected to decrease by more than nine

percent. Even though the Pioneer Trail interchange is projected to cause a reduction in traffic volumes on Williamson Boulevard, the southbound direction of travel is still likely to have a high degree of congestion during the PM peak-hour within the committed four-lane section.

The Taylor Road/Williamson Boulevard intersection will benefit the most with the Madeline Avenue overpass across I-95. However, recognizing that the traffic volume reduction is relatively minor, particularly as compared to the benefit of the Pioneer Trail interchange, the overall benefit to the Taylor Road/Williamson Boulevard intersection delay is also relatively minor. Also, the operating conditions at the other three intersections are not projected to experience any significant benefit from the Madeline Avenue overpass. Additionally, Williamson Boulevard between Airport Road and Taylor Road is not projected to benefit from the Madeline Avenue overpass as the volume on Williamson Boulevard is projected to remain the same.

APPENDIX A

EXISTING TURNING MOVEMENT COUNTS

DE-TRAFFIC
WWW.DE-TRAFFIC.COM
WILLIAMSON BLVD AT TAYLOR RD
VOLUSIA COUNTY, FLORIDA

File Name : 04 Williamson @ Taylor
Site Code : 00000004
Start Date : 5/1/2008
Page No : 1

Groups Printed- Automobiles - Commercial

	Williamson Blvd Southbound				Taylor Rd Westbound				South Williamson Blvd Northbound				Taylor Rd Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
07:00 AM	31	25	17	73	76	44	38	158	24	53	154	231	71	118	15	204	666
07:15 AM	15	26	18	59	100	54	48	202	17	53	154	224	58	97	16	171	656
07:30 AM	26	25	20	71	117	46	53	216	25	76	175	276	48	134	21	203	766
07:45 AM	25	34	26	85	125	77	39	241	16	78	165	259	56	120	22	198	783
Total	97	110	81	288	418	221	178	817	82	260	648	990	233	469	74	776	2871
08:00 AM	26	26	16	68	144	106	75	325	25	102	175	302	44	140	20	204	899
08:15 AM	21	42	26	89	113	76	56	245	26	96	147	269	35	145	16	196	799
08:30 AM	26	33	27	86	103	101	41	245	34	77	125	236	38	153	20	211	778
08:45 AM	20	22	22	64	97	71	33	201	25	58	143	226	55	143	26	224	715
Total	93	123	91	307	457	354	205	1016	110	333	590	1033	172	581	82	835	3191
04:00 PM	34	76	36	146	88	168	35	291	20	99	88	207	20	100	25	145	789
04:15 PM	43	114	26	183	97	178	43	318	24	86	99	209	26	137	18	181	891
04:30 PM	35	76	26	137	78	176	52	306	33	96	77	206	23	154	19	196	845
04:45 PM	76	112	44	232	112	165	37	314	25	74	75	174	43	131	26	200	920
Total	188	378	132	698	375	687	167	1229	102	355	339	796	112	522	88	722	3445
05:00 PM	75	94	51	220	134	200	42	376	26	77	99	202	39	156	21	216	1014
05:15 PM	84	151	35	270	122	201	36	359	26	92	95	213	26	135	25	186	1028
05:30 PM	76	135	43	254	143	198	44	385	27	86	77	190	34	117	37	188	1017
05:45 PM	67	104	25	196	112	149	33	294	33	66	66	165	22	107	24	153	808
Total	302	484	154	940	511	748	155	1414	112	321	337	770	121	515	107	743	3867
Grand Total	680	1095	458	2233	1761	2010	705	4476	406	1269	1914	3589	638	2087	351	3076	13374
Apprch %	30.5	49.0	20.5		39.3	44.9	15.8		11.3	35.4	53.3		20.7	67.8	11.4		
Total %	5.1	8.2	3.4	16.7	13.2	15.0	5.3	33.5	3.0	9.5	14.3	26.8	4.8	15.6	2.6	23.0	

DE-TRAFFIC
WWW.DE-TRAFFIC.COM
WILLIAMSON BLVD AT TAYLOR RD
VOLUSIA COUNTY, FLORIDA

File Name : 04 Williamson @ Taylor
Site Code : 00000004
Start Date : 5/1/2008

	Williamson Blvd Southbound				Taylor Rd Westbound				South Williamson Blvd Northbound				Taylor Rd Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 07:00 AM to 09:00 AM - Peak 1 of 1																	
Intersection	07:45 AM																
Volume	98	135	95	328	485	360	211	1056	101	353	612	1066	173	558	78	809	3259
Percent	29.9	41.2	29.0		45.9	34.1	20.0		9.5	33.1	57.4		21.4	69.0	9.6		
08:00 Volume	26	26	16	68	144	106	75	325	25	102	175	302	44	140	20	204	899
Peak Factor																	0.906
High Int.	08:15 AM				08:00 AM				08:00 AM				08:30 AM				
Volume	21	42	26	89	144	106	75	325	25	102	175	302	38	153	20	211	
Peak Factor				0.921				0.812				0.882				0.959	
Peak Hour From 04:00 PM to 06:00 PM - Peak 1 of 1																	
Intersection	04:45 PM																
Volume	311	492	173	976	511	764	159	1434	104	329	346	779	142	539	109	790	3979
Percent	31.9	50.4	17.7		35.6	53.3	11.1		13.4	42.2	44.4		18.0	68.2	13.8		
05:15 Volume	84	151	35	270	122	201	36	359	26	92	95	213	26	135	25	186	1028
Peak Factor																	0.968
High Int.	05:15 PM				05:30 PM				05:15 PM				05:00 PM				
Volume	84	151	35	270	143	198	44	385	26	92	95	213	39	156	21	216	
Peak Factor				0.904				0.931				0.914				0.914	

DE-TRAFFIC
WWW.DE-TRAFFIC.COM
WILLIAMSON BLVD AT TAYLOR RD
VOLUSIA COUNTY, FLORIDA

File Name : 04 Williamson @ Taylor
Site Code : 00000004
Start Date : 5/1/2008
Page No : 3

Groups Printed- Commercial

	Williamson Blvd Southbound				Taylor Rd Westbound				South Williamson Blvd Northbound				Taylor Rd Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
07:00 AM	3	1	2	6	4	2	1	7	0	1	1	2	2	4	1	7	22
07:15 AM	2	1	2	5	2	2	1	5	1	2	0	3	2	2	1	5	18
07:30 AM	2	1	1	4	2	1	2	5	1	1	0	2	3	2	2	7	18
07:45 AM	0	2	2	4	1	2	2	5	0	2	0	2	2	1	1	4	15
Total	7	5	7	19	9	7	6	22	2	6	1	9	9	9	5	23	73
08:00 AM	2	2	0	4	2	0	1	3	1	4	0	5	2	2	2	6	18
08:15 AM	2	1	2	5	2	2	2	6	0	1	1	2	0	0	1	1	14
08:30 AM	2	1	2	5	0	1	0	1	2	2	1	5	2	2	1	5	16
08:45 AM	1	1	1	3	2	2	1	5	1	2	1	4	1	1	2	4	16
Total	7	5	5	17	6	5	4	15	4	9	3	16	5	5	6	16	64
04:00 PM	2	1	1	4	1	4	1	6	1	1	1	3	1	2	1	4	17
04:15 PM	2	2	2	6	2	2	1	5	0	2	1	3	2	2	2	6	20
04:30 PM	3	1	0	4	0	1	1	2	1	0	2	3	0	2	1	3	12
04:45 PM	2	0	2	4	1	2	2	5	1	2	0	3	2	1	2	5	17
Total	9	4	5	18	4	9	5	18	3	5	4	12	5	7	6	18	66
05:00 PM	0	2	0	2	2	1	0	3	1	2	0	3	1	2	2	5	13
05:15 PM	0	2	0	2	1	2	1	4	2	1	0	3	2	0	1	3	12
05:30 PM	1	0	2	3	1	2	2	5	1	2	2	5	2	2	2	6	19
05:45 PM	2	2	1	5	1	3	1	5	1	2	1	4	1	1	0	2	16
Total	3	6	3	12	5	8	4	17	5	7	3	15	6	5	5	16	60
Grand Total	26	20	20	66	24	29	19	72	14	27	11	52	25	26	22	73	263
Apprch %	39.4	30.3	30.3		33.3	40.3	26.4		26.9	51.9	21.2		34.2	35.6	30.1		
Total %	9.9	7.6	7.6	25.1	9.1	11.0	7.2	27.4	5.3	10.3	4.2	19.8	9.5	9.9	8.4	27.8	

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WILLIAMSON BLVD AT TAYLOR RD
VOLUSIA COUNTY, FLORIDA

File Name : 04 Williamson @ Taylor
Site Code : 00000004
Start Date : 5/1/2008
Page No : 4

Groups Printed- Peds

	Williamson Blvd Southbound					Taylor Rd Westbound					South Williamson Blvd Northbound					Taylor Rd Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
07:45 AM	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
04:45 PM	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
Total	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
Grand Total	0	0	0	2	2	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	3
Apprch %	0.0	0.0	0.0	100.0		0.0	0.0	0.0	100.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0		
Total %	0.0	0.0	0.0	66.7	66.7	0.0	0.0	0.0	33.3	33.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

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TAYLOR RD AT DUNLAWTON AVE
VOLUSIA COUNTY, FLORIDA

File Name : 08 Taylor @ Dunlawton
Site Code : 00000008
Start Date : 5/1/2008
Page No : 1

Groups Printed- Automobiles - Commercial

	N/A Southbound				Dunlawton Ave Westbound				Taylor Rd Northbound				Dunlawton Ave Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
07:00 AM	0	0	0	0	14	220	0	234	123	0	21	144	0	263	103	366	744
07:15 AM	0	0	0	0	12	251	0	263	139	0	25	164	0	306	81	387	814
07:30 AM	0	0	0	0	21	242	0	263	153	0	26	179	0	308	117	425	867
07:45 AM	0	0	0	0	22	226	0	248	180	0	33	213	0	388	138	526	987
Total	0	0	0	0	69	939	0	1008	595	0	105	700	0	1265	439	1704	3412
08:00 AM	0	0	0	0	23	212	0	235	206	0	25	231	0	372	104	476	942
08:15 AM	0	0	0	0	26	208	0	234	213	0	26	239	0	320	97	417	890
08:30 AM	0	0	0	0	26	160	0	186	148	0	27	175	0	269	67	336	697
08:45 AM	0	0	0	0	23	136	0	159	118	0	34	152	0	232	47	279	590
Total	0	0	0	0	98	716	0	814	685	0	112	797	0	1193	315	1508	3119
04:00 PM	0	0	0	0	26	332	0	358	103	0	19	122	0	286	85	371	851
04:15 PM	0	0	0	0	38	345	0	383	104	0	26	130	0	320	105	425	938
04:30 PM	0	0	0	0	29	351	0	380	142	0	18	160	0	296	136	432	972
04:45 PM	0	0	0	0	34	327	0	361	134	0	27	161	0	288	101	389	911
Total	0	0	0	0	127	1355	0	1482	483	0	90	573	0	1190	427	1617	3672
05:00 PM	0	0	0	0	44	447	0	491	114	0	28	142	0	391	115	506	1139
05:15 PM	0	0	0	0	29	466	0	495	113	0	26	139	0	399	140	539	1173
05:30 PM	0	0	0	0	40	389	0	429	85	0	17	102	0	372	85	457	988
05:45 PM	0	0	0	0	43	399	0	442	79	0	17	96	0	287	78	365	903
Total	0	0	0	0	156	1701	0	1857	391	0	88	479	0	1449	418	1867	4203
Grand Total	0	0	0	0	450	4711	0	5161	2154	0	395	2549	0	5097	1599	6696	14406
Apprch %	0.0	0.0	0.0		8.7	91.3	0.0		84.5	0.0	15.5		0.0	76.1	23.9		
Total %	0.0	0.0	0.0	0.0	3.1	32.7	0.0	35.8	15.0	0.0	2.7	17.7	0.0	35.4	11.1	46.5	

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TAYLOR RD AT DUNLAWTON AVE
VOLUSIA COUNTY, FLORIDA

File Name : 08 Taylor @ Dunlawton
Site Code : 00000008
Start Date : 5/1/2008
Page No : 2

	N/A Southbound				Dunlawton Ave Westbound				Taylor Rd Northbound				Dunlawton Ave Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 07:00 AM to 09:00 AM - Peak 1 of 1																	
Intersection	07:30 AM																
Volume	0	0	0	0	92	888	0	980	752	0	110	862	0	1388	456	1844	3686
Percent	0.0	0.0	0.0		9.4	90.6	0.0		87.2	0.0	12.8		0.0	75.3	24.7		
07:45 Volume	0	0	0	0	22	226	0	248	180	0	33	213	0	388	138	526	987
Peak Factor																	0.934
High Int.	6:45:00 AM				07:30 AM				08:15 AM				07:45 AM				
Volume	0	0	0	0	21	242	0	263	213	0	26	239	0	388	138	526	
Peak Factor								0.932				0.902				0.876	
Peak Hour From 04:00 PM to 06:00 PM - Peak 1 of 1																	
Intersection	04:45 PM																
Volume	0	0	0	0	147	1629	0	1776	446	0	98	544	0	1450	441	1891	4211
Percent	0.0	0.0	0.0		8.3	91.7	0.0		82.0	0.0	18.0		0.0	76.7	23.3		
05:15 Volume	0	0	0	0	29	466	0	495	113	0	26	139	0	399	140	539	1173
Peak Factor																	0.897
High Int.					05:15 PM				04:45 PM				05:15 PM				
Volume	0	0	0	0	29	466	0	495	134	0	27	161	0	399	140	539	
Peak Factor								0.897				0.845				0.877	

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TAYLOR RD AT DUNLAWTON AVE
VOLUSIA COUNTY, FLORIDA

File Name : 08 Taylor @ Dunlawton
Site Code : 00000008
Start Date : 5/1/2008
Page No : 3

Groups Printed- Commercial

	N/A Southbound				Dunlawton Ave Westbound				Taylor Rd Northbound				Dunlawton Ave Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
07:00 AM	0	0	0	0	4	9	0	13	9	0	2	11	0	9	4	13	37
07:15 AM	0	0	0	0	2	9	0	11	7	0	1	8	0	8	5	13	32
07:30 AM	0	0	0	0	5	10	0	15	8	0	0	8	0	7	2	9	32
07:45 AM	0	0	0	0	4	10	0	14	5	0	1	6	0	13	4	17	37
Total	0	0	0	0	15	38	0	53	29	0	4	33	0	37	15	52	138
08:00 AM	0	0	0	0	4	11	0	15	7	0	1	8	0	10	2	12	35
08:15 AM	0	0	0	0	2	9	0	11	5	0	1	6	0	11	6	17	34
08:30 AM	0	0	0	0	0	11	0	11	8	0	1	9	0	7	2	9	29
08:45 AM	0	0	0	0	2	10	0	12	4	0	2	6	0	8	4	12	30
Total	0	0	0	0	8	41	0	49	24	0	5	29	0	36	14	50	128
04:00 PM	0	0	0	0	2	11	0	13	4	0	1	5	0	10	4	14	32
04:15 PM	0	0	0	0	4	10	0	14	2	0	2	4	0	9	2	11	29
04:30 PM	0	0	0	0	2	9	0	11	1	0	2	3	0	10	4	14	28
04:45 PM	0	0	0	0	0	11	0	11	2	0	3	5	0	10	1	11	27
Total	0	0	0	0	8	41	0	49	9	0	8	17	0	39	11	50	116
05:00 PM	0	0	0	0	2	16	0	18	0	0	2	2	0	15	0	15	35
05:15 PM	0	0	0	0	4	14	0	18	2	0	2	4	0	15	5	20	42
05:30 PM	0	0	0	0	5	11	0	16	1	0	4	5	0	16	4	20	41
05:45 PM	0	0	0	0	1	10	0	11	4	0	1	5	0	11	2	13	29
Total	0	0	0	0	12	51	0	63	7	0	9	16	0	57	11	68	147
Grand Total	0	0	0	0	43	171	0	214	69	0	26	95	0	169	51	220	529
Apprch %	0.0	0.0	0.0		20.1	79.9	0.0		72.6	0.0	27.4		0.0	76.8	23.2		
Total %	0.0	0.0	0.0	0.0	8.1	32.3	0.0	40.5	13.0	0.0	4.9	18.0	0.0	31.9	9.6	41.6	

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TAYLOR RD AT DUNLAWTON AVE
VOLUSIA COUNTY, FLORIDA

File Name : 08 Taylor @ Dunlawton
Site Code : 00000008
Start Date : 5/1/2008
Page No : 4

Groups Printed- Peds

	N/A Southbound					Dunlawton Ave Westbound					Taylor Rd Northbound					Dunlawton Ave Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
08:00 AM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Total	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	2
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	2
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	2	3
05:15 PM	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
05:30 PM	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	4
Total	0	0	0	3	3	0	0	0	0	0	0	0	0	1	1	0	0	0	4	4	8
Grand Total	0	0	0	3	3	0	0	0	1	1	0	0	0	2	2	0	0	0	7	7	13
Apprch %	0.0	0.0	0.0	100.0		0.0	0.0	0.0	100.0		0.0	0.0	0.0	100.0		0.0	0.0	0.0	100.0		
Total %	0.0	0.0	0.0	23.1	23.1	0.0	0.0	0.0	7.7	7.7	0.0	0.0	0.0	15.4	15.4	0.0	0.0	0.0	53.8	53.8	

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I-95 NB RAMPS AT TAYLOR RD
VOLUSIA COUNTY, FLORIDA

File Name : I 95 NBR @ Taylor
Site Code : 00000003
Start Date : 5/8/2008
Page No : 1

Groups Printed- Automobiles - Commercial

	N/A Southbound				Taylor Rd Westbound				I-95 NB Ramps Northbound				Taylor Rd Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
07:00 AM	0	0	0	0	0	130	158	288	20	0	55	75	56	391	0	447	810
07:15 AM	0	0	0	0	0	196	201	397	15	0	76	91	56	364	0	420	908
07:30 AM	0	0	0	0	0	197	222	419	15	0	76	91	76	337	0	413	923
07:45 AM	0	0	0	0	0	270	227	497	17	0	85	102	66	284	0	350	949
Total	0	0	0	0	0	793	808	1601	67	0	292	359	254	1376	0	1630	3590
08:00 AM	0	0	0	0	0	260	220	480	14	0	78	92	75	245	0	320	892
08:15 AM	0	0	0	0	0	239	149	388	15	0	54	69	55	297	0	352	809
08:30 AM	0	0	0	0	0	229	134	363	13	0	77	90	58	354	0	412	865
08:45 AM	0	0	0	0	0	182	117	299	11	0	66	77	57	321	0	378	754
Total	0	0	0	0	0	910	620	1530	53	0	275	328	245	1217	0	1462	3320
04:00 PM	0	0	0	0	0	284	105	389	10	0	33	43	42	374	0	416	848
04:15 PM	0	0	0	0	0	293	120	413	11	0	52	63	35	384	0	419	895
04:30 PM	0	0	0	0	0	290	124	414	10	0	56	66	51	379	0	430	910
04:45 PM	0	0	0	0	0	282	135	417	12	0	44	56	43	419	0	462	935
Total	0	0	0	0	0	1149	484	1633	43	0	185	228	171	1556	0	1727	3588
05:00 PM	0	0	0	0	0	306	146	452	9	0	47	56	32	488	0	520	1028
05:15 PM	0	0	0	0	0	381	134	515	8	0	36	44	56	525	0	581	1140
05:30 PM	0	0	0	0	0	295	115	410	12	0	66	78	35	505	0	540	1028
05:45 PM	0	0	0	0	0	262	107	369	9	0	46	55	41	434	0	475	899
Total	0	0	0	0	0	1244	502	1746	38	0	195	233	164	1952	0	2116	4095
Grand Total	0	0	0	0	0	4096	2414	6510	201	0	947	1148	834	6101	0	6935	14593
Apprch %	0.0	0.0	0.0		0.0	62.9	37.1		17.5	0.0	82.5		12.0	88.0	0.0		
Total %	0.0	0.0	0.0	0.0	0.0	28.1	16.5	44.6	1.4	0.0	6.5	7.9	5.7	41.8	0.0	47.5	

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I-95 NB RAMPS AT TAYLOR RD
VOLUSIA COUNTY, FLORIDA

File Name : I 95 NBR @ Taylor
Site Code : 00000003
Start Date : 5/8/2008
Page No : 2

	N/A Southbound				Taylor Rd Westbound				I-95 NB Ramps Northbound				Taylor Rd Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 07:00 AM to 09:00 AM - Peak 1 of 1																	
Intersection	07:15 AM																
Volume	0	0	0	0	0	923	870	1793	61	0	315	376	273	1230	0	1503	3672
Percent	0.0	0.0	0.0		0.0	51.5	48.5		16.2	0.0	83.8		18.2	81.8	0.0		
07:45 Volume	0	0	0	0	0	270	227	497	17	0	85	102	66	284	0	350	949
Peak Factor																	0.967
High Int.	6:45:00 AM				07:45 AM				07:45 AM				07:15 AM				
Volume	0	0	0	0	0	270	227	497	17	0	85	102	56	364	0	420	
Peak Factor								0.902				0.922				0.895	
Peak Hour From 04:00 PM to 06:00 PM - Peak 1 of 1																	
Intersection	04:45 PM																
Volume	0	0	0	0	0	1264	530	1794	41	0	193	234	166	1937	0	2103	4131
Percent	0.0	0.0	0.0		0.0	70.5	29.5		17.5	0.0	82.5		7.9	92.1	0.0		
05:15 Volume	0	0	0	0	0	381	134	515	8	0	36	44	56	525	0	581	1140
Peak Factor																	0.906
High Int.					05:15 PM				05:30 PM				05:15 PM				
Volume	0	0	0	0	0	381	134	515	12	0	66	78	56	525	0	581	
Peak Factor								0.871				0.750				0.905	

DE-TRAFFIC
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I-95 NB RAMPS AT TAYLOR RD
VOLUSIA COUNTY, FLORIDA

File Name : I 95 NBR @ Taylor
Site Code : 00000003
Start Date : 5/8/2008
Page No : 3

Groups Printed- Commercial

	N/A Southbound				Taylor Rd Westbound				I-95 NB Ramps Northbound				Taylor Rd Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
07:00 AM	0	0	0	0	0	4	2	6	1	0	1	2	4	10	0	14	22
07:15 AM	0	0	0	0	0	5	1	6	0	0	2	2	2	11	0	13	21
07:30 AM	0	0	0	0	0	4	1	5	0	0	0	0	1	10	0	11	16
07:45 AM	0	0	0	0	0	5	2	7	1	0	1	2	1	12	0	13	22
Total	0	0	0	0	0	18	6	24	2	0	4	6	8	43	0	51	81
08:00 AM	0	0	0	0	0	4	4	8	0	0	2	2	1	13	0	14	24
08:15 AM	0	0	0	0	0	4	4	8	0	0	0	0	1	11	0	12	20
08:30 AM	0	0	0	0	0	5	2	7	1	0	2	3	2	10	0	12	22
08:45 AM	0	0	0	0	0	6	1	7	0	0	1	1	1	10	0	11	19
Total	0	0	0	0	0	19	11	30	1	0	5	6	5	44	0	49	85
04:00 PM	0	0	0	0	0	8	4	12	1	0	2	3	1	9	0	10	25
04:15 PM	0	0	0	0	0	10	5	15	0	0	1	1	0	9	0	9	25
04:30 PM	0	0	0	0	0	9	2	11	1	0	2	3	0	11	0	11	25
04:45 PM	0	0	0	0	0	6	4	10	2	0	2	4	0	9	0	9	23
Total	0	0	0	0	0	33	15	48	4	0	7	11	1	38	0	39	98
05:00 PM	0	0	0	0	0	4	5	9	0	0	1	1	0	13	0	13	23
05:15 PM	0	0	0	0	0	5	2	7	0	0	0	0	1	11	0	12	19
05:30 PM	0	0	0	0	0	6	1	7	1	0	1	2	1	10	0	11	20
05:45 PM	0	0	0	0	0	6	2	8	1	0	1	2	0	9	0	9	19
Total	0	0	0	0	0	21	10	31	2	0	3	5	2	43	0	45	81
Grand Total	0	0	0	0	0	91	42	133	9	0	19	28	16	168	0	184	345
Apprch %	0.0	0.0	0.0		0.0	68.4	31.6		32.1	0.0	67.9		8.7	91.3	0.0		
Total %	0.0	0.0	0.0	0.0	0.0	26.4	12.2	38.6	2.6	0.0	5.5	8.1	4.6	48.7	0.0	53.3	

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WWW.DE-TRAFFIC.COM
I-95 NB RAMPS AT TAYLOR RD
VOLUSIA COUNTY, FLORIDA

File Name : I 95 NBR @ Taylor
Site Code : 00000003
Start Date : 5/8/2008

Groups Printed- Peds

	N/A Southbound				Taylor Rd Westbound				I-95 NB Ramps Northbound				Taylor Rd Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0		
Total %																	

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I-95 SB RAMPS AT TAYLOR RD
VOLUSIA COUNTY, FLORIDA

File Name : I 95 SBR @ Taylor
Site Code : 00000002
Start Date : 5/8/2008
Page No : 1

Groups Printed- Automobiles - Commercial

	I-95 SB Ramps Southbound				Taylor Rd Westbound				N/A Northbound				Taylor Rd Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
07:00 AM	139	0	22	161	27	137	0	164	0	0	0	0	0	305	27	332	657
07:15 AM	103	0	25	128	35	171	0	206	0	0	0	0	0	313	33	346	680
07:30 AM	123	0	33	156	29	183	0	212	0	0	0	0	0	299	26	325	693
07:45 AM	132	0	25	157	33	263	0	296	0	0	0	0	0	225	35	260	713
Total	497	0	105	602	124	754	0	878	0	0	0	0	0	1142	121	1263	2743
08:00 AM	105	0	36	141	28	264	0	292	0	0	0	0	0	209	41	250	683
08:15 AM	96	0	30	126	31	231	0	262	0	0	0	0	0	261	36	297	685
08:30 AM	94	0	32	126	36	203	0	239	0	0	0	0	0	329	38	367	732
08:45 AM	78	0	27	105	36	161	0	197	0	0	0	0	0	303	32	335	637
Total	373	0	125	498	131	859	0	990	0	0	0	0	0	1102	147	1249	2737
04:00 PM	158	0	73	231	47	262	0	309	0	0	0	0	0	261	22	283	823
04:15 PM	162	0	64	226	58	261	0	319	0	0	0	0	0	271	32	303	848
04:30 PM	177	0	85	262	61	260	0	321	0	0	0	0	0	254	18	272	855
04:45 PM	178	0	74	252	54	232	0	286	0	0	0	0	0	272	23	295	833
Total	675	0	296	971	220	1015	0	1235	0	0	0	0	0	1058	95	1153	3359
05:00 PM	223	0	102	325	75	265	0	340	0	0	0	0	0	308	15	323	988
05:15 PM	312	0	100	412	66	338	0	404	0	0	0	0	0	273	18	291	1107
05:30 PM	266	0	84	350	44	255	0	299	0	0	0	0	0	261	21	282	931
05:45 PM	200	0	71	271	46	213	0	259	0	0	0	0	0	284	26	310	840
Total	1001	0	357	1358	231	1071	0	1302	0	0	0	0	0	1126	80	1206	3866
Grand Total	2546	0	883	3429	706	3699	0	4405	0	0	0	0	0	4428	443	4871	12705
Apprch %	74.2	0.0	25.8		16.0	84.0	0.0		0.0	0.0	0.0		0.0	90.9	9.1		
Total %	20.0	0.0	7.0	27.0	5.6	29.1	0.0	34.7	0.0	0.0	0.0	0.0	0.0	34.9	3.5	38.3	

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I-95 SB RAMPS AT TAYLOR RD
VOLUSIA COUNTY, FLORIDA

File Name : I 95 SBR @ Taylor
Site Code : 00000002
Start Date : 5/8/2008

	I-95 SB Ramps Southbound				Taylor Rd Westbound				N/A Northbound				Taylor Rd Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 07:00 AM to 09:00 AM - Peak 1 of 1																	
Intersection	07:45 AM																
Volume	427	0	123	550	128	961	0	1089	0	0	0	0	0	1024	150	1174	2813
Percent	77.6	0.0	22.4		11.8	88.2	0.0		0.0	0.0	0.0		0.0	87.2	12.8		
08:30 Volume	94	0	32	126	36	203	0	239	0	0	0	0	0	329	38	367	732
Peak Factor																	0.961
High Int.	07:45 AM				07:45 AM				6:45:00 AM				08:30 AM				
Volume	132	0	25	157	33	263	0	296	0	0	0	0	0	329	38	367	
Peak Factor				0.876				0.920								0.800	
Peak Hour From 04:00 PM to 06:00 PM - Peak 1 of 1																	
Intersection	05:00 PM																
Volume	1001	0	357	1358	231	1071	0	1302	0	0	0	0	0	1126	80	1206	3866
Percent	73.7	0.0	26.3		17.7	82.3	0.0		0.0	0.0	0.0		0.0	93.4	6.6		
05:15 Volume	312	0	100	412	66	338	0	404	0	0	0	0	0	273	18	291	1107
Peak Factor																	0.873
High Int.	05:15 PM				05:15 PM								05:00 PM				
Volume	312	0	100	412	66	338	0	404	0	0	0	0	0	308	15	323	
Peak Factor				0.824				0.806								0.933	

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I-95 SB RAMPS AT TAYLOR RD
VOLUSIA COUNTY, FLORIDA

File Name : I 95 SBR @ Taylor
Site Code : 00000002
Start Date : 5/8/2008
Page No : 3

Groups Printed- Commercial

	I-95 SB Ramps Southbound				Taylor Rd Westbound				N/A Northbound				Taylor Rd Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
07:00 AM	4	0	1	5	0	8	0	8	0	0	0	0	0	9	0	9	22
07:15 AM	2	0	0	2	1	7	0	8	0	0	0	0	0	11	1	12	22
07:30 AM	2	0	1	3	0	8	0	8	0	0	0	0	0	10	1	11	22
07:45 AM	2	0	1	3	1	9	0	10	0	0	0	0	0	12	0	12	25
Total	10	0	3	13	2	32	0	34	0	0	0	0	0	42	2	44	91
08:00 AM	4	0	0	4	1	8	0	9	0	0	0	0	0	9	0	9	22
08:15 AM	5	0	1	6	0	7	0	7	0	0	0	0	0	8	0	8	21
08:30 AM	5	0	1	6	1	8	0	9	0	0	0	0	0	8	0	8	23
08:45 AM	2	0	2	4	1	5	0	6	0	0	0	0	0	8	1	9	19
Total	16	0	4	20	3	28	0	31	0	0	0	0	0	33	1	34	85
04:00 PM	2	0	0	2	1	7	0	8	0	0	0	0	0	5	0	5	15
04:15 PM	1	0	2	3	2	8	0	10	0	0	0	0	0	7	0	7	20
04:30 PM	2	0	1	3	0	4	0	4	0	0	0	0	0	8	0	8	15
04:45 PM	2	0	2	4	0	8	0	8	0	0	0	0	0	8	0	8	20
Total	7	0	5	12	3	27	0	30	0	0	0	0	0	28	0	28	70
05:00 PM	2	0	1	3	0	9	0	9	0	0	0	0	0	7	0	7	19
05:15 PM	2	0	2	4	1	6	0	7	0	0	0	0	0	8	1	9	20
05:30 PM	1	0	0	1	2	8	0	10	0	0	0	0	0	9	0	9	20
05:45 PM	2	0	2	4	0	8	0	8	0	0	0	0	0	8	0	8	20
Total	7	0	5	12	3	31	0	34	0	0	0	0	0	32	1	33	79
Grand Total	40	0	17	57	11	118	0	129	0	0	0	0	0	135	4	139	325
Apprch %	70.2	0.0	29.8		8.5	91.5	0.0		0.0	0.0	0.0		0.0	97.1	2.9		
Total %	12.3	0.0	5.2	17.5	3.4	36.3	0.0	39.7	0.0	0.0	0.0	0.0	0.0	41.5	1.2	42.8	

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VOLUSIA COUNTY, FLORIDA

File Name : I 95 SBR @ Taylor
Site Code : 00000002
Start Date : 5/8/2008
Page No : 4

Groups Printed- Peds

	I-95 SB Ramps Southbound				Taylor Rd Westbound				N/A Northbound				Taylor Rd Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0		
Total %																	

APPENDIX B

EXISTING SIGNAL TIMINGS

VOLUSIA COUNTY TRA ENGINEERING
SYSTEM INV. JRY

LOCATION: DUNLAWTON AVE & TAYLOR RD. SYSTEM NO.: 23 INTERSECTION NO.: 6 ID # 192

DATE: 9-11-07

DESIGNED BY: C. LESTER

Volusia County FLORIDA

CONTROLLER TIME CHART

MVMNT	MIN	EXT	CLR	A.R.	MAXI	MAX II	WALK	PDW	LOCK	REC	FLASH
1											
2	15	3	5	2	53		7		L	MIN	Y
3											
4	6	3	4	1	20		7	31	NL		R
5	5	3	4	1	15						-
6	15	3	5	2	53		7	23	L	MIN	
7	6	3	4	1	20				NL		R
8											

COORDINATION

PLAN NO.	1		2		3		4		5		6	
CYCLE	125		130		140		120					
PARMATER	SEC	%	SEC	%	SEC	%	SEC	%	SEC	%	SEC	%
OFFSET 1		74		76		70		68				
OFFSET 2												
OFFSET 3												
BEGIN P.P.												
END P.P.		6%		6%		6%		6%		6%		6%

PHASE SPLITS (%)

PHASE NO.	DIAL # 1	2	3	4	5	6
1						
2	64	68	68	68		
3						
4	36	32	32	32		
5	18	22	22	18		
6	46	46	46	50		
7	36	32	32	32		
8						

CLOCK SETTINGS

PERIOD NO.		1	2	3	4	5	6	7	8	9	10	11	12
MON	TIME	6:30-11:00	11:00-1500	15:00-19:00	19:00-2100	21:00-							
	PLAN NO.	C10151	C20152	C30153	C40154	FREE							
TUES	TIME												
	PLAN NO.												
WED	TIME												
	PLAN NO.												
THURS	TIME												
	PLAN NO.												
FRI	TIME												
	PLAN NO.												
SAT	TIME	7:00-900	9:00-1900	19:00-2100	21:00-								
	PLAN NO.	C40154	C10151	C40154	FREE								
SUN	TIME	8:00-1000	10:00-1800	18:00-2000	20:00								
	PLAN NO.	C40154	C10151	C40154	FREE								

VOLUSIA COUNTY TRA ENGINEERING
SYSTEM IN\ JRY

LOCATION: DUNLAWTON AVE./TAYLOR # I-95 SB RAMP SYSTEM NO.: 23 INTERSECTION NO.: 7 ID#211

DATE: 11-14-07

DESIGNED BY: G. LESTER

Volusia County
FLORIDA

CONTROLLER TIME CHART

MVMNT	MIN	EXT	CLR	A.R.	MAXI	MAX II	WALK	FDW	LOCK	REC	FLASH
1											
2	20	3	4.5	2	60		5		L.	MIN	Y
3											
4											
5	5	3	4.5	1	20				NL		-
6	20	3	4.5	2	60		5		L	MIN	Y
7											
8	12	3	4.5	1	40				NL		R

COORDINATION

PLAN NO.	1		2		3		4		5		6	
CYCLE	125		130		140		120					
PARAMATER	SEC	%	SEC	%	SEC	%	SEC	%	SEC	%	SEC	%
OFFSET 1		65		69		58		63				
OFFSET 2												
OFFSET 3												
BEGIN P.P.												
END P.P.		6%		6%		6%		6%		6%		6%

PHASE SPLITS (%)

PHASE NO.	DIAL # 1	2	3	4	5	6
1						
2	73	68	68	68		
3						
4						
5	25	30	30	23		
6	48	38	38	45		
7						
8	27	32	32	32		

CLOCK SETTINGS

PERIOD NO.		1	2	3	4	5	6	7	8	9	10	11	12
MON	TIME	6:30-11:00	11:00-15:00	15:00-19:00	19:00-21:00	21:00-							
	PLAN NO.	C10151	C20152	C30153	C40154	FREE							
TUES	TIME												
	PLAN NO.												
WED	TIME												
	PLAN NO.												
THURS	TIME												
	PLAN NO.												
FRI	TIME												
	PLAN NO.	↓	↓	↓	↓	↓							
SAT	TIME	7:00-9:00	9:00-19:00	19:00-21:00	21:00-								
	PLAN NO.	C40154	C10151	C40154	FREE								
SUN	TIME	8:00-10:00	10:00-18:00	18:00-20:00	20:00-								
	PLAN NO.	C40154	C10151	C40154	FREE								

VOLUSIA COUNTY TR/ ENGINEERING
SYSTEM IN\ JRY

LOCATION: WILLIAMSON BLVD & TAYLOR RD. SYSTEM NO.: 23 INTERSECTION NO.: 8 ID# 277

DATE: 09-11-07

DESIGNED BY: GLESTER

Volusia County FLORIDA

CONTROLLER TIME CHART

MVMNT	MIN	EXT	CLR	A.R.	MAXI	MAX II	WALK	FDW	LOCK	REC	FLASH
1	5	3	4	1	15				NL		-
2	10	3	4	2	30		7	20	L	MIN	Y
3											
4	6	3	4	2	25		7	35	NL		R
5	5	3	4	1	35				NL		-
6	10	3	4	2	30		7	20	L	MIN	Y
7	5	3	4	1	15				NL		R
8	6	3	4	2	25		7	35	NL		R

COORDINATION

PLAN NO.	1		2		3		4		5		6	
CYCLE	125		130		140		120					
PARMATER	SEC	%	SEC	%	SEC	%	SEC	%	SEC	%	SEC	%
OFFSET 1		54		57		50		50				
OFFSET 2												
OFFSET 3												
BEGIN P.P.												
END P.P.		6%		6%		6%		6%		6%		6%

PHASE SPLITS (%)

PHASE NO.	DIAL # 1	2	3	4	5	6
1	15	13	12	15		
2	37	45	46	40		
3						
4	48	42	42	45		
5	24	30	33	25		
6	28	28	25	30		
7	13	13	12	18		
8	35	29	30	27		

CLOCK SETTINGS

PERIOD NO.		1	2	3	4	5	6	7	8	9	10	11	12
MON	TIME	6:30-11:00	11:00-15:00	15:00-19:00	19:00-21:00	21:00 -							
	PLAN NO.	C10151	C20152	C30151	C40154	FREE							
TUES	TIME												
	PLAN NO.												
WED	TIME												
	PLAN NO.												
THURS	TIME												
	PLAN NO.												
FRI	TIME												
	PLAN NO.	↓	↓	↓	↓	↓							
SAT	TIME	7:00-9:00	9:00-19:00	19:00-2100	21:00 -								
	PLAN NO.	C40154	C10151	C40154	FREE								
SUN	TIME	8:00-10:00	10:00-1800	18:00-2000	20:00								
	PLAN NO.	C40154	C10151	C40154	FREE								

VOLUSIA COUNTY TRAFFIC ENGINEERING
SYSTEM INVENTORY

LOCATION: DUNLAWTON & I-95 NB RAMP SYSTEM NO.: 23 INTERSECTION NO.: 12 ID # 417

DATE: 04-09-08

DESIGNED BY: G. LESTER

Volusia County
FLORIDA

CONTROLLER TIME CHART

MVMNT	MIN	EXT	CLR	A.R.	MAXI	MAX II	WALK	PDW	LOCK	REC	FLASH
1	8	3	4.5	1	20				NL		—
2	20	3	4.5	1	60		5		L	MIN	Y
3											
4	12	3	4.5	1	20				NL		R
5											
6	20	3	4.5	1	60		5		L	MIN	Y
7	12	3	4.5	1	20				NL		R
8											

COORDINATION

PLAN NO.	1		2		3		4		5		6	
CYCLE	125		130		140		120					
PARMATER	SEC	%	SEC	%	SEC	%	SEC	%	SEC	%	SEC	%
OFFSET 1		72		79		71		65				
OFFSET 2												
OFFSET 3												
BEGIN P.P.												
END P.P.		6%		6%		6%		6%		6%		5%

PHASE SPLITS (%)

PHASE NO.	DIAL # 1	2	3	4	5	6	7	8
1	20	17	15	20				
2	54	60	62	50				
3								
4	26	23	23	30				
5								
6	74	77	77	70				
7	26	23	23	30				
8								

CLOCK SETTINGS

PERIOD NO.		1	2	3	4	5	6	7	8	9	10	11	12
MON	TIME	6:30-11:00	11:00-15:00	15:00-19:00	19:00-21:00	21:00							
	PLAN NO.	C10151	C20152	C30153	C40154	FREE							
TUES	TIME												
	PLAN NO.												
WED	TIME												
	PLAN NO.												
THURS	TIME												
	PLAN NO.												
FRI	TIME												
	PLAN NO.	↓	↓	↓	↓	↓							
SAT	TIME	7:00-9:00	9:00-19:00	19:00-21:00	21:00 —								
	PLAN NO.	C40154	C10151	C40154	FREE								
SUN	TIME	8:00-10:00	10:00-18:00	18:00-20:00	20:00 —								
	PLAN NO.	C40154	C10151	C40154	FREE								

APPENDIX C

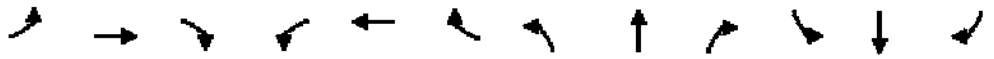
SYNCHRO & SIMTRAFFIC PRINTOUTS
(Existing Volumes)

EXISTING VOLUMES AND EXISTING GEOMETRY

Synchro HCS Printout

HCM Signalized Intersection Capacity Analysis
1: SR 421 & Williamson Blvd

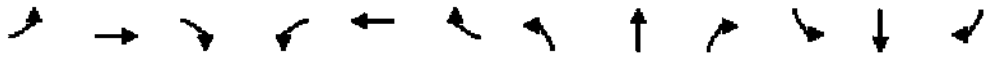
8/7/2008



Lane Configurations												
Volume (vph)	146	544	112	546	817	171	107	339	349	314	507	178
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	*0.83	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3477		1787	3123	1568	1770	1863	1599	1787	1881	1599
Flt Permitted	0.10	1.00		0.21	1.00	1.00	0.33	1.00	1.00	0.27	1.00	1.00
Satd. Flow (perm)	176	3477		398	3123	1568	609	1863	1599	500	1881	1599
Peak-hour factor, PHF	0.91	0.91	0.91	0.93	0.93	0.93	0.91	0.91	0.91	0.90	0.90	0.90
Adj. Flow (vph)	160	598	123	587	878	184	118	373	384	349	563	198
RTOR Reduction (vph)	0	12	0	0	0	85	0	0	224	0	0	130
Lane Group Flow (vph)	160	709	0	587	878	99	118	373	160	349	563	68
Heavy Vehicles (%)	5%	1%	2%	1%	1%	3%	2%	2%	1%	1%	1%	1%
Turn Type	pm+pt			pm+pt		Perm	Perm		Perm	pm+pt		custom
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2			6		6	8		8	4		6
Actuated Green, G (s)	60.0	46.0		64.0	48.0	48.0	43.0	43.0	43.0	61.0	61.0	48.0
Effective Green, g (s)	60.0	46.0		64.0	48.0	48.0	43.0	43.0	43.0	61.0	61.0	48.0
Actuated g/C Ratio	0.43	0.33		0.46	0.34	0.34	0.31	0.31	0.31	0.44	0.44	0.34
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	230	1142		341	1071	538	187	572	491	337	820	548
v/s Ratio Prot	0.07	0.20		c0.20	0.28			0.20		c0.10	0.30	
v/s Ratio Perm	0.23			c0.59		0.06	0.19		0.10	c0.35		0.04
v/c Ratio	0.70	0.62		1.72	0.82	0.18	0.63	0.65	0.32	1.04	0.69	0.12
Uniform Delay, d1	29.9	39.6		31.1	42.0	32.3	41.7	42.0	37.3	37.1	31.8	31.6
Progression Factor	1.00	1.00		1.80	0.85	1.56	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.8	2.5		334.5	5.8	0.8	15.1	5.7	1.8	58.5	2.4	0.5
Delay (s)	38.8	42.2		390.4	41.5	51.0	56.8	47.7	39.1	95.7	34.2	32.0
Level of Service	D	D		F	D	D	E	D	D	F	C	C
Approach Delay (s)		41.6			166.8			45.1			53.1	
Approach LOS		D			F			D			D	

HCM Average Control Delay	90.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.32		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	102.4%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group



Lane Configurations		↑↑↑	↱	↰	↑↑					↰↰		↱
Volume (vph)	0	1123	83	240	1162	0	0	0	0	999	0	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.5	4.0	5.5	6.5					5.5		5.5
Lane Util. Factor		0.91	1.00	1.00	0.95					0.97		1.00
Frt		1.00	0.85	1.00	1.00					1.00		0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (prot)		5036	1599	1787	3505					3467		1599
Flt Permitted		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (perm)		5036	1599	1787	3505					3467		1599
Peak-hour factor, PHF	0.25	0.91	0.77	0.77	0.79	0.25	0.25	0.25	0.25	0.80	0.25	0.88
Adj. Flow (vph)	0	1234	108	312	1471	0	0	0	0	1249	0	160
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1234	108	312	1471	0	0	0	0	1249	0	160
Heavy Vehicles (%)	0%	3%	1%	1%	3%	0%	0%	0%	0%	1%	0%	1%
Turn Type			Free	Prot						Prot		custom
Protected Phases		6		5	2					8		
Permitted Phases			Free									8
Actuated Green, G (s)		47.1	140.0	29.3	81.9					46.1		46.1
Effective Green, g (s)		47.1	140.0	29.3	81.9					46.1		46.1
Actuated g/C Ratio		0.34	1.00	0.21	0.59					0.33		0.33
Clearance Time (s)		6.5		5.5	6.5					5.5		5.5
Vehicle Extension (s)		3.0		3.0	3.0					3.0		3.0
Lane Grp Cap (vph)		1694	1599	374	2050					1142		527
v/s Ratio Prot		0.25		c0.17	c0.42					c0.36		
v/s Ratio Perm			0.07									0.10
v/c Ratio		0.73	0.07	0.83	0.72					1.09		0.30
Uniform Delay, d1		40.8	0.0	53.0	20.8					47.0		35.0
Progression Factor		0.93	1.00	1.28	0.99					1.00		1.00
Incremental Delay, d2		2.0	0.1	11.7	1.7					56.0		0.3
Delay (s)		39.9	0.1	79.4	22.2					103.0		35.3
Level of Service		D	A	E	C					F		D
Approach Delay (s)		36.7			32.2			0.0			95.3	
Approach LOS		D			C			A			F	

HCM Average Control Delay	53.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Configurations												
Volume (vph)	173	1949	0	0	1359	569	43	0	201	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5			5.5	4.0	5.5		5.5			
Lane Util. Factor	0.97	0.91			0.95	1.00	1.00		0.88			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	3467	5085			3539	1583	1687		2787			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	3467	5085			3539	1583	1687		2787			
Peak-hour factor, PHF	0.74	0.92	0.92	0.92	0.83	0.91	0.85	0.92	0.73	0.92	0.92	0.92
Adj. Flow (vph)	234	2118	0	0	1637	625	51	0	275	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	234	2118	0	0	1637	625	51	0	275	0	0	0
Heavy Vehicles (%)	1%	2%	0%	0%	2%	2%	7%	0%	2%	0%	0%	0%
Turn Type	Prot					Free	Prot		custom			
Protected Phases	5	2			6		8		4			
Permitted Phases						Free						
Actuated Green, G (s)	14.5	110.0			90.0	140.0	19.0		19.0			
Effective Green, g (s)	14.5	110.0			90.0	140.0	19.0		19.0			
Actuated g/C Ratio	0.10	0.79			0.64	1.00	0.14		0.14			
Clearance Time (s)	5.5	5.5			5.5		5.5		5.5			
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)	359	3995			2275	1583	229		378			
v/s Ratio Prot	c0.07	0.42			c0.46		0.03		c0.10			
v/s Ratio Perm						0.39						
v/c Ratio	0.65	0.53			0.72	0.39	0.22		0.73			
Uniform Delay, d1	60.3	5.5			16.6	0.0	53.9		58.0			
Progression Factor	1.56	0.95			1.25	1.00	1.00		1.00			
Incremental Delay, d2	2.9	0.2			1.7	0.6	0.5		6.8			
Delay (s)	97.0	5.4			22.5	0.6	54.4		64.9			
Level of Service	F	A			C	A	D		E			
Approach Delay (s)		14.5			16.5			63.2			0.0	
Approach LOS		B			B			E			A	

HCM Average Control Delay	18.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Configurations	↑↑↑	↱	↘	↑↑↑	↰↰	↱
Volume (vph)	1649	501	151	1514	414	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	4.0	5.0	7.0	5.0	5.0
Lane Util. Factor	0.91	1.00	1.00	0.91	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	4988	1583	1671	5036	3467	1455
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	4988	1583	1671	5036	3467	1455
Peak-hour factor, PHF	0.91	0.79	0.84	0.87	0.83	0.88
Adj. Flow (vph)	1812	634	180	1740	499	115
RTOR Reduction (vph)	0	0	0	0	0	94
Lane Group Flow (vph)	1812	634	180	1740	499	21
Heavy Vehicles (%)	4%	2%	8%	3%	1%	11%
Turn Type		Free	Prot			custom
Protected Phases	6		5	2	7	4
Permitted Phases		Free				
Actuated Green, G (s)	77.1	140.0	20.2	102.3	25.7	25.7
Effective Green, g (s)	77.1	140.0	20.2	102.3	25.7	25.7
Actuated g/C Ratio	0.55	1.00	0.14	0.73	0.18	0.18
Clearance Time (s)	7.0		5.0	7.0	5.0	5.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2747	1583	241	3680	636	267
v/s Ratio Prot	c0.36		c0.11	0.35	c0.14	0.01
v/s Ratio Perm		0.40				
v/c Ratio	0.66	0.40	0.75	0.47	0.78	0.08
Uniform Delay, d1	22.2	0.0	57.4	7.8	54.5	47.3
Progression Factor	1.20	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	0.7	11.9	0.4	6.3	0.1
Delay (s)	27.7	0.7	69.3	8.2	60.8	47.5
Level of Service	C	A	E	A	E	D
Approach Delay (s)	20.7			13.9	58.3	
Approach LOS	C			B	E	

HCM Average Control Delay	22.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		

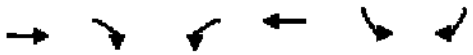
c Critical Lane Group

Synchro Queue Report

Lane Group Flow (vph)	160	721	587	878	184	118	373	384	349	563	198
v/c Ratio	0.70	0.62	1.71	0.82	0.30	0.63	0.65	0.54	1.02	0.69	0.29
Control Delay	42.7	41.5	360.1	42.2	19.5	58.9	48.4	10.1	86.5	37.1	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.7	41.5	360.1	42.2	19.5	58.9	48.4	10.1	86.5	37.1	5.7
Queue Length 50th (ft)	84	284	~589	392	85	93	295	39	~226	408	0
Queue Length 95th (ft)	153	354	#784	490	383	#173	410	134	#443	546	58
Internal Link Dist (ft)		1569		280			2748			1756	
Turn Bay Length (ft)						300		300	240		750
Base Capacity (vph)	405	1154	343	1072	623	187	572	716	341	820	678
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.62	1.71	0.82	0.30	0.63	0.65	0.54	1.02	0.69	0.29

~ 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.



Lane Group Flow (vph)	1234	108	312	1471	1249	160
v/c Ratio	0.73	0.07	0.84	0.72	1.09	0.30
Control Delay	40.2	0.1	82.5	22.0	99.5	38.6
Queue Delay	0.0	0.0	0.0	0.8	0.0	0.0
Total Delay	40.2	0.1	82.5	22.8	99.5	38.6
Queue Length 50th (ft)	393	0	284	255	~666	109
Queue Length 95th (ft)	m415	m0	302	478	#726	180
Internal Link Dist (ft)	273			477		
Turn Bay Length (ft)		100				
Base Capacity (vph)	1695	1599	466	2216	1142	527
Starvation Cap Reductn	0	0	0	409	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.07	0.67	0.81	1.09	0.30

~ 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.

Lane Group Flow (vph)	234	2118	1637	625	51	275
v/c Ratio	0.65	0.53	0.72	0.39	0.22	0.73
Control Delay	99.7	5.8	24.3	0.6	54.7	69.0
Queue Delay	0.0	0.2	0.2	0.0	0.2	0.0
Total Delay	99.7	6.0	24.5	0.6	55.0	69.0
Queue Length 50th (ft)	116	210	613	0	42	138
Queue Length 95th (ft)	119	m13	696	0	76	146
Internal Link Dist (ft)		477	553			
Turn Bay Length (ft)	650				330	330
Base Capacity (vph)	399	3994	2274	1583	319	528
Starvation Cap Reductn	0	909	118	0	0	0
Spillback Cap Reductn	0	195	77	0	63	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.69	0.76	0.39	0.20	0.52

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

Lane Group Flow (vph)	1812	634	180	1740	499	115
v/c Ratio	0.66	0.40	0.75	0.47	0.78	0.32
Control Delay	29.9	0.7	75.4	8.7	63.3	9.9
Queue Delay	0.1	0.0	0.0	0.1	0.0	0.0
Total Delay	30.0	0.7	75.4	8.7	63.3	9.9
Queue Length 50th (ft)	421	0	159	213	226	0
Queue Length 95th (ft)	643	0	213	276	247	48
Internal Link Dist (ft)	553			1593	262	
Turn Bay Length (ft)		200	250		500	
Base Capacity (vph)	2744	1583	313	3678	991	498
Starvation Cap Reductn	209	0	0	0	0	0
Spillback Cap Reductn	0	0	0	473	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.40	0.58	0.54	0.50	0.23

SimTraffic Single-Run Report

Summary of All Intervals

End Time	7:15
Total Time (min)	20
Time Recorded (min)	15
# of Intervals	2
# of Recorded Intvls	1
Vehs Entered	1684
Vehs Exited	1381
Starting Vehs	281
Ending Vehs	584
Denied Entry Before	6
Denied Entry After	60
Travel Distance (mi)	1451
Travel Time (hr)	109.5
Total Delay (hr)	68.4
Total Stops	3113
Fuel Used (gal)	624.5

Interval #0 Information Seeding

Start Time	6:55
End Time	7:00
Total Time (min)	5

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	7:15
Total Time (min)	15

Volumes adjusted by Growth Factors.

Vehs Exited	1381
Starting Vehs	281
Ending Vehs	584
Denied Entry Before	6
Denied Entry After	60
Travel Distance (mi)	1451
Travel Time (hr)	109.5
Total Delay (hr)	68.4
Total Stops	3113
Fuel Used (gal)	624.5

1: SR 421 & Williamson Blvd Performance by movement

Total Delay (hr)	0.3	2.0	0.4	4.2	2.5	0.3	0.7	1.3	0.5	2.1	1.8	0.3
Delay / Veh (s)	26.0	54.8	50.0	171.8	75.1	18.6	78.3	50.4	16.6	94.2	50.9	21.8
Stop Delay (hr)	0.3	1.6	0.4	3.9	2.1	0.3	0.6	1.0	0.3	1.8	1.3	0.3
St Del/Veh (s)	23.4	44.3	45.3	160.8	64.3	17.5	68.9	40.0	10.3	79.1	36.7	16.3
Total Stops	28	116	27	197	105	43	34	70	68	146	129	47
Stop/Veh	0.70	0.89	0.93	2.24	0.89	0.78	1.06	0.78	0.67	1.80	1.03	0.84
Travel Dist (mi)	11.6	41.0	9.0	8.1	11.0	5.5	15.7	47.8	53.1	29.0	43.9	18.1
Travel Time (hr)	0.6	2.9	0.7	4.5	2.7	0.5	1.2	2.6	2.1	3.0	3.0	0.9
Avg Speed (mph)	19	14	14	2	4	10	14	18	26	10	15	20
Vehicles Entered	39	135	30	92	119	57	30	88	102	89	132	52
Vehicles Exited	40	127	28	85	118	54	33	91	101	74	118	59
Hourly Exit Rate	160	508	112	340	472	216	132	364	404	296	472	236
Input Volume	146	544	112	546	819	171	107	339	349	314	507	178
% of Volume	110	93	100	62	58	126	123	107	116	94	93	133
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0

1: SR 421 & Williamson Blvd Performance by movement

Total Delay (hr)	16.3
Delay / Veh (s)	62.0
Stop Delay (hr)	13.8
St Del/Veh (s)	52.3
Total Stops	1010
Stop/Veh	1.07
Travel Dist (mi)	293.7
Travel Time (hr)	24.8
Avg Speed (mph)	12
Vehicles Entered	965
Vehicles Exited	928
Hourly Exit Rate	3712
Input Volume	4132
% of Volume	90
Denied Entry Before	0
Denied Entry After	0

3: SR 421 & Taylor Branch Rd. Performance by movement

Total Delay (hr)	3.0	0.4	1.3	2.6	2.1	0.1	9.5
Delay / Veh (s)	32.2	14.1	121.0	24.7	58.8	7.1	33.7
Stop Delay (hr)	2.2	0.2	1.3	1.8	1.9	0.1	7.5
St Del/Veh (s)	23.8	5.2	114.1	17.3	54.8	7.0	26.4
Total Stops	226	23	46	198	113	25	631
Stop/Veh	0.67	0.21	1.15	0.53	0.88	0.86	0.62
Travel Dist (mi)	37.9	11.0	14.1	120.8	6.8	1.6	192.2
Travel Time (hr)	4.0	0.8	1.7	5.3	2.4	0.1	14.3
Avg Speed (mph)	10	14	9	23	3	12	14
Vehicles Entered	366	110	46	394	125	29	1070
Vehicles Exited	313	104	34	351	130	29	961
Hourly Exit Rate	1252	416	136	1404	520	116	3844
Input Volume	1682	501	147	1629	446	98	4503
% of Volume	74	83	93	86	117	118	85
Denied Entry Before	0	0	1	2	0	0	3
Denied Entry After	2	0	0	1	0	0	3

17: SR 421 & I-95 NB Ramps Performance by movement

Total Delay (hr)	0.6	1.1	3.1	0.3	0.1	1.1	6.4
Delay / Veh (s)	75.2	9.8	34.1	7.0	51.5	68.6	23.5
Stop Delay (hr)	0.6	0.4	2.1	0.0	0.1	1.1	4.3
St Del/Veh (s)	71.4	3.7	23.1	0.1	47.8	65.5	15.9
Total Stops	24	95	215	0	7	56	397
Stop/Veh	0.83	0.23	0.66	0.00	0.88	0.93	0.41
Travel Dist (mi)	2.8	46.2	36.8	10.9	2.5	16.3	115.5
Travel Time (hr)	0.7	2.4	4.1	0.6	0.2	1.6	9.6
Avg Speed (mph)	4	19	9	18	15	10	12
Vehicles Entered	26	412	341	140	9	59	987
Vehicles Exited	31	412	316	136	8	60	963
Hourly Exit Rate	124	1648	1264	544	32	240	3852
Input Volume	173	1952	1506	569	43	201	4444
% of Volume	72	84	84	96	74	119	87
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0

18: SR 421 & I-95 SB Ramps Performance by movement

Total Delay (hr)	2.0	0.0	1.0	5.6	5.1	0.0	1.5	15.2
Delay / Veh (s)	25.7	7.1	75.1	90.6	108.4	18.7	200.2	71.9
Stop Delay (hr)	1.6	0.0	0.9	4.8	4.9	0.0	1.5	13.7
St Del/Veh (s)	20.5	3.7	68.3	76.9	105.2	14.7	197.3	64.7
Total Stops	130	3	39	300	78	1	21	572
Stop/Veh	0.47	0.17	0.81	1.34	0.46	1.00	0.78	0.75
Travel Dist (mi)	18.0	1.0	4.9	24.2	5.7	0.0	1.0	54.7
Travel Time (hr)	2.4	0.1	1.2	6.2	5.4	0.0	1.6	16.7
Avg Speed (mph)	8	15	4	4	2	5	1	4
Vehicles Entered	275	18	46	246	173	2	32	792
Vehicles Exited	273	18	50	202	166	1	23	733
Hourly Exit Rate	1092	72	200	808	664	4	92	2932
Input Volume	1124	83	240	1169	999	12	141	3768
% of Volume	97	87	83	69	66	33	65	78
Denied Entry Before	0	0	0	0	3	0	0	3
Denied Entry After	0	0	0	2	8	0	0	10

Total Zone Performance

Total Delay (hr)	47.4
Delay / Veh (s)	1059.2
Stop Delay (hr)	39.2
St Del/Veh (s)	876.7
Total Stops	2610
Stop/Veh	16.21
Travel Dist (mi)	656.1
Travel Time (hr)	65.3
Avg Speed (mph)	10
Vehicles Entered	939
Vehicles Exited	47
Hourly Exit Rate	188
Input Volume	16847
% of Volume	1
Denied Entry Before	6
Denied Entry After	13

Intersection: 1: SR 421 & Williamson Blvd

Movement(s) Served	WBL	EBTL	SBTL	EBL	WBTL	SBL	NBTL
Maximum Green (s)	16.0	46.0	61.0	29.0	33.0	13.0	43.0
Minimum Green (s)	5.0	10.0	6.0	5.0	10.0	5.0	6.0
Recall	None	C-Min	None	None	C-Min	None	Max
Avg. Green (s)	16.0	43.6	63.4	13.4	46.0	15.4	43.0
g/C Ratio	0.11	0.31	0.45	0.10	0.33	0.11	0.31
Cycles Skipped (%)	0	0	0	0	0	0	0
Cycles @ Minimum (%)	0	0	0	0	0	0	0
Cycles Maxed Out (%)	100	100	100	0	100	100	100
Cycles with Peds (%)	0	0	0	0	0	0	0

Average Cycle Length (s): 140.0
Number of Complete Cycles : 6

Intersection: 3: SR 421 & Taylor Branch Rd.

Movement(s) Served	SBT	NWR	SBL	NBT	NWL
Maximum Green (s)	88.0	40.0	26.0	57.0	40.0
Minimum Green (s)	15.0	6.0	5.0	15.0	6.0
Recall	C-Min	None	None	C-Min	None
Avg. Green (s)	103.4	31.4	20.1	78.3	31.4
g/C Ratio	0.74	0.22	0.11	0.56	0.22
Cycles Skipped (%)	0	0	25	0	0
Cycles @ Minimum (%)	0	0	0	0	0
Cycles Maxed Out (%)	100	20	13	100	20
Cycles with Peds (%)	0	0	0	0	0

Average Cycle Length (s): 140.0
Number of Complete Cycles : 5

Intersection: 17: SR 421 & I-95 NB Ramps

Movement(s) Served	EBT	NBR	EBL	WBT	NBL
Maximum Green (s)	102.5	26.5	15.5	81.5	26.5
Minimum Green (s)	20.0	12.0	8.0	20.0	12.0
Recall	C-Min	None	None	C-Min	None
Avg. Green (s)	119.0	19.8	10.9	102.6	19.8
g/C Ratio	0.85	0.14	0.07	0.73	0.14
Cycles Skipped (%)	0	0	14	0	0
Cycles @ Minimum (%)	0	20	14	0	20
Cycles Maxed Out (%)	100	20	0	100	20
Cycles with Peds (%)	0	0	0	0	0

Average Cycle Length (s): 140.0
Number of Complete Cycles : 5

Intersection: 18: SR 421 & I-95 SB Ramps

Movement(s) Served	WBT	WBL	EBT	SBL
Maximum Green (s)	88.5	36.5	46.5	39.5
Minimum Green (s)	20.0	5.0	20.0	12.0
Recall	C-Min	None	C-Min	None
Avg. Green (s)	88.5	19.9	63.1	39.5
g/C Ratio	0.63	0.14	0.45	0.28
Cycles Skipped (%)	0	0	0	0
Cycles @ Minimum (%)	0	0	0	0
Cycles Maxed Out (%)	100	0	100	100
Cycles with Peds (%)	0	0	0	0

Average Cycle Length (s): 140.0
Number of Complete Cycles : 6

SimTraffic Five-Run Average Report

Summary of All Intervals

Start Time	6:55	6:55	6:55	6:55	6:55	6:55
End Time	7:15	7:15	7:15	7:15	7:15	7:15
Total Time (min)	20	20	20	20	20	20
Time Recorded (min)	15	15	15	15	15	15
# of Intervals	2	2	2	2	2	2
# of Recorded Intvls	1	1	1	1	1	1
Vehs Entered	1552	1612	1606	1665	1581	1603
Vehs Exited	1346	1261	1438	1361	1439	1370
Starting Vehs	284	283	381	344	306	319
Ending Vehs	490	634	549	648	448	558
Denied Entry Before	4	1	2	5	0	1
Denied Entry After	38	158	63	7	12	55
Travel Distance (mi)	1368	1333	1395	1410	1408	1383
Travel Time (hr)	93.6	123.9	108.7	115.6	93.0	0.0
Total Delay (hr)	54.8	86.2	69.4	75.6	53.4	67.9
Total Stops	2482	2830	2888	3584	2814	2919
Fuel Used (gal)	571.6	625.9	614.5	628.1	586.1	605.2

Interval #0 Information Seeding

Start Time	6:55
End Time	7:00
Total Time (min)	5

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	7:15
Total Time (min)	15

Volumes adjusted by Growth Factors.

Vehs Entered	1552	1612	1606	1665	1581	1603
Vehs Exited	1346	1261	1438	1361	1439	1370
Starting Vehs	284	283	381	344	306	319
Ending Vehs	490	634	549	648	448	558
Denied Entry Before	4	1	2	5	0	1
Denied Entry After	38	158	63	7	12	55
Travel Distance (mi)	1368	1333	1395	1410	1408	1383
Travel Time (hr)	93.6	123.9	108.7	115.6	93.0	0.0
Total Delay (hr)	54.8	86.2	69.4	75.6	53.4	67.9
Total Stops	2482	2830	2888	3584	2814	2919
Fuel Used (gal)	571.6	625.9	614.5	628.1	586.1	605.2

Total Zone Performance

Total Delay (hr)	50.0
Delay / Veh (s)	1332.2
Stop Delay (hr)	42.2
St Del/Veh (s)	1125.5
Total Stops	2501
Stop/Veh	18.53
Travel Dist (mi)	618.4
Travel Time (hr)	0.0
Avg Speed (mph)	-597
Vehicles Entered	925
Vehicles Exited	43
Hourly Exit Rate	172
Input Volume	16847
% of Volume	1
Denied Entry Before	1
Denied Entry After	5

Intersection: 1: SR 421 & Williamson Blvd

Directions Served	L	T	TR	L	T	T	R	L	T	R	L	T
Maximum Queue (ft)	158	255	288	521	511	436	188	169	473	278	264	642
Average Queue (ft)	92	182	240	509	448	171	63	78	258	119	228	390
95th Queue (ft)	167	274	313	546	616	430	201	179	466	284	301	673
Link Distance (ft)	1599	1599	1599	278	278	278	278		2766			1751
Upstream Blk Time (%)				82	4	0						
Queuing Penalty (veh)				316	15	0						
Storage Bay Dist (ft)								300		300	240	
Storage Blk Time (%)									4	0	21	11
Queuing Penalty (veh)									20	0	142	53

Intersection: 1: SR 421 & Williamson Blvd

Directions Served	R
Maximum Queue (ft)	98
Average Queue (ft)	56
95th Queue (ft)	108
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	750
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: SR 421 & Taylor Branch Rd.

Directions Served	T	T	T	R	L	T	T	T	L	L	R	T
Maximum Queue (ft)	461	464	497	180	252	729	734	711	222	233	282	263
Average Queue (ft)	243	241	276	69	158	246	260	213	157	192	148	128
95th Queue (ft)	503	508	551	229	273	642	647	601	239	264	349	462
Link Distance (ft)	512	512	512			1657	1657	1657			242	645
Upstream Blk Time (%)	2	3	4						0	7	15	2
Queuing Penalty (veh)	18	21	27						0	0	0	0
Storage Bay Dist (ft)				200	250				500	500		
Storage Blk Time (%)			13	0	2	18			0	7	15	
Queuing Penalty (veh)			65	2	11	26			0	7	65	

Intersection: 17: SR 421 & I-95 NB Ramps

Directions Served	L	L	T	T	T	T	T	R	L	R	R
Maximum Queue (ft)	255	258	125	130	220	587	572	210	100	157	163
Average Queue (ft)	135	128	42	47	72	316	358	30	41	89	101
95th Queue (ft)	272	284	118	138	191	655	651	231	92	163	168
Link Distance (ft)			491	491	491	512	512	512		1439	
Upstream Blk Time (%)					0	9	18	0			
Queuing Penalty (veh)					0	62	126	1			
Storage Bay Dist (ft)	650	650							330		330
Storage Blk Time (%)											
Queuing Penalty (veh)											

Intersection: 18: SR 421 & I-95 SB Ramps

Directions Served	T	T	T	L	T	T	L	L	R
Maximum Queue (ft)	228	215	302	578	538	540	192	197	193
Average Queue (ft)	133	142	190	368	427	425	184	190	155
95th Queue (ft)	231	233	298	687	647	626	222	201	229
Link Distance (ft)	130	130	130	491	491	491	54	54	54
Upstream Blk Time (%)	6	8	21	9	34	16	76	79	75
Queuing Penalty (veh)	25	30	83	44	158	77	287	297	281
Storage Bay Dist (ft)									
Storage Blk Time (%)			30						
Queuing Penalty (veh)			25						

Zone Summary

Zone wide Queuing Penalty: 2284

Intersection: 1: SR 421 & Williamson Blvd

Movement(s) Served	WBL	EBTL	SBTL	EBL	WBTL	SBL	NBTL
Maximum Green (s)	16.0	46.0	61.0	29.0	33.0	13.0	43.0
Minimum Green (s)	5.0	10.0	6.0	5.0	10.0	5.0	6.0
Recall	None	C-Min	None	None	C-Min	None	Max
Avg. Green (s)	16.0	42.6	64.4	16.1	44.8	15.2	44.3
g/C Ratio	0.11	0.30	0.46	0.10	0.32	0.11	0.32
Cycles Skipped (%)	0	0	0	14	0	0	0
Cycles @ Minimum (%)	0	0	0	0	0	0	0
Cycles Maxed Out (%)	100	100	100	0	100	83	100
Cycles with Peds (%)	0	0	0	0	0	0	0

Average Cycle Length (s): 140.0
Number of Complete Cycles : 6

Intersection: 3: SR 421 & Taylor Branch Rd.

Movement(s) Served	SBT	NWR	SBL	NBT	NWL
Maximum Green (s)	88.0	40.0	26.0	57.0	40.0
Minimum Green (s)	15.0	6.0	5.0	15.0	6.0
Recall	C-Min	None	None	C-Min	None
Avg. Green (s)	118.7	34.7	22.0	91.1	34.7
g/C Ratio	0.85	0.25	0.16	0.65	0.25
Cycles Skipped (%)	0	0	0	0	0
Cycles @ Minimum (%)	0	0	0	0	0
Cycles Maxed Out (%)	100	20	20	100	20
Cycles with Peds (%)	0	0	0	0	0

Average Cycle Length (s): 140.0
Number of Complete Cycles : 5

Intersection: 17: SR 421 & I-95 NB Ramps

Movement(s) Served	EBT	NBR	EBL	WBT	NBL
Maximum Green (s)	102.5	26.5	15.5	81.5	26.5
Minimum Green (s)	20.0	12.0	8.0	20.0	12.0
Recall	C-Min	None	None	C-Min	None
Avg. Green (s)	114.2	23.1	13.7	95.0	23.1
g/C Ratio	0.82	0.17	0.08	0.68	0.17
Cycles Skipped (%)	0	0	14	0	0
Cycles @ Minimum (%)	0	0	0	0	0
Cycles Maxed Out (%)	100	40	29	100	40
Cycles with Peds (%)	0	0	0	0	0

Average Cycle Length (s): 140.0
Number of Complete Cycles : 5

Intersection: 18: SR 421 & I-95 SB Ramps

Movement(s) Served	WBT	WBL	EBT	SBL
Maximum Green (s)	88.5	36.5	46.5	39.5
Minimum Green (s)	20.0	5.0	20.0	12.0
Recall	C-Min	None	C-Min	None
Avg. Green (s)	88.7	24.7	60.5	39.7
g/C Ratio	0.63	0.18	0.43	0.28
Cycles Skipped (%)	0	0	0	0
Cycles @ Minimum (%)	0	0	0	0
Cycles Maxed Out (%)	100	0	100	83
Cycles with Peds (%)	0	0	0	0

Average Cycle Length (s): 140.0
Number of Complete Cycles : 6

EXISTING VOLUMES AND COMMITTED GEOMETRY

Synchro HCS Printout

HCM Signalized Intersection Capacity Analysis
1: SR 421 & Williamson Blvd

8/7/2008

Lane Configurations												
Volume (vph)	109	544	112	546	836	152	163	283	349	314	507	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	
Lane Util. Factor	0.97	0.91		0.97	*0.95	1.00	0.97	0.95	0.88	0.97	0.95	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3335	4996		3467	3574	1568	3433	3539	2814	3467	3494	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3335	4996		3467	3574	1568	3433	3539	2814	3467	3494	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	117	585	120	587	899	163	175	304	375	338	545	96
RTOR Reduction (vph)	0	24	0	0	0	78	0	0	307	0	12	0
Lane Group Flow (vph)	117	681	0	587	899	85	175	304	68	338	629	0
Heavy Vehicles (%)	5%	1%	2%	1%	1%	3%	2%	2%	1%	1%	1%	1%
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Actuated Green, G (s)	10.3	36.8		37.9	64.4	64.4	11.7	25.4	25.4	17.9	31.6	
Effective Green, g (s)	10.3	36.8		37.9	64.4	64.4	11.7	25.4	25.4	17.9	31.6	
Actuated g/C Ratio	0.07	0.26		0.27	0.46	0.46	0.08	0.18	0.18	0.13	0.23	
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	245	1313		939	1644	721	287	642	511	443	789	
v/s Ratio Prot	0.04	0.14		c0.17	c0.25		0.05	0.09		c0.10	c0.18	
v/s Ratio Perm						0.05			0.02			
v/c Ratio	0.48	0.52		0.63	0.55	0.12	0.61	0.47	0.13	0.76	0.80	
Uniform Delay, d1	62.3	44.0		44.8	27.3	21.6	61.9	51.3	48.1	59.0	51.2	
Progression Factor	1.00	1.00		1.40	0.49	2.12	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.5	1.5		1.2	1.2	0.3	3.6	0.6	0.1	7.6	5.6	
Delay (s)	63.7	45.5		63.8	14.5	46.0	65.6	51.9	48.2	66.6	56.8	
Level of Service	E	D		E	B	D	E	D	D	E	E	
Approach Delay (s)		48.1			35.1			53.1			60.2	
Approach LOS		D			D			D			E	

HCM Average Control Delay	46.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	68.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Configurations		↑↑↑	↱	↰	↑↑					↰↰		↱
Volume (vph)	0	1123	83	240	1162	0	0	0	0	999	0	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.5	4.0	5.5	6.5					5.5		5.5
Lane Util. Factor		0.91	1.00	1.00	0.95					0.97		1.00
Frt		1.00	0.85	1.00	1.00					1.00		0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (prot)		5036	1599	1787	3505					3467		1599
Flt Permitted		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (perm)		5036	1599	1787	3505					3467		1599
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	1208	89	258	1249	0	0	0	0	1074	0	152
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1208	89	258	1249	0	0	0	0	1074	0	152
Heavy Vehicles (%)	0%	3%	1%	1%	3%	0%	0%	0%	0%	1%	0%	1%
Turn Type			Free	Prot						Prot		custom
Protected Phases		6		5	2					8		8
Permitted Phases			Free									
Actuated Green, G (s)		49.4	140.0	25.5	80.4					47.6		47.6
Effective Green, g (s)		49.4	140.0	25.5	80.4					47.6		47.6
Actuated g/C Ratio		0.35	1.00	0.18	0.57					0.34		0.34
Clearance Time (s)		6.5		5.5	6.5					5.5		5.5
Vehicle Extension (s)		3.0		3.0	3.0					3.0		3.0
Lane Grp Cap (vph)		1777	1599	325	2013					1179		544
v/s Ratio Prot		c0.24		c0.14	0.36					c0.31		0.10
v/s Ratio Perm			0.06									
v/c Ratio		0.68	0.06	0.79	0.62					0.91		0.28
Uniform Delay, d1		38.6	0.0	54.7	19.7					44.2		33.7
Progression Factor		0.96	1.00	1.11	0.54					1.00		1.00
Incremental Delay, d2		1.9	0.1	11.6	1.3					10.6		0.3
Delay (s)		39.1	0.1	72.4	12.1					54.7		34.0
Level of Service		D	A	E	B					D		C
Approach Delay (s)		36.4			22.4			0.0			52.2	
Approach LOS		D			C			A			D	

HCM Average Control Delay	36.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Configurations												
Volume (vph)	173	1949	0	0	1359	569	43	0	201	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5			5.5	4.0	5.5		5.5			
Lane Util. Factor	0.97	0.91			0.91	1.00	1.00		0.88			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	3467	5085			5085	1583	1687		2787			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	3467	5085			5085	1583	1687		2787			
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	186	2096	0	0	1461	612	46	0	216	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	186	2096	0	0	1461	612	46	0	216	0	0	0
Heavy Vehicles (%)	1%	2%	0%	0%	2%	2%	7%	0%	2%	0%	0%	0%
Turn Type	Prot					Free	Prot		custom			
Protected Phases	5	2			6		4		7			
Permitted Phases						Free						
Actuated Green, G (s)	12.8	112.7			94.4	140.0	16.3		16.3			
Effective Green, g (s)	12.8	112.7			94.4	140.0	16.3		16.3			
Actuated g/C Ratio	0.09	0.80			0.67	1.00	0.12		0.12			
Clearance Time (s)	5.5	5.5			5.5		5.5		5.5			
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)	317	4093			3429	1583	196		324			
v/s Ratio Prot	0.05	c0.41			0.29		0.03		c0.08			
v/s Ratio Perm						0.39						
v/c Ratio	0.59	0.51			0.43	0.39	0.23		0.67			
Uniform Delay, d1	61.1	4.5			10.4	0.0	56.2		59.2			
Progression Factor	1.12	2.02			0.75	1.00	1.00		1.00			
Incremental Delay, d2	2.0	0.3			0.3	0.6	0.6		5.1			
Delay (s)	70.3	9.4			8.2	0.6	56.8		64.4			
Level of Service	E	A			A	A	E		E			
Approach Delay (s)		14.4			6.0			63.0			0.0	
Approach LOS		B			A			E			A	

HCM Average Control Delay	13.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

	↑	↱	↘	↓	↶	↖
Lane Configurations	↑↑↑	↱	↰	↑↑↑	↰↰	↱
Volume (vph)	1649	501	151	1514	446	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	4.0	5.0	7.0	5.0	5.0
Lane Util. Factor	0.91	1.00	1.00	0.91	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	4988	1583	1671	5036	3467	1455
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	4988	1583	1671	5036	3467	1455
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	1773	539	162	1628	480	105
RTOR Reduction (vph)	0	0	0	0	0	86
Lane Group Flow (vph)	1773	539	162	1628	480	19
Heavy Vehicles (%)	4%	2%	8%	3%	1%	11%
Turn Type		Free	Prot			custom
Protected Phases	6		5	2	7	4
Permitted Phases		Free				
Actuated Green, G (s)	79.2	140.0	18.8	103.0	25.0	25.0
Effective Green, g (s)	79.2	140.0	18.8	103.0	25.0	25.0
Actuated g/C Ratio	0.57	1.00	0.13	0.74	0.18	0.18
Clearance Time (s)	7.0		5.0	7.0	5.0	5.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2822	1583	224	3705	619	260
v/s Ratio Prot	c0.36		c0.10	0.32	c0.14	0.01
v/s Ratio Perm		0.34				
v/c Ratio	0.63	0.34	0.72	0.44	0.78	0.07
Uniform Delay, d1	20.5	0.0	58.1	7.2	54.8	47.8
Progression Factor	1.18	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.5	11.0	0.4	6.0	0.1
Delay (s)	25.0	0.5	69.1	7.6	60.9	48.0
Level of Service	C	A	E	A	E	D
Approach Delay (s)	19.3			13.2	58.6	
Approach LOS	B			B	E	

HCM Average Control Delay	21.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Synchro Queue Report

Queues
1: SR 421 & Williamson Blvd

8/13/2008

Lane Group Flow (vph)	117	705	587	899	163	175	304	375	338	641
v/c Ratio	0.48	0.53	0.63	0.55	0.20	0.61	0.47	0.46	0.76	0.80
Control Delay	68.4	42.7	67.0	15.3	12.4	71.4	53.0	6.0	70.6	57.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.4	42.7	67.0	15.3	12.4	71.4	53.0	6.0	70.6	57.7
Queue Length 50th (ft)	53	192	216	101	55	80	132	0	154	286
Queue Length 95th (ft)	85	214	#359	186	382	121	167	44	#225	335
Internal Link Dist (ft)		1569		280			2748			1756
Turn Bay Length (ft)	250					300		300	240	
Base Capacity (vph)	381	1663	938	1645	800	305	986	1054	456	1109
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	0.31	0.42	0.63	0.55	0.20	0.57	0.31	0.36	0.74	0.58

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

Lane Group Flow (vph)	1208	89	258	1249	1074	152
v/c Ratio	0.68	0.06	0.79	0.62	0.91	0.28
Control Delay	39.3	0.1	76.5	11.9	56.6	37.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.3	0.1	76.5	11.9	56.6	37.2
Queue Length 50th (ft)	377	0	165	90	480	101
Queue Length 95th (ft)	431	m0	292	120	#704	176
Internal Link Dist (ft)	273			477		
Turn Bay Length (ft)		100				
Base Capacity (vph)	1777	1599	466	2216	1179	544
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.06	0.55	0.56	0.91	0.28

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.

Lane Group Flow (vph)	186	2096	1461	612	46	216
v/c Ratio	0.59	0.51	0.43	0.39	0.23	0.67
Control Delay	73.5	9.9	8.7	0.6	57.9	69.2
Queue Delay	0.0	0.3	0.1	0.0	0.0	0.0
Total Delay	73.5	10.2	8.8	0.6	57.9	69.2
Queue Length 50th (ft)	92	379	187	0	39	109
Queue Length 95th (ft)	134	395	190	0	77	152
Internal Link Dist (ft)		477	553			
Turn Bay Length (ft)	650				330	330
Base Capacity (vph)	388	4095	3430	1583	319	528
Starvation Cap Reductn	0	1080	614	0	0	0
Spillback Cap Reductn	0	176	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.70	0.52	0.39	0.14	0.41

Lane Group Flow (vph)	1773	539	162	1628	480	105
v/c Ratio	0.63	0.34	0.72	0.44	0.78	0.30
Control Delay	26.9	0.5	75.5	8.0	63.6	10.3
Queue Delay	0.2	0.0	0.0	0.0	0.0	0.0
Total Delay	27.2	0.5	75.5	8.0	63.6	10.3
Queue Length 50th (ft)	369	0	144	188	218	0
Queue Length 95th (ft)	657	0	212	258	265	49
Internal Link Dist (ft)	553			1593	262	
Turn Bay Length (ft)		200	250		500	
Base Capacity (vph)	2823	1583	310	3706	991	491
Starvation Cap Reductn	356	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.34	0.52	0.44	0.48	0.21

SimTraffic Single-Run Report

Summary of All Intervals

End Time	5:15
Total Time (min)	20
Time Recorded (min)	15
# of Intervals	2
# of Recorded Intvls	1
Vehs Entered	1652
Vehs Exited	1614
Starting Vehs	299
Ending Vehs	337
Denied Entry Before	0
Denied Entry After	8
Travel Distance (mi)	1570
Travel Time (hr)	83.0
Total Delay (hr)	38.7
Total Stops	2189
Fuel Used (gal)	610.4

Interval #0 Information Seeding

Start Time	4:55
End Time	5:00
Total Time (min)	5

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	5:00
End Time	5:15
Total Time (min)	15

Volumes adjusted by Growth Factors.

Vehs Exited	1614
Starting Vehs	299
Ending Vehs	337
Denied Entry Before	0
Denied Entry After	8
Travel Distance (mi)	1570
Travel Time (hr)	83.0
Total Delay (hr)	38.7
Total Stops	2189
Fuel Used (gal)	610.4

1: SR 421 & Williamson Blvd Performance by movement

Total Delay (hr)	0.7	1.4	0.3	3.7	1.6	0.1	0.7	0.6	0.4	1.1	1.9	0.3
Delay / Veh (s)	72.3	35.9	38.2	91.8	29.1	4.3	65.5	41.8	13.9	54.4	48.5	50.5
Total Stops	32	78	20	152	87	27	41	39	82	69	118	16
Travel Dist (mi)	10.2	43.8	7.3	12.8	18.4	5.8	23.8	26.2	51.4	26.3	50.0	6.3
Travel Time (hr)	1.0	2.5	0.5	4.1	2.0	0.4	1.4	1.4	1.9	2.0	3.3	0.5
Avg Speed (mph)	11	19	17	3	9	17	17	19	27	13	15	14
Vehicles Entered	33	143	24	139	198	63	45	49	99	77	147	19
Vehicles Exited	38	147	25	150	202	65	35	56	94	75	133	18
Hourly Exit Rate	152	588	100	600	808	260	140	224	376	300	532	72
Input Volume	109	544	112	546	838	152	163	283	349	314	507	89
% of Volume	139	108	89	110	96	171	86	79	108	96	105	81
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0

1: SR 421 & Williamson Blvd Performance by movement

Total Delay (hr)	12.8
Delay / Veh (s)	44.5
Total Stops	761
Travel Dist (mi)	282.4
Travel Time (hr)	20.9
Avg Speed (mph)	14
Vehicles Entered	1036
Vehicles Exited	1038
Hourly Exit Rate	4152
Input Volume	4006
% of Volume	104
Denied Entry Before	0
Denied Entry After	0

3: SR 421 & Taylor Branch Rd. Performance by movement

Total Delay (hr)	2.5	0.5	0.8	1.4	1.5	0.1	6.7
Delay / Veh (s)	22.3	12.8	79.2	11.3	51.9	11.3	21.4
Total Stops	218	36	36	122	80	18	510
Travel Dist (mi)	44.0	14.0	11.9	135.5	5.6	1.2	212.3
Travel Time (hr)	3.5	0.9	1.1	4.5	1.7	0.1	12.0
Avg Speed (mph)	13	15	11	31	3	9	18
Vehicles Entered	401	132	37	428	105	22	1125
Vehicles Exited	395	133	39	438	104	22	1131
Hourly Exit Rate	1580	532	156	1752	416	88	4524
Input Volume	1682	501	147	1629	446	98	4503
% of Volume	94	106	106	108	93	90	100
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	1	0	0	0	0	0	1

17: SR 421 & I-95 NB Ramps Performance by movement

Total Delay (hr)	1.0	1.2	1.1	0.4	0.2	0.8	4.7
Delay / Veh (s)	78.7	8.8	10.6	8.0	57.4	64.2	14.9
Total Stops	48	108	90	3	9	40	298
Travel Dist (mi)	5.2	52.8	42.4	12.5	3.0	12.3	128.2
Travel Time (hr)	1.2	2.7	2.2	0.7	0.3	1.1	8.3
Avg Speed (mph)	4	19	19	17	12	11	16
Vehicles Entered	49	475	384	158	11	45	1122
Vehicles Exited	48	484	392	159	11	42	1136
Hourly Exit Rate	192	1936	1568	636	44	168	4544
Input Volume	173	1952	1506	569	43	201	4444
% of Volume	111	99	104	112	102	84	102
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	1	1

18: SR 421 & I-95 SB Ramps Performance by movement

Total Delay (hr)	2.9	0.0	1.4	1.7	2.9	0.0	0.4	9.4
Delay / Veh (s)	36.2	6.4	76.1	20.7	44.2	20.9	38.9	35.4
Total Stops	141	3	60	106	112	2	30	454
Travel Dist (mi)	18.6	1.3	6.8	31.7	7.9	0.1	1.3	67.7
Travel Time (hr)	3.3	0.1	1.6	2.5	3.3	0.0	0.5	11.3
Avg Speed (mph)	6	16	4	13	3	4	3	6
Vehicles Entered	281	25	64	304	246	3	36	959
Vehicles Exited	296	25	69	302	228	3	35	958
Hourly Exit Rate	1184	100	276	1208	912	12	140	3832
Input Volume	1124	83	240	1169	999	12	141	3768
% of Volume	105	120	115	103	91	100	99	102
Denied Entry Before	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	6	0	0	6

Total Zone Performance

Total Delay (hr)	33.6
Delay / Veh (s)	3101.4
Total Stops	2023
Travel Dist (mi)	690.6
Travel Time (hr)	52.4
Avg Speed (mph)	13
Vehicles Entered	925
Vehicles Exited	49
Hourly Exit Rate	196
Input Volume	16721
% of Volume	1
Denied Entry Before	0
Denied Entry After	8

SimTraffic Five-Run Average Report

Summary of All Intervals

Start Time	4:55	4:55	4:55	4:55	4:55	4:55
End Time	5:15	5:15	5:15	5:15	5:15	5:15
Total Time (min)	20	20	20	20	20	20
Time Recorded (min)	15	15	15	15	15	15
# of Intervals	2	2	2	2	2	2
# of Recorded Intvls	1	1	1	1	1	1
Vehs Entered	1665	1700	1580	1630	1557	1624
Vehs Exited	1616	1627	1537	1620	1567	1595
Starting Vehs	294	293	296	355	300	305
Ending Vehs	343	366	339	365	290	340
Denied Entry Before	4	6	5	0	0	1
Denied Entry After	12	12	5	6	4	7
Travel Distance (mi)	1562	1588	1466	1570	1490	1535
Travel Time (hr)	85.1	94.1	75.8	86.9	75.4	0.0
Total Delay (hr)	41.0	49.4	34.6	42.8	33.5	40.3
Total Stops	2191	2531	2118	2239	1839	2182
Fuel Used (gal)	613.3	645.4	569.2	621.8	571.6	604.2

Interval #0 Information Seeding

Start Time	4:55
End Time	5:00
Total Time (min)	5

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	5:00
End Time	5:15
Total Time (min)	15

Volumes adjusted by Growth Factors.

Vehs Entered	1665	1700	1580	1630	1557	1624
Vehs Exited	1616	1627	1537	1620	1567	1595
Starting Vehs	294	293	296	355	300	305
Ending Vehs	343	366	339	365	290	340
Denied Entry Before	4	6	5	0	0	1
Denied Entry After	12	12	5	6	4	7
Travel Distance (mi)	1562	1588	1466	1570	1490	1535
Travel Time (hr)	85.1	94.1	75.8	86.9	75.4	0.0
Total Delay (hr)	41.0	49.4	34.6	42.8	33.5	40.3
Total Stops	2191	2531	2118	2239	1839	2182
Fuel Used (gal)	613.3	645.4	569.2	621.8	571.6	604.2

Total Zone Performance

Total Delay (hr)	32.6
Delay / Veh (s)	2606.7
Total Stops	1926
Travel Dist (mi)	675.7
Travel Time (hr)	0.0
Avg Speed (mph)	619
Vehicles Entered	912
Vehicles Exited	53
Hourly Exit Rate	212
Input Volume	16721
% of Volume	1
Denied Entry Before	1
Denied Entry After	6

Intersection: 1: SR 421 & Williamson Blvd

Directions Served	L	L	T	T	TR	L	L	T	T	R	L	L
Maximum Queue (ft)	115	120	198	208	225	309	298	256	206	59	101	110
Average Queue (ft)	58	63	125	125	161	229	226	134	133	26	61	80
95th Queue (ft)	119	122	204	205	223	370	329	249	244	64	105	120
Link Distance (ft)			1593	1593		247	247	247	247	247		
Upstream Blk Time (%)						15	16	1	0			
Queuing Penalty (veh)						46	49	3	1			
Storage Bay Dist (ft)	250	250			180						300	300
Storage Blk Time (%)			0	0	7							
Queuing Penalty (veh)			0	0	13							

Intersection: 1: SR 421 & Williamson Blvd

Directions Served	T	T	R	R	L	L	T	TR
Maximum Queue (ft)	140	150	75	66	192	200	318	357
Average Queue (ft)	93	107	50	49	124	143	223	247
95th Queue (ft)	145	158	86	73	194	226	392	430
Link Distance (ft)	2761	2761					1747	1747
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			300	300	240	240		
Storage Blk Time (%)					0	1	5	
Queuing Penalty (veh)					0	3	15	

Intersection: 3: SR 421 & Taylor Branch Rd.

Directions Served	T	T	T	R	L	T	T	T	L	L	R	T
Maximum Queue (ft)	413	448	468	225	221	233	250	186	218	229	234	30
Average Queue (ft)	248	259	258	100	149	121	138	101	158	172	89	6
95th Queue (ft)	461	477	496	269	238	233	264	185	233	245	236	33
Link Distance (ft)	512	512	512			1657	1657	1657			242	645
Upstream Blk Time (%)			0	1					0	1	2	
Queuing Penalty (veh)			2	4					0	0	0	
Storage Bay Dist (ft)				200	250				500	500		
Storage Blk Time (%)			10	0	0	1			0	1	2	
Queuing Penalty (veh)			49	2	3	1			0	1	7	

Intersection: 17: SR 421 & I-95 NB Ramps

Directions Served	L	L	T	T	T	T	T	T	L	R	R
Maximum Queue (ft)	121	94	182	185	225	113	208	252	81	141	138
Average Queue (ft)	76	63	94	94	126	46	124	151	44	80	89
95th Queue (ft)	136	115	202	204	259	82	217	247	90	148	152
Link Distance (ft)			491	491	491		512	512		1439	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	650	650				450			330		330
Storage Blk Time (%)											
Queuing Penalty (veh)											

Intersection: 18: SR 421 & I-95 SB Ramps

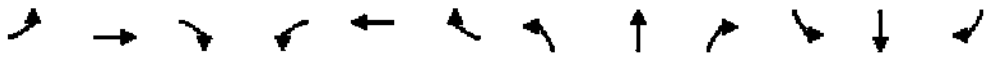
Directions Served	T	T	T	L	T	T	L	L	R
Maximum Queue (ft)	272	245	344	349	246	289	198	192	168
Average Queue (ft)	156	159	210	197	96	133	191	190	91
95th Queue (ft)	265	249	344	348	259	281	206	195	188
Link Distance (ft)	130	130	130	491	491	491	54	54	54
Upstream Blk Time (%)	22	27	36				64	67	22
Queuing Penalty (veh)	90	109	147				241	251	82
Storage Bay Dist (ft)									
Storage Blk Time (%)			43						
Queuing Penalty (veh)			35						

Zone Summary

Zone wide Queuing Penalty: 1153

EXISTING VOLUMES, COMMITTED GEOMETRY AND RIGHT-IN/RIGHT-OUT AT S.R. 421/TAYLOR ROAD INTERSECTION

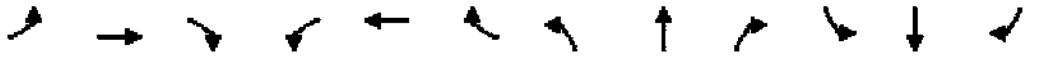
Synchro HCS Printout



Lane Configurations												
Volume (vph)	109	544	112	546	836	152	163	283	349	314	507	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	12	12
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	
Lane Util. Factor	0.97	0.91		0.97	*0.83	1.00	0.97	0.95	0.88	0.97	0.95	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3224	4996		3351	3123	1568	3319	3539	2814	3351	3494	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3224	4996		3351	3123	1568	3319	3539	2814	3351	3494	
Peak-hour factor, PHF	0.91	0.91	0.91	0.93	0.93	0.93	0.91	0.91	0.91	0.90	0.90	0.90
Adj. Flow (vph)	120	598	123	587	899	163	179	311	384	349	563	99
RTOR Reduction (vph)	0	21	0	0	0	78	0	0	0	0	11	0
Lane Group Flow (vph)	120	700	0	587	899	85	179	311	384	349	651	0
Heavy Vehicles (%)	5%	1%	2%	1%	1%	3%	2%	2%	1%	1%	1%	1%
Turn Type	Prot			Prot		Perm	Prot		pt+ov	Prot		
Protected Phases	5	2		1	6		3	8	8 1	7	4	
Permitted Phases						6						
Actuated Green, G (s)	10.4	43.4		30.2	63.2	63.2	11.9	19.0	54.2	25.4	32.5	
Effective Green, g (s)	10.4	43.4		30.2	63.2	63.2	11.9	19.0	49.2	25.4	32.5	
Actuated g/C Ratio	0.07	0.31		0.22	0.45	0.45	0.08	0.14	0.35	0.18	0.23	
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	239	1549		723	1410	708	282	480	989	608	811	
v/s Ratio Prot	0.04	c0.14		c0.18	c0.29		0.05	c0.09	0.14	0.10	c0.19	
v/s Ratio Perm						0.05						
v/c Ratio	0.50	0.45		0.81	0.64	0.12	0.63	0.65	0.39	0.57	0.80	
Uniform Delay, d1	62.3	38.8		52.2	29.6	22.3	61.9	57.3	34.1	52.4	50.7	
Progression Factor	1.00	1.00		0.66	0.56	2.11	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.7	1.0		6.0	1.9	0.3	4.6	3.0	0.3	1.3	5.8	
Delay (s)	64.0	39.7		40.3	18.4	47.4	66.6	60.3	34.4	53.7	56.5	
Level of Service	E	D		D	B	D	E	E	C	D	E	
Approach Delay (s)		43.2			29.1			50.2			55.5	
Approach LOS		D			C			D			E	

HCM Average Control Delay	42.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	29.0
Intersection Capacity Utilization	68.4%	ICU Level of Service	C
Analysis Period (min)	15		

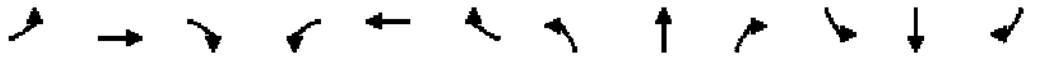
c Critical Lane Group



Lane Configurations		↑↑↑	↱	↰	↑↑					↰↰		↱
Volume (vph)	0	1123	83	240	1162	0	0	0	0	999	0	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.5	4.0	5.5	6.5					5.5		4.0
Lane Util. Factor		0.91	1.00	1.00	0.95					0.97		1.00
Frt		1.00	0.85	1.00	1.00					1.00		0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (prot)		5036	1599	1787	3505					3467		1599
Flt Permitted		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (perm)		5036	1599	1787	3505					3467		1599
Peak-hour factor, PHF	0.25	0.91	0.77	0.77	0.79	0.25	0.25	0.25	0.25	0.80	0.25	0.88
Adj. Flow (vph)	0	1234	108	312	1471	0	0	0	0	1249	0	160
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1234	108	312	1471	0	0	0	0	1249	0	160
Heavy Vehicles (%)	0%	3%	1%	1%	3%	0%	0%	0%	0%	1%	0%	1%
Turn Type			Free	Prot						Prot		Free
Protected Phases		6		5	2					8		
Permitted Phases			Free									Free
Actuated Green, G (s)		36.5	140.0	29.8	71.8					56.2		140.0
Effective Green, g (s)		36.5	140.0	29.8	71.8					56.2		140.0
Actuated g/C Ratio		0.26	1.00	0.21	0.51					0.40		1.00
Clearance Time (s)		6.5		5.5	6.5					5.5		
Vehicle Extension (s)		3.0		3.0	3.0					3.0		
Lane Grp Cap (vph)		1313	1599	380	1798					1392		1599
v/s Ratio Prot		c0.25		0.17	c0.42					c0.36		
v/s Ratio Perm			0.07									0.10
v/c Ratio		0.94	0.07	0.82	0.82					0.90		0.10
Uniform Delay, d1		50.7	0.0	52.6	28.6					39.2		0.0
Progression Factor		0.87	1.00	0.81	0.67					1.00		1.00
Incremental Delay, d2		13.2	0.1	12.3	3.9					7.9		0.1
Delay (s)		57.6	0.1	54.8	23.2					47.1		0.1
Level of Service		E	A	D	C					D		A
Approach Delay (s)		52.9			28.7			0.0			41.8	
Approach LOS		D			C			A			D	

HCM Average Control Delay	40.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Configurations												
Volume (vph)	173	1949	0	0	1359	569	43	0	201	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5			5.5	4.0	5.5		5.5			
Lane Util. Factor	0.97	0.91			0.91	1.00	1.00		0.88			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	3467	5085			5085	1583	1687		2787			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	3467	5085			5085	1583	1687		2787			
Peak-hour factor, PHF	0.74	0.92	0.92	0.92	0.83	0.91	0.85	0.92	0.73	0.92	0.92	0.92
Adj. Flow (vph)	234	2118	0	0	1637	625	51	0	275	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	234	2118	0	0	1637	625	51	0	275	0	0	0
Heavy Vehicles (%)	1%	2%	0%	0%	2%	2%	7%	0%	2%	0%	0%	0%
Turn Type	Prot					Free	Prot		custom			
Protected Phases	5	2			6		3		8			
Permitted Phases						Free						
Actuated Green, G (s)	14.7	110.0			89.8	140.0	19.0		19.0			
Effective Green, g (s)	14.7	110.0			89.8	140.0	19.0		19.0			
Actuated g/C Ratio	0.10	0.79			0.64	1.00	0.14		0.14			
Clearance Time (s)	5.5	5.5			5.5		5.5		5.5			
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)	364	3995			3262	1583	229		378			
v/s Ratio Prot	c0.07	c0.42			0.32		0.03		c0.10			
v/s Ratio Perm						0.39						
v/c Ratio	0.64	0.53			0.50	0.39	0.22		0.73			
Uniform Delay, d1	60.1	5.5			13.3	0.0	53.9		58.0			
Progression Factor	1.21	0.21			1.00	1.00	1.00		1.00			
Incremental Delay, d2	1.4	0.2			0.6	0.7	0.5		6.8			
Delay (s)	74.0	1.3			13.8	0.7	54.4		64.9			
Level of Service	E	A			B	A	D		E			
Approach Delay (s)		8.6			10.2			63.2			0.0	
Approach LOS		A			B			E			A	

HCM Average Control Delay	12.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Configurations	↑↑↑	↱		↑↑↑↑		↱
Volume (veh/h)	1649	501	0	1928	0	101
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.79	0.84	0.87	0.83	0.88
Hourly flow rate (vph)	1812	634	0	2216	0	115
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	633					
pX, platoon unblocked			0.88		0.88	0.88
vC, conflicting volume			1812		2366	604
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1438		2069	61
tC, single (s)			4.3		6.8	7.1
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.4
p0 queue free %			100		100	86
cM capacity (veh/h)			385		42	845

Volume Total	604	604	604	634	554	554	554	554	115
Volume Left	0	0	0	0	0	0	0	0	0
Volume Right	0	0	0	634	0	0	0	0	115
cSH	1700	1700	1700	1700	1700	1700	1700	1700	845
Volume to Capacity	0.36	0.36	0.36	0.37	0.33	0.33	0.33	0.33	0.14
Queue Length 95th (ft)	0	0	0	0	0	0	0	0	12
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.9
Lane LOS									A
Approach Delay (s)	0.0				0.0				9.9
Approach LOS									A

Average Delay	0.2		
Intersection Capacity Utilization	44.8%	ICU Level of Service	A
Analysis Period (min)	15		

Synchro Queue Report

Queues
1: SR 421 & Williamson Blvd

8/13/2008

Lane Group Flow (vph)	120	721	587	899	163	179	311	384	349	662
v/c Ratio	0.50	0.46	0.81	0.64	0.21	0.63	0.65	0.35	0.57	0.81
Control Delay	69.3	40.2	42.4	19.4	12.9	72.1	63.3	30.3	56.3	57.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.3	40.2	42.4	19.4	12.9	72.1	63.3	30.3	56.3	57.4
Queue Length 50th (ft)	55	188	238	163	59	81	142	139	150	296
Queue Length 95th (ft)	87	256	202	293	378	#151	186	158	206	342
Internal Link Dist (ft)		1569		280			2748			1756
Turn Bay Length (ft)	450					300		300	240	
Base Capacity (vph)	280	1601	813	1411	786	282	683	1237	614	1034
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	0.43	0.45	0.72	0.64	0.21	0.63	0.46	0.31	0.57	0.64

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

Lane Group Flow (vph)	1234	108	312	1471	1249	160
v/c Ratio	0.94	0.07	0.82	0.82	0.90	0.10
Control Delay	57.8	0.1	58.4	23.0	49.3	0.1
Queue Delay	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay	57.8	0.1	58.4	23.2	49.3	0.1
Queue Length 50th (ft)	429	0	269	580	544	0
Queue Length 95th (ft)	#491	0	252	47	#628	0
Internal Link Dist (ft)	273			477		
Turn Bay Length (ft)		200				
Base Capacity (vph)	1313	1599	517	2065	1392	1599
Starvation Cap Reductn	0	0	0	90	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.07	0.60	0.74	0.90	0.10

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

Lane Group Flow (vph)	234	2118	1637	625	51	275
v/c Ratio	0.64	0.53	0.50	0.39	0.22	0.73
Control Delay	75.2	1.4	14.7	0.7	54.7	69.0
Queue Delay	0.0	0.5	0.1	0.0	0.0	0.0
Total Delay	75.2	1.9	14.8	0.7	54.7	69.0
Queue Length 50th (ft)	116	0	272	0	42	138
Queue Length 95th (ft)	m122	282	328	0	76	146
Internal Link Dist (ft)		477	553			
Turn Bay Length (ft)	650				330	330
Base Capacity (vph)	403	3994	3267	1583	319	528
Starvation Cap Reductn	0	1259	0	0	0	0
Spillback Cap Reductn	0	0	318	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.77	0.56	0.39	0.16	0.52

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

SimTraffic Single-Run Report

Summary of All Intervals

End Time	5:15
Total Time (min)	20
Time Recorded (min)	15
# of Intervals	2
# of Recorded Intvls	1
Vehs Entered	1649
Vehs Exited	1639
Starting Vehs	294
Ending Vehs	304
Denied Entry Before	6
Denied Entry After	10
Travel Distance (mi)	1592
Travel Time (hr)	75.5
Total Delay (hr)	31.0
Total Stops	1731
Fuel Used (gal)	596.4

Interval #0 Information Seeding

Start Time	4:55
End Time	5:00
Total Time (min)	5

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	5:00
End Time	5:15
Total Time (min)	15

Volumes adjusted by Growth Factors.

Vehs Exited	1639
Starting Vehs	294
Ending Vehs	304
Denied Entry Before	6
Denied Entry After	10
Travel Distance (mi)	1592
Travel Time (hr)	75.5
Total Delay (hr)	31.0
Total Stops	1731
Fuel Used (gal)	596.4

1: SR 421 & Williamson Blvd Performance by movement

Total Delay (hr)	0.5	1.6	0.4	2.1	1.3	0.0	1.0	1.3	0.8	1.1	2.0	0.3
Delay / Veh (s)	74.8	50.1	33.4	52.8	22.5	3.5	82.3	57.8	32.4	44.6	43.6	43.0
Total Stops	21	84	36	130	95	25	44	73	57	63	121	20
Travel Dist (mi)	6.6	32.9	11.8	13.0	19.2	4.5	22.2	42.9	47.9	29.7	54.6	8.2
Travel Time (hr)	0.6	2.4	0.7	2.5	1.7	0.3	1.7	2.5	2.3	2.0	3.6	0.6
Avg Speed (mph)	11	14	18	5	11	17	14	17	22	15	15	15
Vehicles Entered	23	108	39	145	210	49	41	79	94	86	159	25
Vehicles Exited	21	121	40	137	208	52	42	80	76	93	165	23
Hourly Exit Rate	84	484	160	548	832	208	168	320	304	372	660	92
Input Volume	109	544	112	546	838	152	163	283	349	314	507	89
% of Volume	77	89	143	100	99	137	103	113	87	118	130	103
Denied Entry Before	1	0	0	1	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0

1: SR 421 & Williamson Blvd Performance by movement

Total Delay (hr)	12.2
Delay / Veh (s)	41.6
Total Stops	769
Travel Dist (mi)	293.6
Travel Time (hr)	20.8
Avg Speed (mph)	14
Vehicles Entered	1058
Vehicles Exited	1058
Hourly Exit Rate	4232
Input Volume	4006
% of Volume	106
Denied Entry Before	1
Denied Entry After	0

3: SR 421 & Taylor Branch Rd. Performance by movement

Total Delay (hr)	0.3	0.2	0.5	0.1	1.1
Delay / Veh (s)	2.8	6.8	3.3	7.3	3.6
Total Stops	0	0	0	28	28
Travel Dist (mi)	44.1	13.0	169.2	1.5	227.9
Travel Time (hr)	1.4	0.7	4.4	0.1	6.5
Avg Speed (mph)	32	20	40	12	36
Vehicles Entered	383	118	540	28	1069
Vehicles Exited	389	124	537	28	1078
Hourly Exit Rate	1556	496	2148	112	4312
Input Volume	1682	501	1928	101	4212
% of Volume	93	99	111	111	102
Denied Entry Before	0	0	1	0	1
Denied Entry After	0	0	0	0	0

17: SR 421 & I-95 NB Ramps Performance by movement

Total Delay (hr)	0.7	1.0	1.5	0.3	0.2	1.0	4.7
Delay / Veh (s)	72.7	8.7	13.8	6.2	51.8	52.8	15.6
Total Stops	33	93	151	0	11	57	345
Travel Dist (mi)	3.8	46.7	43.4	11.4	3.6	17.4	126.3
Travel Time (hr)	0.9	2.4	2.5	0.6	0.3	1.4	8.0
Avg Speed (mph)	4	20	18	20	13	12	16
Vehicles Entered	35	420	389	153	13	64	1074
Vehicles Exited	39	425	386	153	15	65	1083
Hourly Exit Rate	156	1700	1544	612	60	260	4332
Input Volume	173	1952	1379	569	43	201	4317
% of Volume	90	87	112	108	140	129	100
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	1	1

18: SR 421 & I-95 SB Ramps Performance by movement

Total Delay (hr)	1.8	0.0	1.3	2.3	3.2	0.0	0.7	9.4
Delay / Veh (s)	25.2	5.1	69.7	24.9	56.6	1.4	84.6	34.9
Total Stops	162	5	63	150	100	0	36	516
Travel Dist (mi)	17.3	1.3	7.4	35.2	5.7	0.0	2.3	69.1
Travel Time (hr)	2.2	0.1	1.6	3.1	3.4	0.0	0.9	11.3
Avg Speed (mph)	8	18	5	11	3	23	5	7
Vehicles Entered	272	25	71	330	205	1	79	983
Vehicles Exited	256	24	66	339	197	1	78	961
Hourly Exit Rate	1024	96	264	1356	788	4	312	3844
Input Volume	1124	83	240	1169	999	9	371	3995
% of Volume	91	116	110	116	79	44	84	96
Denied Entry Before	0	0	0	0	4	0	0	4
Denied Entry After	0	0	0	0	6	0	3	9

Total Zone Performance

Total Delay (hr)	27.4
Delay / Veh (s)	6165.9
Total Stops	1658
Travel Dist (mi)	716.9
Travel Time (hr)	46.7
Avg Speed (mph)	16
Vehicles Entered	1080
Vehicles Exited	14
Hourly Exit Rate	56
Input Volume	16530
% of Volume	0
Denied Entry Before	6
Denied Entry After	10

SimTraffic Five-Run Average Report

Summary of All Intervals

Start Time	4:55	4:55	4:55	4:55	4:55	4:55
End Time	5:15	5:15	5:15	5:15	5:15	5:15
Total Time (min)	20	20	20	20	20	20
Time Recorded (min)	15	15	15	15	15	15
# of Intervals	2	2	2	2	2	2
# of Recorded Intvls	1	1	1	1	1	1
Vehs Entered	1575	1635	1585	1541	1526	1569
Vehs Exited	1615	1615	1574	1573	1534	1581
Starting Vehs	303	296	275	317	256	288
Ending Vehs	263	316	286	285	248	279
Denied Entry Before	4	10	11	6	7	8
Denied Entry After	56	44	31	9	23	31
Travel Distance (mi)	1534	1545	1487	1460	1448	1495
Travel Time (hr)	79.4	78.0	72.3	74.7	68.1	0.0
Total Delay (hr)	36.7	35.2	30.8	34.1	27.9	32.9
Total Stops	1692	1712	1600	1563	1528	1619
Fuel Used (gal)	587.9	590.2	559.8	561.1	540.6	567.9

Interval #0 Information Seeding

Start Time	4:55
End Time	5:00
Total Time (min)	5

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	5:00
End Time	5:15
Total Time (min)	15

Volumes adjusted by Growth Factors.

Vehs Entered	1575	1635	1585	1541	1526	1569
Vehs Exited	1615	1615	1574	1573	1534	1581
Starting Vehs	303	296	275	317	256	288
Ending Vehs	263	316	286	285	248	279
Denied Entry Before	4	10	11	6	7	8
Denied Entry After	56	44	31	9	23	31
Travel Distance (mi)	1534	1545	1487	1460	1448	1495
Travel Time (hr)	79.4	78.0	72.3	74.7	68.1	0.0
Total Delay (hr)	36.7	35.2	30.8	34.1	27.9	32.9
Total Stops	1692	1712	1600	1563	1528	1619
Fuel Used (gal)	587.9	590.2	559.8	561.1	540.6	567.9

Total Zone Performance

Total Delay (hr)	29.2
Delay / Veh (s)	13145.6
Total Stops	1495
Travel Dist (mi)	667.6
Travel Time (hr)	0.0
Avg Speed (mph)	133
Vehicles Entered	969
Vehicles Exited	18
Hourly Exit Rate	72
Input Volume	16530
% of Volume	0
Denied Entry Before	8
Denied Entry After	31

Intersection: 1: SR 421 & Williamson Blvd

Directions Served	L	L	T	T	TR	L	L	T	T	R	L	L
Maximum Queue (ft)	93	101	224	245	226	280	273	206	198	71	134	144
Average Queue (ft)	46	55	151	146	167	184	182	105	110	25	73	85
95th Queue (ft)	89	102	244	252	253	306	288	226	217	72	154	159
Link Distance (ft)			1594	1594		248	248	248	248	248		
Upstream Blk Time (%)						3	3	0	0			
Queuing Penalty (veh)						9	9	1	1			
Storage Bay Dist (ft)	450	450			200						300	300
Storage Blk Time (%)				1	7							
Queuing Penalty (veh)				2	13							

Intersection: 1: SR 421 & Williamson Blvd

Directions Served	T	T	R	R	L	L	T	TR
Maximum Queue (ft)	177	231	183	180	185	252	360	357
Average Queue (ft)	118	135	98	99	110	142	217	232
95th Queue (ft)	190	256	188	185	194	257	364	370
Link Distance (ft)	2762	2762					1748	1748
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			300	300	240	240		
Storage Blk Time (%)		0	1	2	2	2	3	
Queuing Penalty (veh)		0	2	2	5	4	9	

Intersection: 3: SR 421 & Taylor Branch Rd.

Directions Served	R
Maximum Queue (ft)	95
Average Queue (ft)	47
95th Queue (ft)	103
Link Distance (ft)	251
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 17: SR 421 & I-95 NB Ramps

Directions Served	L	L	T	T	T	T	T	T	L	R	R
Maximum Queue (ft)	144	133	161	164	222	182	274	287	96	137	143
Average Queue (ft)	100	81	83	83	119	70	142	169	48	78	90
95th Queue (ft)	157	147	182	183	237	176	276	303	103	135	143
Link Distance (ft)			491	491	491	545	545	545		1439	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	650	650							330		330
Storage Blk Time (%)											
Queuing Penalty (veh)											

Intersection: 18: SR 421 & I-95 SB Ramps

Directions Served	T	T	T	L	T	T	L	L	R
Maximum Queue (ft)	307	321	354	300	409	439	190	196	192
Average Queue (ft)	162	174	219	172	154	217	180	190	145
95th Queue (ft)	299	310	379	295	385	449	223	200	220
Link Distance (ft)	130	130	130	491	491	491	54	54	54
Upstream Blk Time (%)	10	13	20		1	2	57	65	30
Queuing Penalty (veh)	41	51	82		5	9	213	243	113
Storage Bay Dist (ft)									
Storage Blk Time (%)			20						
Queuing Penalty (veh)			17						

Zone Summary

Zone wide Queuing Penalty: 832

APPENDIX D

TURNING MOVEMENT VOLUME PROJECTIONS

Williamson Boulevard at Taylor Road
PM Peak-Hour Turning Movement Projections
Year: 2025

Existing TMCs and Background Approach and Departure Volumes

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Existing Count												
Date 5/1/2008	142	539	109	511	764	159	104	329	346	311	492	173
PSF 1.03	146	555	112	526	787	164	107	339	356	320	507	178
Balanced Existing Volumes	146	544	112	546	817	171	107	339	349	314	507	178
Publix/Summertrees Adjustments	-37	0	0	0	19	-19	56	-56	0	0	0	-89
Adjusted Volumes with Committed Adjustments	109	544	112	546	836	152	163	283	349	314	507	89
Adjusted Volumes with S.R. 421/Taylor Br. Rd Modifications	109	544	112	546	836	152	163	283	349	314	507	89
Approach												
Existing Volume		765			1,534			795			910	
Bckgrnd Link Vol		1,040			3,497			1,996			1,907	
Volume Growth		275			1,963			1,201			997	
Departure												
Existing Volume		1,207			1,088			544			1,165	
Bckgrnd Link Vol		2,752			1,479			1,140			2,925	
Volume Growth		1,545			391			596			1,760	

Growth in Future Turning Movements

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
By Approach	42	109	124	1,258	279	426	185	283	733	417	475	105
By Departure	48	172	150	1,068	184	340	113	208	750	623	542	94
Average	45	140	137	1,163	232	383	149	245	742	520	509	100

Total Future Turning Movement Calculations

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Existing TMCs + Volume Growth	154	684	249	1,709	1,068	535	312	528	1,091	834	1,016	189
Balanced TMCs	154	636	249	1,560	975	488	312	528	1,013	775	1,016	189
Total Volumes Projections with Pioneer Trail Interchange												
Adjustments	15	9	-7	-233	17	30	-10	-7	-163	28	-13	31
Total	169	645	242	1,327	992	518	302	521	850	803	1,003	220
Total Volumes Projections with Madeline Avenue Overpass												
Adjustments	0	-43	0	0	-63	-7	0	0	0	-12	0	0
Total	154	593	249	1,560	912	481	312	528	1,013	763	1,016	189

S.R. 421/Taylor Road at I-95 SB Ramps
PM Peak-Hour Turning Movement Projections
Year: 2025

Existing TMCs and Background Approach and Departure Volumes

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Existing Count												
Date 5/8/2008	0	1,126	80	231	1,071	0	0	0	0	1,001	0	357
PSF 1.04	0	1,171	83	240	1,114	0	0	0	0	1,041	0	371
Balanced Existing Volumes	0	1,123	83	240	1,162	0	0	0	0	999	0	371
Adjusted Volumes with Committed Adjustments	0	1,123	83	240	1,162	0	0	0	0	999	0	371
Adjusted Volumes with S.R. 421/Taylor Br. Rd Modifications	0	1,123	83	240	1,162	0	0	0	0	999	0	371
Approach												
Existing Volume		1,206			1,402			0			1,370	
Bckgrnd Link Vol		2,611			n/a			0			1,836	
Volume Growth		1,405			n/a			0			466	
Departure												
Existing Volume		2,122			1,533			0			323	
Bckgrnd Link Vol		n/a			3,319			0			548	
Volume Growth		n/a			1,786			0			225	

Growth in Future Turning Movements

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
By Approach	0	1,176	229	80	733	0	0	0	0	156	0	310
By Departure	0	789	143	82	1,199	0	0	0	0	209	0	587
Average	0	982	186	81	966	0	0	0	0	183	0	448

Total Future Turning Movement Calculations

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Existing TMCs + Volume Growth	0	2,105	269	321	2,128	0	0	0	0	1,182	0	819
Balanced TMCs	0	2,155	269	321	2,204	0	0	0	0	1,210	0	819
Total Volumes Projections with Pioneer Trail Interchange												
Adjustments	0	-139	14	37	-35	0	0	0	0	-18	0	-150
Total	0	2,016	283	358	2,169	0	0	0	0	1,192	0	669
Total Volumes Projections with Madeline Avenue Overpass												
Adjustments	0	-55	0	0	-50	0	0	0	0	-10	0	-20
Total	0	2,100	269	321	2,154	0	0	0	0	1,200	0	799

S.R.421/Taylor Road at I-95 NB Ramps
PM Peak-Hour Turning Movement Projections
Year: 2025

Existing TMCs and Background Approach and Departure Volumes

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Existing Count												
Date 5/8/2008	166	1,937	0	0	1,264	530	41	0	193	0	0	0
PSF 1.04	173	2,014	0	0	1,315	551	43	0	201	0	0	0
Balanced Existing Volumes	173	1,949	0	0	1,359	569	43	0	201	0	0	0
Adjusted Volumes with Committed Adjustments	173	1,949	0	0	1,359	569	43	0	201	0	0	0
Adjusted Volumes with S.R. 421/Taylor Br. Rd Modifications	173	1,949	0	0	1,359	569	43	0	201	0	0	0
Approach												
Existing Volume		2,122			1,928			244			0	
Bckgrnd Link Vol		n/a			2,737			387			0	
Volume Growth		n/a			809			143			0	
Departure												
Existing Volume		2,150			1,402			742			0	
Bckgrnd Link Vol		3,052			n/a			994			0	
Volume Growth		902			n/a			252			0	

Growth in Future Turning Movements

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
By Approach	257	1,075	0	0	719	90	95	0	48	0	0	0
By Departure	160	838	0	0	1,101	92	180	0	64	0	0	0
Average	208	957	0	0	910	91	138	0	56	0	0	0

Total Future Turning Movement Calculations

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Existing TMCs + Volume Growth	381	2,906	0	0	2,269	660	181	0	257	0	0	0
Balanced TMCs	381	2,984	0	0	2,344	682	181	0	257	0	0	0
Total Volumes Projections with Pioneer Trail Interchange												
Adjustments	-81	-76	0	0	-19	-17	21	0	30	0	0	0
Total	300	2,908	0	0	2,325	665	202	0	287	0	0	0
Total Volumes Projections with Madeline Avenue Overpass												
Adjustments	-10	-65	0	0	-60	-10	0	0	0	0	0	0
Total	371	2,919	0	0	2,284	672	181	0	257	0	0	0

S.R. 421 at Taylor Branch Road
PM Peak-Hour Turning Movement Projections
Year: 2025

Existing TMCs and Background Approach and Departure Volumes

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Existing Count												
Date 5/1/2008	0	1,450	441	147	1,629	0	446	0	98	0	0	0
PSF 1.03	0	1,494	454	151	1,678	0	459	0	101	0	0	0
Balanced Existing Volumes	0	1,649	501	151	1,514	0	414	0	101	0	0	0
Adjusted Volumes with Committed Adjustments	0	1,649	501	151	1,514	0	414	0	101	0	0	0
Right-in/Right-out Adjustments	0	0	0	-151	414	0	-414	0	0	0	0	0
Adjusted Volumes with S.R. 421/Taylor Br. Rd Modifications	0	1,649	501	0	1,928	0	0	0	101	0	0	0
Approach												
Existing Volume		2,150			1,928			101			0	
Bckgrnd Link Vol		3,141			2,880			135			0	
Volume Growth		991			952			34			0	
Departure												
Existing Volume		1,750			1,928			0			501	
Bckgrnd Link Vol		2,614			2,816			0			671	
Volume Growth		864			888			0			170	

Growth in Future Turning Movements

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
By Approach	0	828	163	0	952	0	0	0	34	0	0	0
By Departure	0	835	87	0	888	0	0	0	29	0	0	0
Average	0	832	125	0	920	0	0	0	31	0	0	0

Total Future Turning Movement Calculations

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Existing TMCs + Volume Growth	0	2,481	626	0	2,848	0	0	0	132	0	0	0
Balanced TMCs	0	2,588	653	0	3,026	0	0	0	132	0	0	0
Total Volumes Projections with Pioneer Trail Interchange												
Adjustments	0	-26	-20	0	-36	0	0	0	-1	0	0	0
Total	0	2,562	633	0	2,990	0	0	0	131	0	0	0
Total Volumes Projections with Madeline Avenue Overpass												
Adjustments	0	-55	-10	0	-60	0	0	0	0	0	0	0
Total	0	2,533	643	0	2,966	0	0	0	132	0	0	0

Pioneer Trail at I-95 SB Ramps
PM Peak-Hour Turning Movement Projections
Year: 2025

Existing TMCs and Background Approach and Departure Volumes

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Existing Count												
Date 6/28/1905	0	164	0	0	134	0	0	0	0	0	0	0
PSF 1.00	0	164	0	0	134	0	0	0	0	0	0	0
Approach												
Existing Volume		164			134			0			0	
Bckgrnd Link Vol		1,238			0			0			1,439	
Adjustment Factor		1.000			0.000			0.000			1.000	
Intersection Specific Link		1,238			0			0			1,439	
Volume Growth		1,074			-134			0			1,439	
Departure												
Existing Volume		164			134			0			0	
Bckgrnd Link Vol		0			1,013			0			631	
Adjustment Factor		0.000			1.000			0.000			1.000	
Intersection Specific Link		0			1,013			0			631	
Volume Growth		-164			879			0			631	

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
By Approach	0	787	287	163	485	0	0	0	0	676	0	763
By Departure	0	878	396	235	385	0	0	0	0	373	0	494
Average	0	833	341	199	435	0	0	0	0	524	0	629

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
By Approach	0	929	309	187	552	0	0	0	0	693	0	746
By Departure	0	957	389	242	472	0	0	0	0	429	0	541
Average	0	943	349	214	512	0	0	0	0	561	0	643

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Existing TMCs + Volume Growth	0	997	341	199	569	0	0	0	0	524	0	629
Based on Calculation #2	0	943	349	214	512	0	0	0	0	561	0	643
Average	0	970	345	207	541	0	0	0	0	543	0	636

Pioneer Trail at I-95 NB Ramps
PM Peak-Hour Turning Movement Projections
Year: 2025

Existing TMCs and Background Approach and Departure Volumes

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Existing Count												
Date 5/8/2008	0	164	0	0	134	0	0	0	0	0	0	0
PSF 1.00	0	164	0	0	134	0	0	0	0	0	0	0
Approach												
Existing Volume		164			134			0			0	
Bckgrnd Link Vol		0			770			486			0	
Adjustment Factor		0.000			1.000			1.000			0.000	
Intersection Specific Link		0			770			486			0	
Volume Growth		-164			636			486			0	
Departure												
Existing Volume		164			134			0			0	
Bckgrnd Link Vol		942			955			955			0	
Adjustment Factor		1.000			0.000			1.000			0.000	
Intersection Specific Link		942			0			955			0	
Volume Growth		778			-134			955			0	

Growth in Future Turning Movements - Calculation #1 - PM Peak Hour

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
By Approach	434	1,029	0	0	390	246	258	0	228	0	0	0
By Departure	600	652	0	0	453	355	167	0	126	0	0	0
Average	517	841	0	0	421	301	212	0	177	0	0	0

Future Turning Movements - Calculation #2 - PM Peak Hour

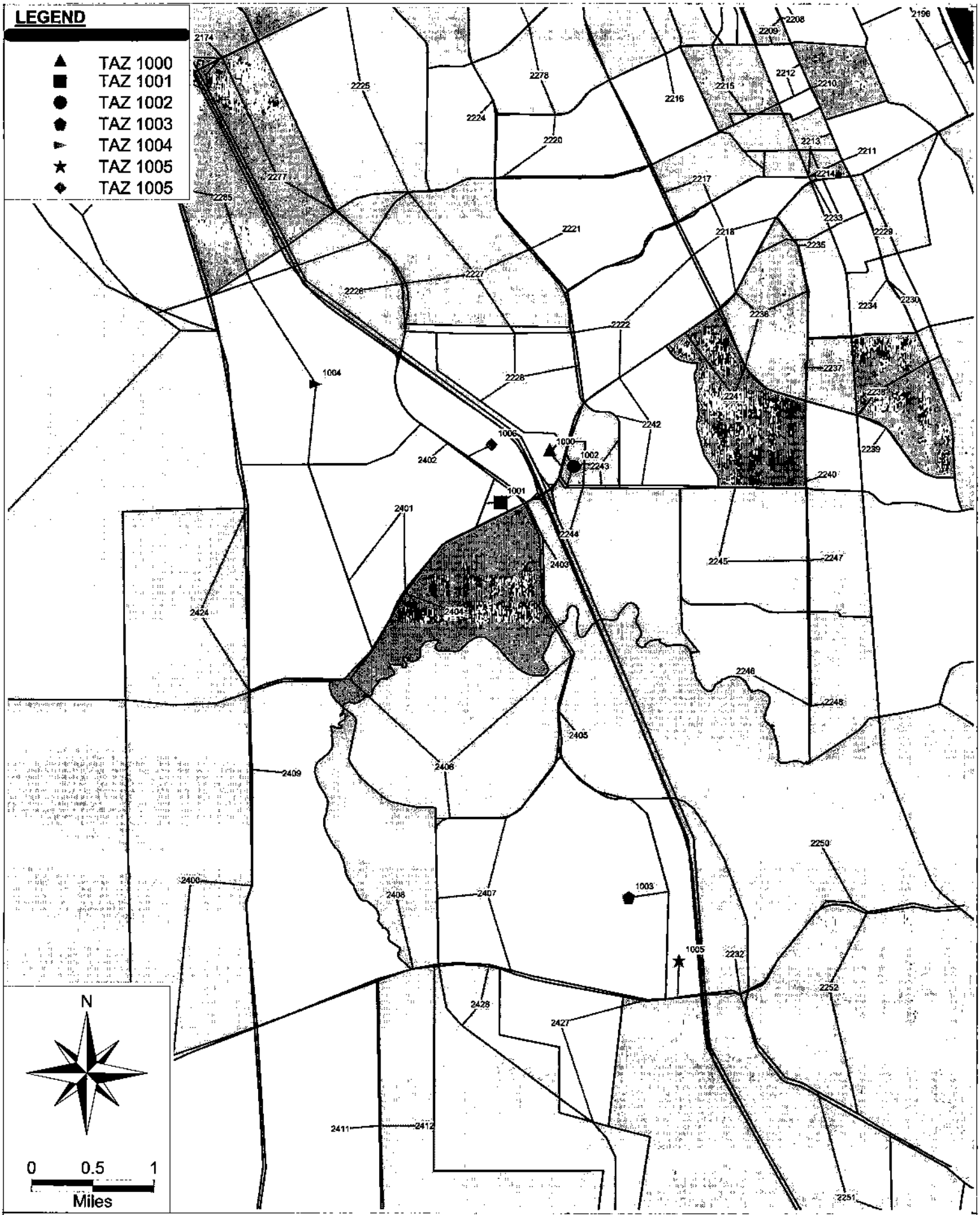
	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
By Approach	468	1,155	0	0	487	283	252	0	234	0	0	0
By Departure	589	797	0	0	531	366	183	0	145	0	0	0
Average	528	976	0	0	509	325	217	0	189	0	0	0

Average in Future Turning Movement Calculations - PM Peak Hour

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Existing TMCs + Volume Growth	517	1,005	0	0	555	301	212	0	177	0	0	0
Based on Calculation #2	528	976	0	0	509	325	217	0	189	0	0	0
Average	523	991	0	0	532	313	215	0	183	0	0	0

APPENDIX E

MODEL PLOTS

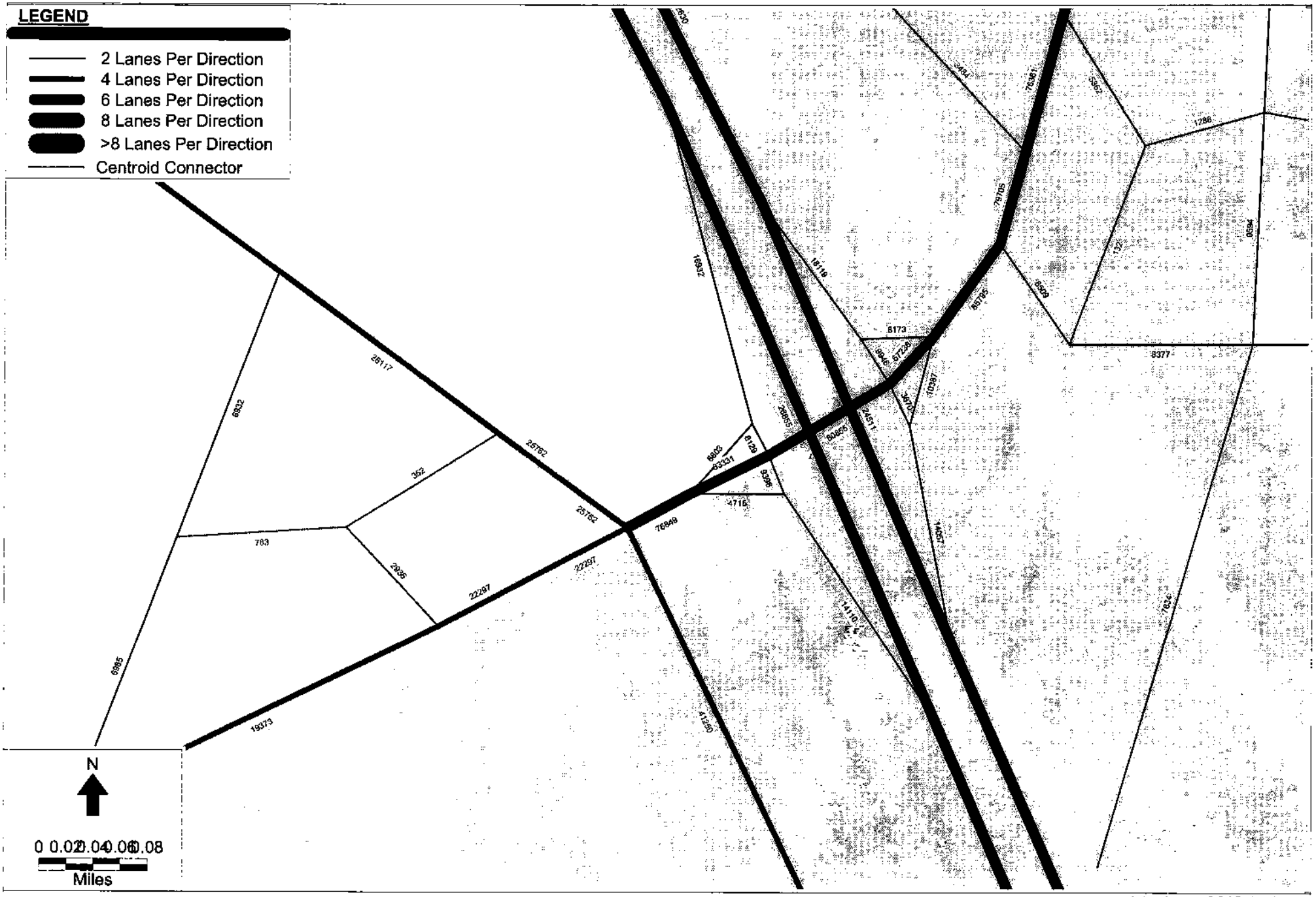


SR 421/I-95 Interchange SOAR Analysis
TAZ MAP
Mon 27 Oct 2008

cube

NO BUILD EVALUATION

Total Volume Plots



Interchange SOAR Analysis
2025 Daily Volume
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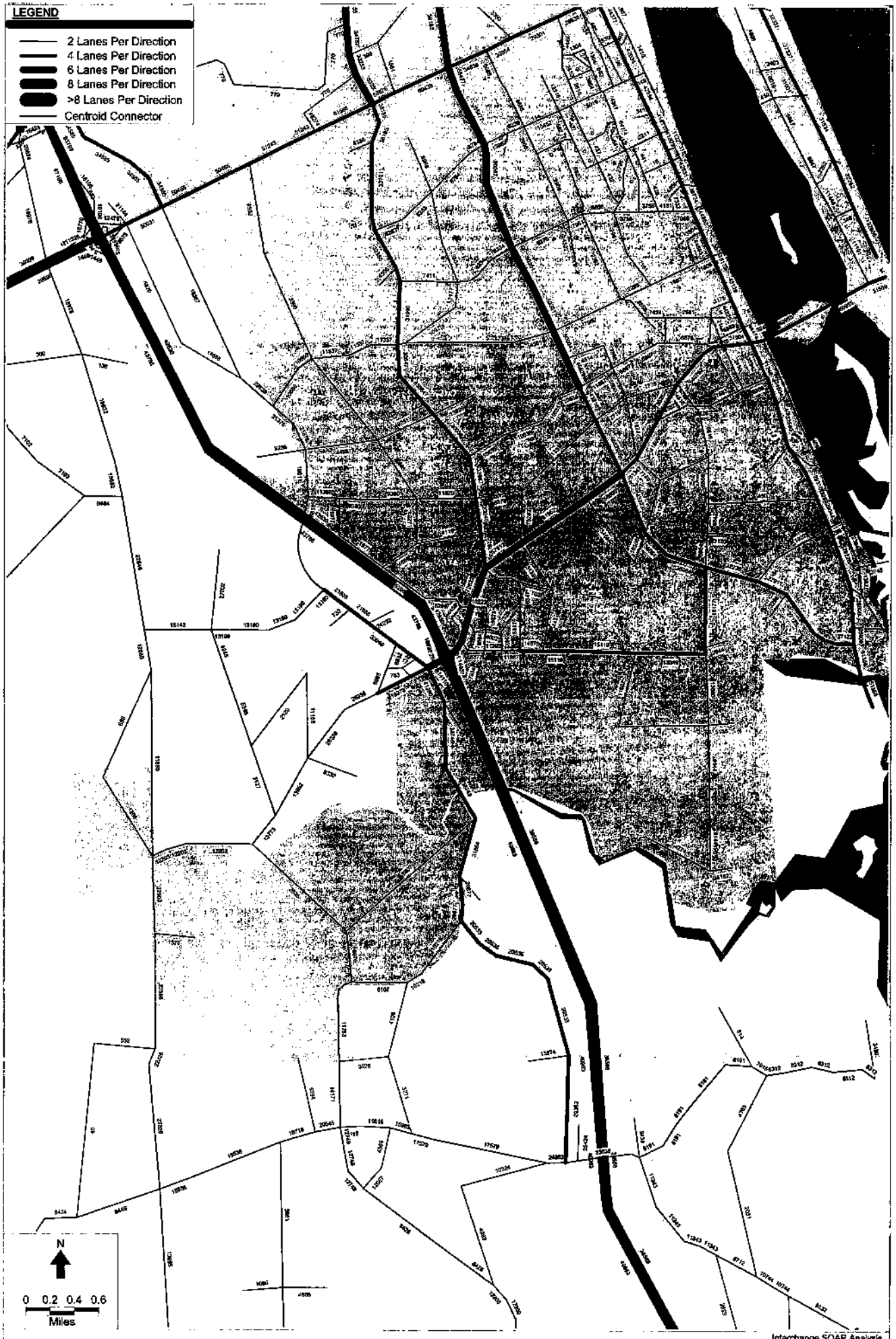
Tue 08 Jul 2008



Interchange SOAR Analysis
2025 Daily Volume
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Tue 08 Jul 2008

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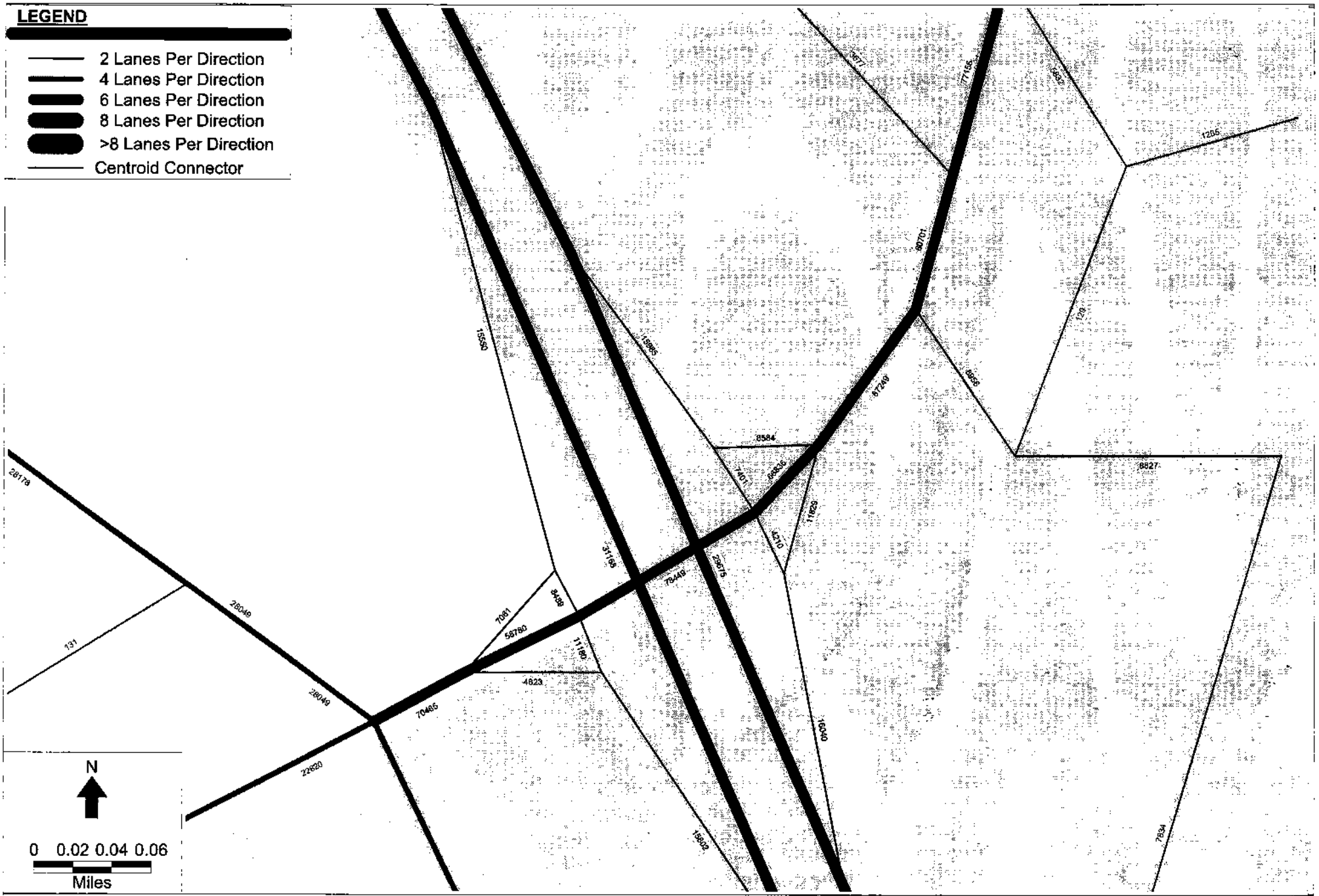
PIONEER TRAIL/I-95 EVALUATION

Total Volume Plots



SR 421/I-95 Interchange SOAR Analysis
With Pioneer Trail/I-95 Interchange
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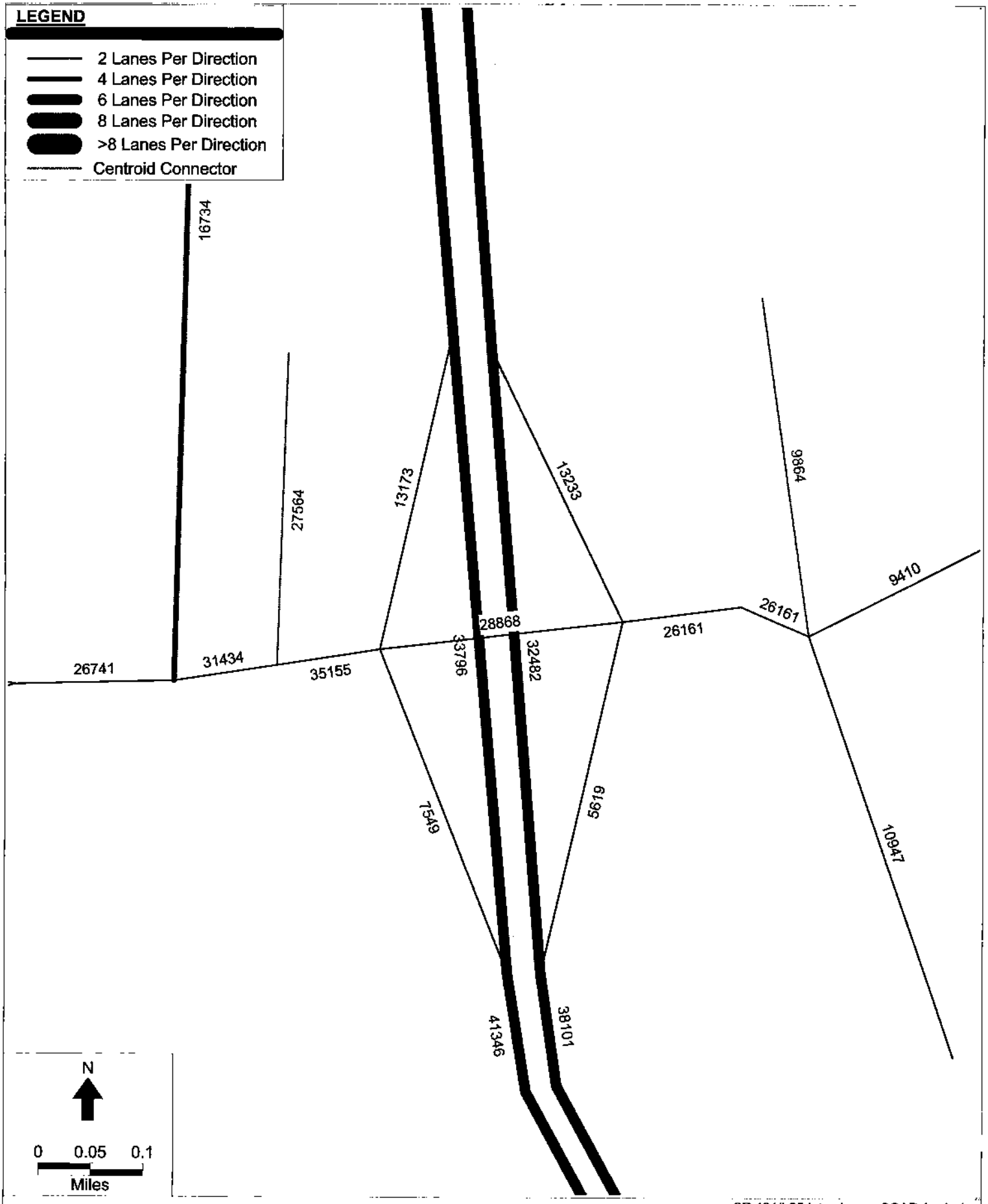
Tue 08 Jul 2008

cubetm



SR 421/I-95 Interchange SOAR Analysis
Pioneer Trail/I-95 Interchange Model Volumes
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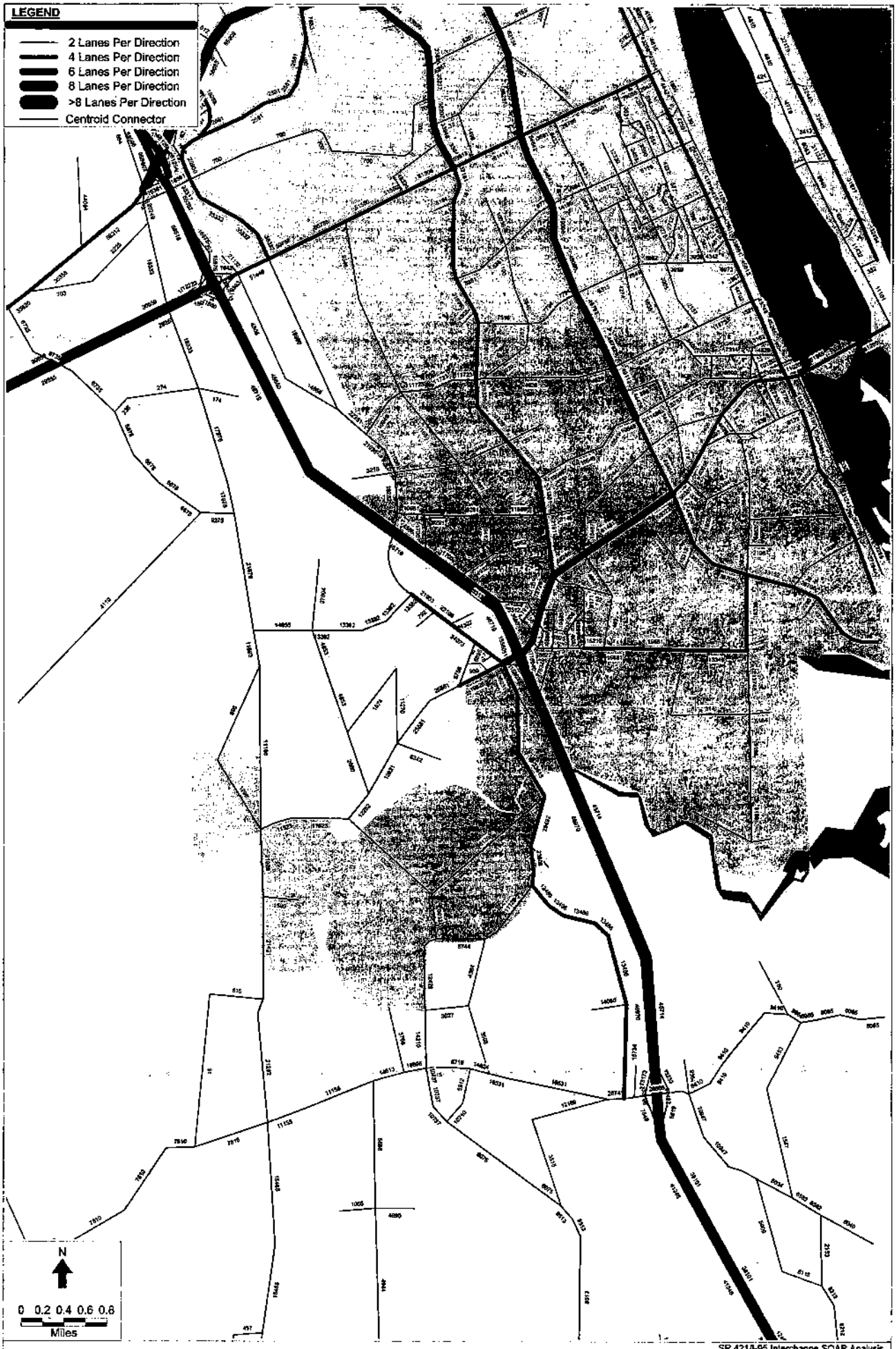
Tue 22 Jul 2008



SR 421/I-95 Interchange SOAR Analysis
With Pioneer Trail/I-95 Interchange
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Tue 08 Jul 2008

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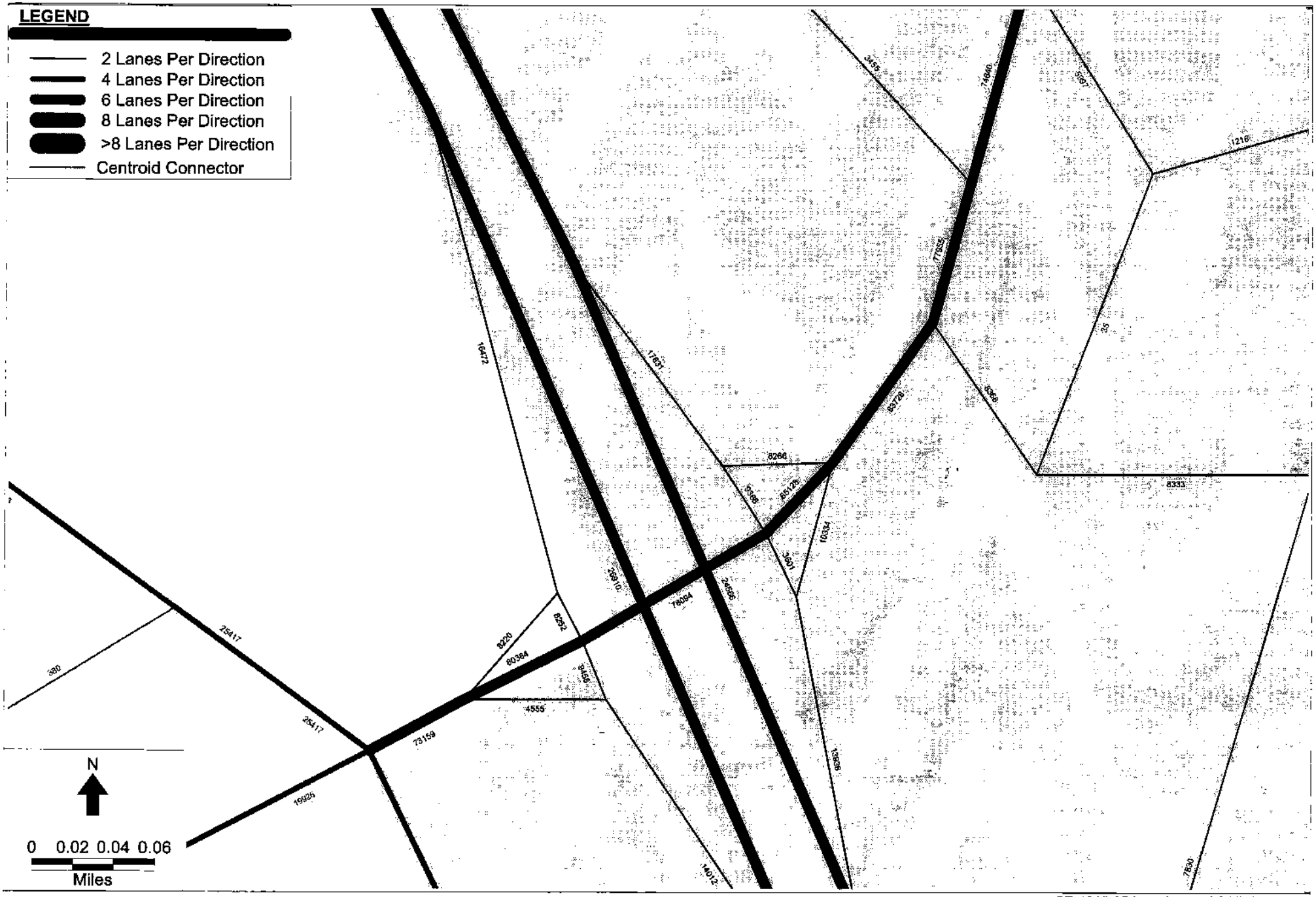
MADELINE AVENUE EXTENSION

Total Volume Plots



SR 421/I-95 Interchange SOAR Analysis
With Madeline Ave Overpass
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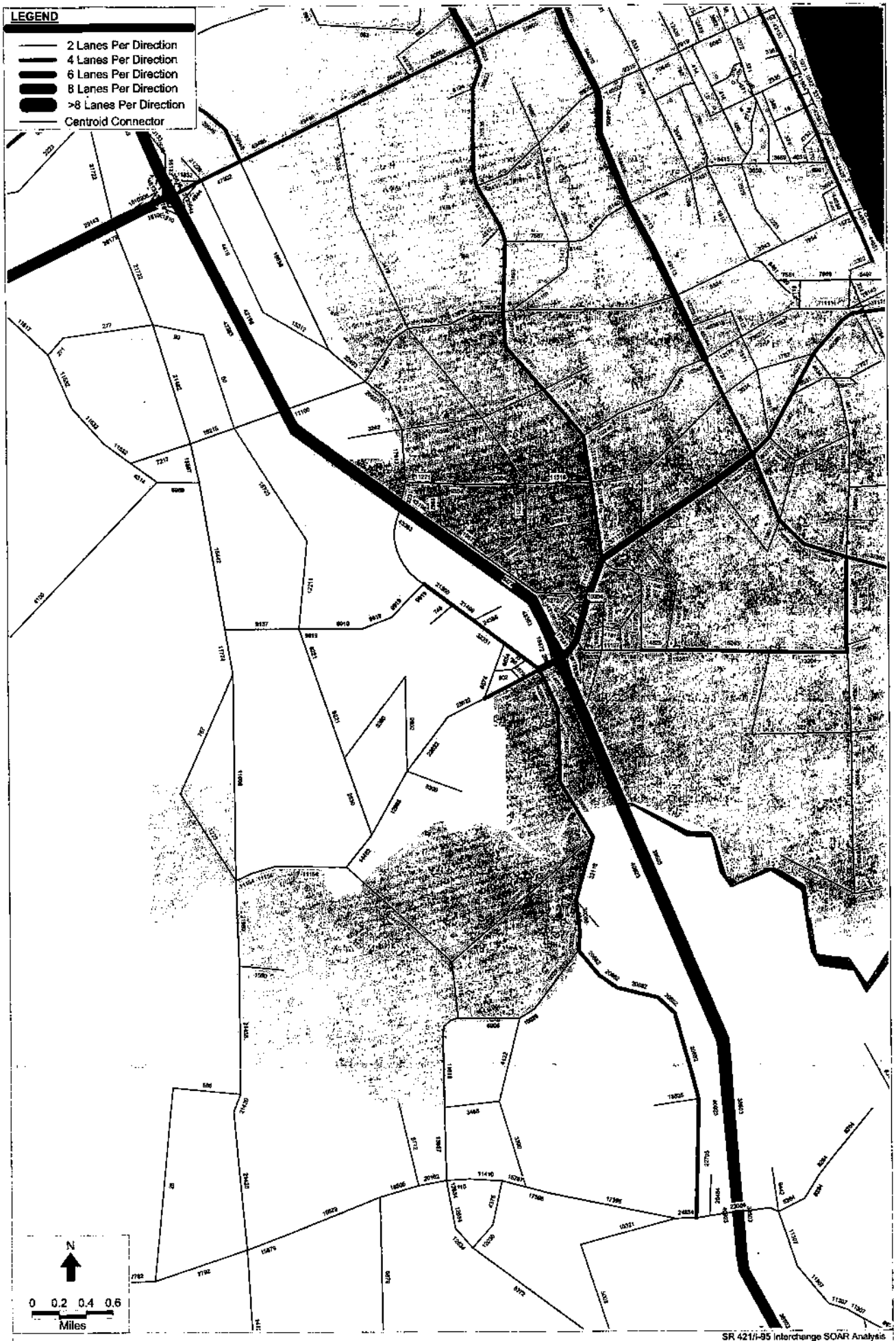
Tue 08 Jul 2008



SR 421/I-95 Interchange SOAR Analysis
With Madeline Ave Overpass
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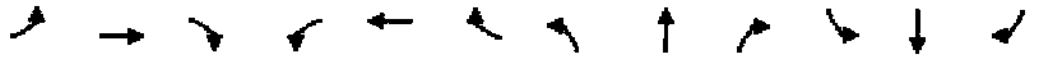
Tue 08 Jul 2008

APPENDIX F

SYNCHRO & SIMTRAFFIC PRINTOUTS
(FUTURE CONDITIONS)

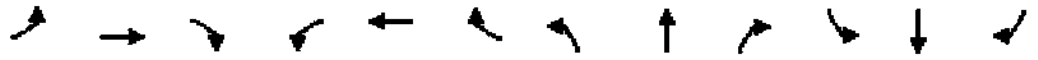
2025 NO-BUILD EVALUATION

Synchro HCS Printout



Lane Configurations												
Volume (vph)	154	636	249	1560	976	487	312	528	1013	775	1016	189
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	12	12
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	
Lane Util. Factor	0.97	0.91		0.97	*0.83	1.00	0.97	0.95	0.88	0.97	0.95	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3224	4905		3351	3123	1568	3319	3539	2814	3351	3490	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3224	4905		3351	3123	1568	3319	3539	2814	3351	3490	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	166	684	268	1677	1049	524	335	568	1089	833	1092	203
RTOR Reduction (vph)	0	51	0	0	0	235	0	0	0	0	11	0
Lane Group Flow (vph)	166	901	0	1677	1049	289	335	568	1089	833	1284	0
Heavy Vehicles (%)	5%	1%	2%	1%	1%	3%	2%	2%	1%	1%	1%	1%
Turn Type	Prot			Prot		Perm	Prot		pt+ov	Prot		
Protected Phases	5	2		1	6		3	8	81	7	4	
Permitted Phases						6						
Actuated Green, G (s)	9.0	21.0		50.0	62.0	62.0	11.0	23.0	78.0	24.0	36.0	
Effective Green, g (s)	9.0	21.0		50.0	62.0	62.0	11.0	23.0	73.0	24.0	36.0	
Actuated g/C Ratio	0.06	0.15		0.36	0.44	0.44	0.08	0.16	0.52	0.17	0.26	
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	207	736		1197	1383	694	261	581	1467	574	897	
v/s Ratio Prot	0.05	c0.18		c0.50	0.34		c0.10	0.16	0.39	0.25	c0.37	
v/s Ratio Perm						0.18						
v/c Ratio	0.80	1.22		1.40	0.76	0.42	1.28	0.98	0.74	1.45	1.43	
Uniform Delay, d1	64.6	59.5		45.0	32.7	26.7	64.5	58.2	26.2	58.0	52.0	
Progression Factor	1.00	1.00		0.72	0.57	0.56	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	19.6	112.8		182.0	1.2	1.3	153.5	31.3	2.1	212.7	200.5	
Delay (s)	84.2	172.3		214.2	19.9	16.3	218.0	89.6	28.2	270.7	252.5	
Level of Service	F	F		F	B	B	F	F	C	F	F	
Approach Delay (s)		159.2			119.6			77.6			259.6	
Approach LOS		F			F			E			F	

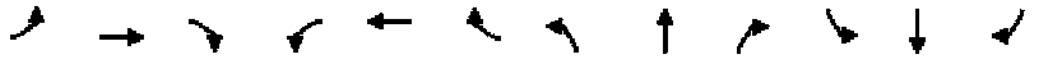
HCM Average Control Delay	150.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.37		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	123.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Lane Configurations		↑↑↑	↱	↰	↑↑					↰↰		↱
Volume (vph)	0	2155	269	321	2204	0	0	0	0	1210	0	687
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.5	4.0	5.5	6.5					5.5		6.5
Lane Util. Factor		0.91	1.00	1.00	0.95					0.97		1.00
Frt		1.00	0.85	1.00	1.00					1.00		0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (prot)		5036	1599	1787	3505					3467		1599
Flt Permitted		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (perm)		5036	1599	1787	3505					3467		1599
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	2317	289	345	2370	0	0	0	0	1301	0	739
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	2317	289	345	2370	0	0	0	0	1301	0	739
Heavy Vehicles (%)	0%	3%	1%	1%	3%	0%	0%	0%	0%	1%	0%	1%
Turn Type			Free	Prot						Prot		custom
Protected Phases		6		5	2					8		
Permitted Phases			Free									6
Actuated Green, G (s)		49.3	140.0	29.7	84.5					43.5		49.3
Effective Green, g (s)		49.3	140.0	29.7	84.5					43.5		49.3
Actuated g/C Ratio		0.35	1.00	0.21	0.60					0.31		0.35
Clearance Time (s)		6.5		5.5	6.5					5.5		6.5
Vehicle Extension (s)		3.0		3.0	3.0					3.0		3.0
Lane Grp Cap (vph)		1773	1599	379	2116					1077		563
v/s Ratio Prot		0.46		0.19	c0.68					c0.38		
v/s Ratio Perm			0.18									c0.46
v/c Ratio		1.31	0.18	0.91	1.12					1.21		1.31
Uniform Delay, d1		45.4	0.0	53.8	27.8					48.2		45.4
Progression Factor		0.85	1.00	1.49	0.83					1.00		1.00
Incremental Delay, d2		138.5	0.0	15.5	58.0					102.5		153.0
Delay (s)		176.8	0.0	96.0	80.9					150.7		198.4
Level of Service		F	A	F	F					F		F
Approach Delay (s)		157.2			82.9			0.0			168.0	
Approach LOS		F			F			A			F	

HCM Average Control Delay	132.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.27		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	114.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group



Lane Configurations												
Volume (vph)	381	2984	0	0	2344	682	181	0	257	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5			5.5	4.0	5.5		5.5			
Lane Util. Factor	0.97	0.91			0.91	1.00	1.00		0.88			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	3467	5085			5085	1583	1687		2787			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	3467	5085			5085	1583	1687		2787			
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	410	3209	0	0	2520	733	195	0	276	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	410	3209	0	0	2520	733	195	0	276	0	0	0
Heavy Vehicles (%)	1%	2%	0%	0%	2%	2%	7%	0%	2%	0%	0%	0%
Turn Type	Prot					Free	Prot		custom			
Protected Phases	5	2			6		3		8			
Permitted Phases						Free						
Actuated Green, G (s)	20.2	108.8			83.1	140.0	20.2		20.2			
Effective Green, g (s)	20.2	108.8			83.1	140.0	20.2		20.2			
Actuated g/C Ratio	0.14	0.78			0.59	1.00	0.14		0.14			
Clearance Time (s)	5.5	5.5			5.5		5.5		5.5			
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)	500	3952			3018	1583	243		402			
v/s Ratio Prot	0.12	c0.63			0.50		c0.12		0.10			
v/s Ratio Perm						0.46						
v/c Ratio	0.82	0.81			0.83	0.46	0.80		0.69			
Uniform Delay, d1	58.1	9.4			22.9	0.0	58.0		56.9			
Progression Factor	1.33	1.11			1.00	1.00	1.00		1.00			
Incremental Delay, d2	1.0	0.2			2.9	1.0	17.2		4.8			
Delay (s)	78.5	10.6			25.8	1.0	75.1		61.7			
Level of Service	E	B			C	A	E		E			
Approach Delay (s)		18.3			20.2			67.3			0.0	
Approach LOS		B			C			E			A	

HCM Average Control Delay	22.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	108.5%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lane Configurations	↑↑↑	↱		↑↑↑↑		↱
Volume (veh/h)	2588	653	0	3026	0	132
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	2783	702	0	3254	0	142
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	633					
pX, platoon unblocked			0.62		0.62	0.62
vC, conflicting volume			2783		3596	928
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1738		3046	0
tC, single (s)			4.3		6.8	7.1
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.4
p0 queue free %			100		100	78
cM capacity (veh/h)			207		6	656

Volume Total	928	928	928	702	813	813	813	813	142
Volume Left	0	0	0	0	0	0	0	0	0
Volume Right	0	0	0	702	0	0	0	0	142
cSH	1700	1700	1700	1700	1700	1700	1700	1700	656
Volume to Capacity	0.55	0.55	0.55	0.41	0.48	0.48	0.48	0.48	0.22
Queue Length 95th (ft)	0	0	0	0	0	0	0	0	20
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0
Lane LOS									B
Approach Delay (s)	0.0				0.0				12.0
Approach LOS									B

Average Delay	0.2		
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		

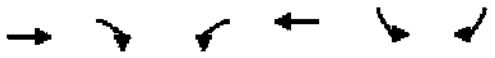
Synchro Queue Report

Lane Group Flow (vph)	166	952	1677	1049	524	335	568	1089	833	1295
v/c Ratio	0.80	1.21	1.40	0.76	0.56	1.28	0.98	0.69	1.45	1.43
Control Delay	91.5	152.2	210.7	20.2	4.9	202.8	90.0	25.4	253.1	235.9
Queue Delay	0.0	0.0	0.0	0.5	0.2	0.0	0.0	0.0	0.0	0.0
Total Delay	91.5	152.2	210.7	20.7	5.1	202.8	90.0	25.4	253.1	235.9
Queue Length 50th (ft)	78	~369	~1075	442	67	~199	274	392	~531	~836
Queue Length 95th (ft)	#138	#465	m#971	m400	m80	#300	#397	481	#661	#978
Internal Link Dist (ft)		1569		280			2748			1756
Turn Bay Length (ft)	450					300		300	240	
Base Capacity (vph)	207	787	1197	1383	929	261	581	1568	574	908
Starvation Cap Reductn	0	0	0	82	67	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	0.80	1.21	1.40	0.81	0.61	1.28	0.98	0.69	1.45	1.43

~ 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.



Lane Group Flow (vph)	2317	289	345	2370	1301	739
v/c Ratio	1.31	0.18	0.91	1.12	1.21	1.31
Control Delay	171.3	0.0	96.6	82.1	144.0	189.5
Queue Delay	0.0	0.0	0.0	0.0	8.1	0.0
Total Delay	171.3	0.0	96.6	82.1	152.1	189.5
Queue Length 50th (ft)	~1016	0	335	~1279	~742	~884
Queue Length 95th (ft)	m#823	m0	m#412	#1414	#879	#1129
Internal Link Dist (ft)	273			477		
Turn Bay Length (ft)		200				
Base Capacity (vph)	1774	1599	402	2116	1077	564
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	16	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.31	0.18	0.86	1.12	1.23	1.31

~ 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.

Lane Group Flow (vph)	410	3209	2520	733	195	276
v/c Ratio	0.82	0.81	0.83	0.46	0.80	0.69
Control Delay	78.8	11.5	27.0	1.0	81.4	65.8
Queue Delay	0.0	15.2	0.4	0.0	384.6	0.0
Total Delay	78.8	26.7	27.4	1.0	466.0	65.8
Queue Length 50th (ft)	204	376	682	0	172	136
Queue Length 95th (ft)	m155	m298	778	0	258	188
Internal Link Dist (ft)		477	553			
Turn Bay Length (ft)	650				330	330
Base Capacity (vph)	534	3953	3020	1583	283	468
Starvation Cap Reductn	0	819	0	0	0	0
Spillback Cap Reductn	0	0	129	0	177	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.77	1.02	0.87	0.46	1.84	0.59

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

SimTraffic Single-Run Report

Summary of All Intervals

End Time	7:15
Total Time (min)	20
Time Recorded (min)	15
# of Intervals	2
# of Recorded Intvls	1
Vehs Entered	2215
Vehs Exited	1759
Starting Vehs	540
Ending Vehs	996
Denied Entry Before	10
Denied Entry After	474
Travel Distance (mi)	1997
Travel Time (hr)	244.9
Total Delay (hr)	189.2
Total Stops	5616
Fuel Used (gal)	108.5

Interval #0 Information Seeding

Start Time	6:55
End Time	7:00
Total Time (min)	5

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	7:15
Total Time (min)	15

Volumes adjusted by Growth Factors.

Vehs Exited	1759
Starting Vehs	540
Ending Vehs	996
Denied Entry Before	10
Denied Entry After	474
Travel Distance (mi)	1997
Travel Time (hr)	244.9
Total Delay (hr)	189.2
Total Stops	5616
Fuel Used (gal)	108.5

1: SR 421 & Williamson Blvd Performance by movement

Total Delay (hr)	1.5	11.7	5.8	6.4	1.0	0.2	2.1	4.4	6.7	12.0	11.2	1.9
Delay / Veh (s)	145.0	356.1	534.5	119.0	34.2	10.7	111.6	112.1	91.3	273.3	196.7	192.2
Total Stops	65	307	104	273	76	36	85	165	339	506	531	87
Travel Dist (mi)	10.7	35.3	10.4	17.6	9.8	4.6	37.3	77.5	144.9	50.4	66.4	11.6
Travel Time (hr)	1.8	12.5	6.1	7.0	1.2	0.3	3.2	6.7	11.1	13.5	13.1	2.2
Avg Speed (mph)	7	3	2	3	8	13	14	14	16	4	5	5
Vehicles Entered	36	141	52	212	111	50	75	149	279	168	222	38
Vehicles Exited	38	96	26	175	105	53	61	134	247	148	188	33
Hourly Exit Rate	152	384	104	700	420	212	244	536	988	592	752	132
Input Volume	154	636	249	1560	987	487	312	528	1013	775	1016	189
% of Volume	99	60	42	45	43	44	78	102	98	76	74	70
Denied Entry Before	0	1	1	0	0	0	2	3	2	0	0	0
Denied Entry After	8	19	8	0	0	0	0	1	8	0	0	0

1: SR 421 & Williamson Blvd Performance by movement

Total Delay (hr)	64.7
Delay / Veh (s)	164.4
Total Stops	2574
Travel Dist (mi)	476.4
Travel Time (hr)	78.8
Avg Speed (mph)	6
Vehicles Entered	1533
Vehicles Exited	1304
Hourly Exit Rate	5216
Input Volume	7906
% of Volume	66
Denied Entry Before	9
Denied Entry After	44

3: SR 421 & Taylor Branch Rd. Performance by movement

Total Delay (hr)	0.3	0.1	14.2	0.2	14.9
Delay / Veh (s)	2.5	5.8	85.9	18.1	45.4
Total Stops	0	0	677	37	714
Travel Dist (mi)	53.2	9.3	189.6	2.0	254.1
Travel Time (hr)	1.6	0.4	18.7	0.3	21.0
Avg Speed (mph)	34	21	11	7	13
Vehicles Entered	459	86	681	36	1262
Vehicles Exited	464	87	513	37	1101
Hourly Exit Rate	1856	348	2052	148	4404
Input Volume	2640	653	3026	132	6451
% of Volume	70	53	68	112	68
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	27	0	27

5: I-95 SB Ramps & Performance by movement

Total Delay (hr)	57.7	2.9	60.6
Delay / Veh (s)	1870.4		1965.9
Total Stops	233	2	235
Travel Dist (mi)	18.3	0.0	18.3
Travel Time (hr)	58.3	2.9	61.3
Avg Speed (mph)	1	0	1
Vehicles Entered	120	1	121
Vehicles Exited	102	0	102
Hourly Exit Rate	408	0	408
Input Volume	1897	132	2029
% of Volume	22	0	20
Denied Entry Before	0	0	0
Denied Entry After	370	28	398

6: SR 421 & Performance by movement

Total Delay (hr)	3.5	2.2	5.6
Delay / Veh (s)	24.8	20.3	22.8
Total Stops	276	102	378
Travel Dist (mi)	31.3	14.1	45.4
Travel Time (hr)	4.8	2.5	7.2
Avg Speed (mph)	7	6	6
Vehicles Entered	510	387	897
Vehicles Exited	505	377	882
Hourly Exit Rate	2020	1508	3528
Input Volume	2473	2935	5542
% of Volume	82	51	64
Denied Entry Before	0	0	0
Denied Entry After	0	1	1

17: SR 421 & I-95 NB Ramps Performance by movement

Total Delay (hr)	1.4	1.1	9.2	0.2	3.7	1.9	17.5
Delay / Veh (s)	68.3	7.8	83.6	7.5	411.3	137.0	54.2
Total Stops	77	91	413	4	69	72	726
Travel Dist (mi)	7.5	53.2	43.4	8.6	9.7	14.6	137.0
Travel Time (hr)	1.6	2.4	10.2	0.5	3.9	2.3	20.9
Avg Speed (mph)	5	22	4	18	3	6	7
Vehicles Entered	71	484	404	114	41	64	1178
Vehicles Exited	74	504	388	117	23	37	1143
Hourly Exit Rate	296	2016	1552	468	92	148	4572
Input Volume	381	2997	2374	682	181	257	6872
% of Volume	78	67	65	69	51	58	67
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	4	0	0	0	4

18: SR 421 & I-95 SB Ramps Performance by movement

Total Delay (hr)	5.7	0.5	1.3	7.4	2.8	0.1	1.7	19.6
Delay / Veh (s)	47.2	28.6	81.9	72.5	97.2	126.7	3134.3	68.1
Total Stops	236	34	62	338	70	2	7	749
Travel Dist (mi)	28.2	3.4	5.8	38.5	3.4	0.1	0.1	79.5
Travel Time (hr)	6.4	0.6	1.5	8.2	3.0	0.1	1.7	21.5
Avg Speed (mph)	4	5	4	5	1	1	0	4
Vehicles Entered	427	66	53	356	101	2	2	1007
Vehicles Exited	448	68	59	374	108	2	2	1061
Hourly Exit Rate	1792	272	236	1496	432	8	8	4244
Input Volume	2160	269	321	2213	1210	19	687	6879
% of Volume	83	101	74	68	36	42	1	62
Denied Entry Before	0	0	0	1	0	0	0	1
Denied Entry After	0	0	0	0	0	0	0	0

Total Network Performance

Total Delay (hr)	189.2
Delay / Veh (s)	342.7
Total Stops	5616
Travel Dist (mi)	1996.8
Travel Time (hr)	244.9
Avg Speed (mph)	10
Vehicles Entered	2215
Vehicles Exited	1759
Hourly Exit Rate	7036
Input Volume	50110
% of Volume	14
Denied Entry Before	10
Denied Entry After	474

SimTraffic Five-Run Average Report

Summary of All Intervals

Start Time	6:55	6:55	6:55	6:55	6:55	6:55
End Time	7:15	7:15	7:15	7:15	7:15	7:15
Total Time (min)	20	20	20	20	20	20
Time Recorded (min)	15	15	15	15	15	15
# of Intervals	2	2	2	2	2	2
# of Recorded Intvls	1	1	1	1	1	1
Vehs Entered	2260	2291	2262	2284	2297	2279
Vehs Exited	1900	1941	1950	1987	1927	1940
Starting Vehs	522	582	539	544	580	552
Ending Vehs	882	932	851	841	950	895
Denied Entry Before	12	11	14	2	6	7
Denied Entry After	409	458	459	403	361	419
Travel Distance (mi)	2149	2176	2168	2194	2149	2167
Travel Time (hr)	224.7	244.9	230.5	214.4	233.0	229.5
Total Delay (hr)	164.7	184.2	170.2	153.3	173.4	169.1
Total Stops	5143	5774	5066	4855	5554	5277
Fuel Used (gal)	108.6	114.4	110.4	106.7	109.9	110.0

Interval #0 Information Seeding

Start Time 6:55
End Time 7:00
Total Time (min) 5
Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time 7:00
End Time 7:15
Total Time (min) 15
Volumes adjusted by Growth Factors.

Vehs Entered	2260	2291	2262	2284	2297	2279
Vehs Exited	1900	1941	1950	1987	1927	1940
Starting Vehs	522	582	539	544	580	552
Ending Vehs	882	932	851	841	950	895
Denied Entry Before	12	11	14	2	6	7
Denied Entry After	409	458	459	403	361	419
Travel Distance (mi)	2149	2176	2168	2194	2149	2167
Travel Time (hr)	224.7	244.9	230.5	214.4	233.0	229.5
Total Delay (hr)	164.7	184.2	170.2	153.3	173.4	169.1
Total Stops	5143	5774	5066	4855	5554	5277
Fuel Used (gal)	108.6	114.4	110.4	106.7	109.9	110.0

1: SR 421 & Williamson Blvd Performance by movement

Total Delay (hr)	0.8	6.2	4.3	4.5	1.2	0.2	3.8	3.2	3.7	10.3	13.1	2.8
Delay / Veh (s)	72.9	148.6	278.3	64.0	29.3	9.7	198.8	90.9	56.2	241.9	229.3	232.9
Total Stops	40	255	159	256	93	37	132	133	194	435	569	126
Travel Dist (mi)	11.3	44.9	16.6	23.1	13.9	6.1	40.8	67.5	129.5	49.3	67.2	14.1
Travel Time (hr)	1.1	7.3	4.7	5.3	1.5	0.4	5.0	5.1	7.7	11.8	15.0	3.2
Avg Speed (mph)	11	6	4	4	9	14	9	15	20	4	4	4
Vehicles Entered	38	155	63	268	153	66	78	129	248	164	217	46
Vehicles Exited	40	148	46	240	144	65	59	121	231	143	194	41
Hourly Exit Rate	160	592	184	960	576	260	236	484	924	572	776	164
Input Volume	154	636	249	1560	987	487	312	528	1013	775	1016	189
% of Volume	104	93	74	62	58	53	76	92	91	74	76	87
Denied Entry Before	1	1	1	0	0	0	1	1	1	0	0	0
Denied Entry After	1	1	1	0	0	0	1	4	8	0	0	0

1: SR 421 & Williamson Blvd Performance by movement

Total Delay (hr)	53.9
Delay / Veh (s)	125.3
Total Stops	2429
Travel Dist (mi)	484.1
Travel Time (hr)	68.2
Avg Speed (mph)	7
Vehicles Entered	1625
Vehicles Exited	1472
Hourly Exit Rate	5888
Input Volume	7906
% of Volume	74
Denied Entry Before	6
Denied Entry After	16

3: SR 421 & Taylor Branch Rd. Performance by movement

Total Delay (hr)	0.4	0.2	10.9	0.2	11.6
Delay / Veh (s)	2.8	6.9	55.6	19.1	32.1
Total Stops	0	0	597	31	628
Travel Dist (mi)	52.3	11.5	226.1	1.7	291.6
Travel Time (hr)	1.6	0.6	16.2	0.2	18.6
Avg Speed (mph)	33	20	15	7	17
Vehicles Entered	458	108	751	31	1348
Vehicles Exited	456	108	660	32	1256
Hourly Exit Rate	1824	432	2640	128	5024
Input Volume	2640	653	3026	132	6451
% of Volume	69	66	87	97	78
Denied Entry Before	0	0	1	0	1
Denied Entry After	0	0	14	0	14

5: I-95 SB Ramps & Performance by movement

Total Delay (hr)	56.6	4.6	61.2
Delay / Veh (s)	1712.2	2364.1	1748.5
Total Stops	230	15	245
Travel Dist (mi)	20.0	1.1	21.1
Travel Time (hr)	57.3	4.6	61.9
Avg Speed (mph)	1	0	1
Vehicles Entered	118	7	125
Vehicles Exited	120	6	126
Hourly Exit Rate	480	24	504
Input Volume	1897	132	2029
% of Volume	25	18	25
Denied Entry Before	0	0	0
Denied Entry After	353	23	376

6: SR 421 & Performance by movement

Total Delay (hr)	1.0	1.3	0.0	0.0	2.3
Delay / Veh (s)	6.7	9.6		9.2	8.1
Total Stops	87	95	0	4	186
Travel Dist (mi)	33.8	18.2	0.0	0.4	52.4
Travel Time (hr)	2.3	1.7	0.0	0.0	4.1
Avg Speed (mph)	15	11	34	12	13
Vehicles Entered	534	495	0	7	1036
Vehicles Exited	526	486	0	7	1019
Hourly Exit Rate	2104	1944	0	28	4076
Input Volume	2473	2935	2	132	5542
% of Volume	85	66	0	21	74
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	1	0	0	1

17: SR 421 & I-95 NB Ramps Performance by movement

Total Delay (hr)	1.8	1.3	7.4	0.4	3.3	1.9	16.1
Delay / Veh (s)	77.9	9.4	52.3	10.1	319.8	130.9	43.6
Total Stops	83	124	398	9	80	76	770
Travel Dist (mi)	9.0	53.8	56.5	11.3	11.3	14.5	156.4
Travel Time (hr)	2.1	2.7	8.7	0.7	3.6	2.3	20.1
Avg Speed (mph)	4	20	7	17	3	7	8
Vehicles Entered	85	491	513	151	45	56	1341
Vehicles Exited	84	506	506	151	30	47	1324
Hourly Exit Rate	336	2024	2024	604	120	188	5296
Input Volume	381	2997	2374	682	181	257	6872
% of Volume	88	68	85	89	66	73	77
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	1	1	2	2	6

18: SR 421 & I-95 SB Ramps Performance by movement

Total Delay (hr)	3.7	0.2	1.8	4.7	2.1	0.0	2.4	14.9
Delay / Veh (s)	28.3	14.9	87.5	36.1	72.3	112.2	517.1	45.3
Total Stops	203	19	74	262	55	0	14	627
Travel Dist (mi)	30.0	3.0	7.5	49.5	3.5	0.0	0.6	94.1
Travel Time (hr)	4.3	0.3	2.0	5.8	2.2	0.0	2.5	17.2
Avg Speed (mph)	7	9	4	9	2	1	0	6
Vehicles Entered	460	58	71	461	103	1	17	1171
Vehicles Exited	470	57	73	471	105	1	16	1193
Hourly Exit Rate	1880	228	292	1884	420	4	64	4772
Input Volume	2160	269	321	2213	1210	19	687	6879
% of Volume	87	85	91	85	35	21	9	69
Denied Entry Before	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	2	0	3	5

Total Network Performance

Total Delay (hr)	169.1
Delay / Veh (s)	288.5
Total Stops	5277
Travel Dist (mi)	2167.1
Travel Time (hr)	229.5
Avg Speed (mph)	12
Vehicles Entered	2279
Vehicles Exited	1940
Hourly Exit Rate	7760
Input Volume	50110
% of Volume	15
Denied Entry Before	7
Denied Entry After	419

Intersection: 1: SR 421 & Williamson Blvd

Directions Served	L	L	T	T	TR	L	L	T	T	R	L	L
Maximum Queue (ft)	102	284	967	1012	250	488	464	428	212	128	307	321
Average Queue (ft)	58	88	629	759	246	481	338	200	121	40	205	232
95th Queue (ft)	96	224	1214	1322	272	487	469	459	231	110	326	353
Link Distance (ft)			1594	1594		248	248	248	248	248		
Upstream Blk Time (%)						35	28	0	1			
Queuing Penalty (veh)						215	169	2	5			
Storage Bay Dist (ft)	450	450			200						300	300
Storage Blk Time (%)			9	22	77						0	5
Queuing Penalty (veh)			13	100	164						1	12

Intersection: 1: SR 421 & Williamson Blvd

Directions Served	T	T	R	R	L	L	T	TR	T	T
Maximum Queue (ft)	510	434	322	312	289	340	1820	1822	1665	1667
Average Queue (ft)	272	305	257	250	242	309	1548	1510	501	481
95th Queue (ft)	485	604	366	346	323	398	2241	2235	1546	1531
Link Distance (ft)	2762	2762					1748	1748	2790	2790
Upstream Blk Time (%)							30	27	0	0
Queuing Penalty (veh)							0	0	0	0
Storage Bay Dist (ft)			300	300	240	240				
Storage Blk Time (%)	3	2	3	3	21	38	56			
Queuing Penalty (veh)	8	25	8	7	109	194	437			

Intersection: 3: SR 421 & Taylor Branch Rd.

Directions Served	T	T	T	T	R
Maximum Queue (ft)	265	1276	1345	1308	124
Average Queue (ft)	85	569	660	519	68
95th Queue (ft)	257	1450	1481	1408	136
Link Distance (ft)		1657	1657	1657	251
Upstream Blk Time (%)		2	2	1	
Queuing Penalty (veh)		0	0	0	
Storage Bay Dist (ft)	250				
Storage Blk Time (%)	1	6			
Queuing Penalty (veh)	5	44			

Intersection: 5: I-95 SB Ramps &

Directions Served	L	L	L	T
Maximum Queue (ft)	963	1027	1028	1015
Average Queue (ft)	446	951	1001	971
95th Queue (ft)	1155	1095	1072	1078
Link Distance (ft)	1012	1012	1012	1012
Upstream Blk Time (%)	9	32	68	32
Queuing Penalty (veh)	0	0	0	0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: SR 421 &

Directions Served	T	T	T	T	T	R
Maximum Queue (ft)	270	264	276	219	217	72
Average Queue (ft)	102	98	113	203	164	12
95th Queue (ft)	312	301	311	240	269	61
Link Distance (ft)	248	248	248	130	130	188
Upstream Blk Time (%)	2	2	2	17	12	
Queuing Penalty (veh)	17	16	20	239	167	
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 17: SR 421 & I-95 NB Ramps

Directions Served	L	L	T	T	T	T	T	T	R	L	R	R
Maximum Queue (ft)	221	224	251	268	330	582	586	570	350	348	842	162
Average Queue (ft)	155	144	124	140	196	430	528	554	142	288	414	94
95th Queue (ft)	226	222	277	293	378	711	631	583	542	417	1134	176
Link Distance (ft)			491	491	491	545	545	545	545		1439	
Upstream Blk Time (%)						10	18	33	3		4	
Queuing Penalty (veh)						72	135	252	22		0	
Storage Bay Dist (ft)	650	650								330		330
Storage Blk Time (%)										37		
Queuing Penalty (veh)										94		

Intersection: 18: SR 421 & I-95 SB Ramps

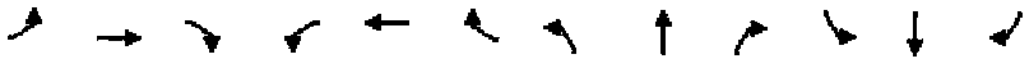
Directions Served	T	T	T	L	T	T	L	L	R
Maximum Queue (ft)	362	361	360	450	517	519	190	201	192
Average Queue (ft)	275	288	303	301	419	459	120	135	185
95th Queue (ft)	441	447	440	530	626	661	251	263	194
Link Distance (ft)	130	130	130	491	491	491	54	54	54
Upstream Blk Time (%)	33	32	37	8	10	22	43	48	97
Queuing Penalty (veh)	267	258	299	64	81	185	274	306	610
Storage Bay Dist (ft)									
Storage Blk Time (%)			37						
Queuing Penalty (veh)			100						

Network Summary

Network wide Queuing Penalty: 4994

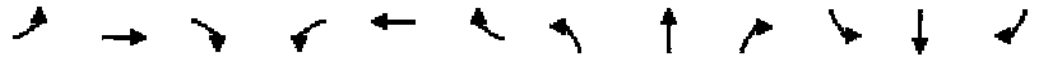
INTERIM IMPROVEMENTS EVALUATION

Synchro HCS Printout



Lane Configurations												
Volume (vph)	0	636	249	1560	975	488	312	528	1013	775	1016	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	12	12
Total Lost time (s)		6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	
Lane Util. Factor		0.91	1.00	0.97	*0.83	1.00	0.97	0.95	0.88	0.97	0.95	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		5136	1583	3351	3123	1568	3319	3539	2814	3351	3574	
Flt Permitted		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		5136	1583	3351	3123	1568	3319	3539	2814	3351	3574	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	684	268	1677	1048	525	335	568	1089	833	1092	0
RTOR Reduction (vph)	0	0	120	0	0	76	0	0	0	0	0	0
Lane Group Flow (vph)	0	684	148	1677	1048	449	335	568	1089	833	1092	0
Heavy Vehicles (%)	5%	1%	2%	1%	1%	3%	2%	2%	1%	1%	1%	1%
Turn Type	Prot		Perm	Prot		pt+ov	Prot		pt+ov	Prot		
Protected Phases	5	2		1	6	6 7	3	8	8 1	7	4	
Permitted Phases			2									
Actuated Green, G (s)		20.9	20.9	50.1	76.0	106.0	11.0	23.0	73.1	24.0	36.0	
Effective Green, g (s)		20.9	20.9	50.1	76.0	106.0	11.0	23.0	73.1	24.0	36.0	
Actuated g/C Ratio		0.15	0.15	0.36	0.54	0.76	0.08	0.16	0.52	0.17	0.26	
Clearance Time (s)		6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		767	236	1199	1695	1187	261	581	1469	574	919	
v/s Ratio Prot		c0.13		c0.50	0.34	0.29	0.10	0.16	0.39	c0.25	c0.31	
v/s Ratio Perm			0.09									
v/c Ratio		0.89	0.63	1.40	0.62	0.38	1.28	0.98	0.74	1.45	1.19	
Uniform Delay, d1		58.4	55.9	44.9	22.0	5.8	64.5	58.2	26.1	58.0	52.0	
Progression Factor		1.00	1.00	0.58	0.28	0.19	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		14.8	12.0	181.2	0.6	0.1	153.5	31.3	2.1	212.7	95.7	
Delay (s)		73.3	67.9	207.5	6.7	1.2	218.0	89.6	28.1	270.7	147.7	
Level of Service		E	E	F	A	A	F	F	C	F	F	
Approach Delay (s)		71.7			109.4			77.6			200.9	
Approach LOS		E			F			E			F	

HCM Average Control Delay	118.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.24		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	112.1%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Lane Configurations		↑↑↑	↱	↰	↑↑					↰↰↰		↱
Volume (vph)	0	2155	269	446	2204	0	0	0	0	1210	0	687
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.5	4.0	5.5	6.5					5.5		6.5
Lane Util. Factor		0.91	1.00	1.00	0.95					0.94		1.00
Frt		1.00	0.85	1.00	1.00					1.00		0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (prot)		5036	1599	1787	3505					5040		1599
Flt Permitted		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (perm)		5036	1599	1787	3505					5040		1599
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	2317	289	480	2370	0	0	0	0	1301	0	739
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	2317	289	480	2370	0	0	0	0	1301	0	739
Heavy Vehicles (%)	0%	3%	1%	1%	3%	0%	0%	0%	0%	1%	0%	1%
Turn Type			Free	Prot						Prot		custom
Protected Phases		6		5	2					8		
Permitted Phases			Free									6
Actuated Green, G (s)		47.5	140.0	33.9	86.9					41.1		47.5
Effective Green, g (s)		47.5	140.0	33.9	86.9					41.1		47.5
Actuated g/C Ratio		0.34	1.00	0.24	0.62					0.29		0.34
Clearance Time (s)		6.5		5.5	6.5					5.5		6.5
Vehicle Extension (s)		3.0		3.0	3.0					3.0		3.0
Lane Grp Cap (vph)		1709	1599	433	2176					1480		543
v/s Ratio Prot		0.46		0.27	c0.68					c0.26		
v/s Ratio Perm			0.18									c0.46
v/c Ratio		1.36	0.18	1.11	1.09					0.88		1.36
Uniform Delay, d1		46.2	0.0	53.0	26.6					47.1		46.2
Progression Factor		0.96	1.00	1.21	0.34					1.00		1.00
Incremental Delay, d2		160.5	0.0	68.2	45.8					6.3		174.1
Delay (s)		204.8	0.0	132.6	54.7					53.4		220.3
Level of Service		F	A	F	D					D		F
Approach Delay (s)		182.1			67.8			0.0			113.9	
Approach LOS		F			E			A			F	

HCM Average Control Delay	120.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	114.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lane Configurations												
Volume (vph)	381	2984	0	0	2344	682	181	0	257	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5			5.5	4.0	5.5		5.5			
Lane Util. Factor	0.97	0.91			0.91	1.00	1.00		0.88			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	3467	5085			5085	1583	1687		2787			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	3467	5085			5085	1583	1687		2787			
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	410	3209	0	0	2520	733	195	0	276	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	410	3209	0	0	2520	733	195	0	276	0	0	0
Heavy Vehicles (%)	1%	2%	0%	0%	2%	2%	7%	0%	2%	0%	0%	0%
Turn Type	Prot					Free	Prot		custom			
Protected Phases	5	2			6		3		8			
Permitted Phases						Free						
Actuated Green, G (s)	20.5	108.8			82.8	140.0	20.2		20.2			
Effective Green, g (s)	20.5	108.8			82.8	140.0	20.2		20.2			
Actuated g/C Ratio	0.15	0.78			0.59	1.00	0.14		0.14			
Clearance Time (s)	5.5	5.5			5.5		5.5		5.5			
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)	508	3952			3007	1583	243		402			
v/s Ratio Prot	0.12	c0.63			0.50		c0.12		0.10			
v/s Ratio Perm						0.46						
v/c Ratio	0.81	0.81			0.84	0.46	0.80		0.69			
Uniform Delay, d1	57.8	9.4			23.2	0.0	58.0		56.9			
Progression Factor	0.52	1.06			1.00	1.00	1.00		1.00			
Incremental Delay, d2	0.9	0.2			3.0	1.0	17.2		4.8			
Delay (s)	30.8	10.2			26.1	1.0	75.1		61.7			
Level of Service	C	B			C	A	E		E			
Approach Delay (s)		12.5			20.5			67.3			0.0	
Approach LOS		B			C			E			A	

HCM Average Control Delay	19.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	103.9%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lane Configurations	↑↑↑	↱		↓↓↓		↱
Volume (veh/h)	2588	653	0	3026	0	132
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	2783	702	0	3254	0	142
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	633					
pX, platoon unblocked			0.62		0.62	0.62
vC, conflicting volume			2783		3596	928
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1738		3046	0
tC, single (s)			4.3		6.8	7.1
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.4
p0 queue free %			100		100	78
cM capacity (veh/h)			207		6	656

Volume Total	928	928	928	702	813	813	813	813	142
Volume Left	0	0	0	0	0	0	0	0	0
Volume Right	0	0	0	702	0	0	0	0	142
cSH	1700	1700	1700	1700	1700	1700	1700	1700	656
Volume to Capacity	0.55	0.55	0.55	0.41	0.48	0.48	0.48	0.48	0.22
Queue Length 95th (ft)	0	0	0	0	0	0	0	0	20
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0
Lane LOS									B
Approach Delay (s)	0.0				0.0				12.0
Approach LOS									B

Average Delay	0.2		
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		

Synchro Queue Report

Lane Group Flow (vph)	684	268	1677	1048	525	335	568	1089	833	1092
v/c Ratio	0.89	0.75	1.40	0.62	0.42	1.28	0.98	0.75	1.45	1.19
Control Delay	73.1	40.7	207.2	6.7	1.2	202.8	90.0	18.5	253.1	140.4
Queue Delay	0.0	0.0	0.0	0.3	0.5	0.0	0.0	0.0	0.0	0.0
Total Delay	73.1	40.7	207.2	7.0	1.7	202.8	90.0	18.5	253.1	140.4
Queue Length 50th (ft)	226	113	~1051	158	12	~199	274	202	~531	~628
Queue Length 95th (ft)	#295	#236	m#980	m139	m10	#300	#397	269	#661	#767
Internal Link Dist (ft)	1569			280			2748			1756
Turn Bay Length (ft)		200				300		300	240	
Base Capacity (vph)	770	357	1198	1695	1255	261	581	1448	574	919
Starvation Cap Reductn	0	0	0	187	357	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	0.89	0.75	1.40	0.69	0.58	1.28	0.98	0.75	1.45	1.19

~ 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.

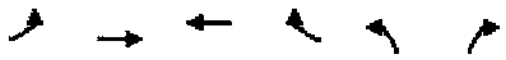
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group Flow (vph)	2317	289	480	2370	1301	739
v/c Ratio	1.36	0.18	1.11	1.09	0.88	1.36
Control Delay	196.2	0.0	125.1	57.3	54.8	210.8
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0
Total Delay	196.2	0.0	125.1	57.3	54.9	210.8
Queue Length 50th (ft)	~1032	0	~460	~1190	395	~884
Queue Length 95th (ft)	m#921	m0	m#593	#1196	450	#1129
Internal Link Dist (ft)	273			477		
Turn Bay Length (ft)		200				
Base Capacity (vph)	1709	1599	433	2176	1566	543
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	18	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.36	0.18	1.11	1.09	0.84	1.36

~ 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.



Lane Group Flow (vph)	410	3209	2520	733	195	276
v/c Ratio	0.81	0.81	0.84	0.46	0.80	0.69
Control Delay	31.4	11.1	27.3	1.0	81.4	65.8
Queue Delay	0.0	2.0	0.0	0.0	0.0	0.0
Total Delay	31.4	13.0	27.3	1.0	81.4	65.8
Queue Length 50th (ft)	204	282	678	0	172	136
Queue Length 95th (ft)	m150	m265	778	0	258	188
Internal Link Dist (ft)		477	553			
Turn Bay Length (ft)	650				330	330
Base Capacity (vph)	532	3953	3010	1583	283	468
Starvation Cap Reductn	0	565	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.95	0.84	0.46	0.69	0.59

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

SimTraffic Single-Run Report

Summary of All Intervals

End Time	7:15
Total Time (min)	20
Time Recorded (min)	15
# of Intervals	2
# of Recorded Intvls	1
Vehs Entered	1847
Vehs Exited	1411
Starting Vehs	586
Ending Vehs	1022
Denied Entry Before	11
Denied Entry After	826
Travel Distance (mi)	1604
Travel Time (hr)	302.2
Total Delay (hr)	257.4
Total Stops	6528
Fuel Used (gal)	112.6

Interval #0 Information Seeding

Start Time	6:55
End Time	7:00
Total Time (min)	5

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	7:15
Total Time (min)	15

Volumes adjusted by Growth Factors.

Vehs Exited	1411
Starting Vehs	586
Ending Vehs	1022
Denied Entry Before	11
Denied Entry After	826
Travel Distance (mi)	1604
Travel Time (hr)	302.2
Total Delay (hr)	257.4
Total Stops	6528
Fuel Used (gal)	112.6

1: SR 421 & Williamson Blvd Performance by movement

Total Delay (hr)	18.8	9.6	6.7	0.8	0.0	3.8	4.2	16.2	16.6	6.6	83.4
Delay / Veh (s)	878.0	1386.9	123.6	26.8	3.6	206.8	124.3	270.5	616.3	140.6	266.1
Total Stops	146	73	246	54	7	180	249	1018	530	323	2826
Travel Dist (mi)	20.9	6.3	17.6	10.2	4.3	37.4	62.9	114.8	32.3	53.0	359.7
Travel Time (hr)	19.3	9.8	7.3	1.1	0.2	5.0	6.0	19.7	17.6	8.1	94.0
Avg Speed (mph)	2	1	2	11	20	8	11	6	2	7	4
Fuel Used (gal)	4.9	2.4	2.1	0.7	0.2	2.0	3.0	7.0	4.8	3.2	30.2
HC Emissions (g)	16	4	10	12	4	9	19	16	7	27	123
CO Emissions (g)	704	205	249	490	149	374	691	832	374	699	4766
NOx Emissions (g)	41	7	22	29	12	40	73	87	28	85	424
Vehicles Entered	81	41	198	114	48	75	118	238	120	158	1191
Vehicles Exited	74	9	193	114	46	60	126	192	74	177	1065
Hourly Exit Rate	296	36	772	456	184	240	504	768	296	708	4260
Input Volume	636	249	1560	986	488	312	528	1013	775	1016	7563
% of Volume	47	14	49	46	38	77	95	76	38	70	56
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	74	29	0	0	0	0	0	1	0	0	104

3: SR 421 & Taylor Branch Rd. Performance by movement

Total Delay (hr)	0.2	0.1	46.8	0.1	47.1
Delay / Veh (s)	2.0	5.0	335.0	9.9	181.3
Total Stops	0	0	1056	21	1077
Travel Dist (mi)	38.5	8.3	161.0	1.2	209.0
Travel Time (hr)	1.1	0.4	50.6	0.1	52.2
Avg Speed (mph)	35	22	5	10	7
Fuel Used (gal)	2.0	0.2	15.2	0.0	17.5
HC Emissions (g)	63	1	98	0	162
CO Emissions (g)	2107	82	2853	2	5044
NOx Emissions (g)	183	7	259	0	449
Vehicles Entered	332	79	543	22	976
Vehicles Exited	336	76	463	21	896
Hourly Exit Rate	1344	304	1852	84	3584
Input Volume	2640	653	3026	132	6451
% of Volume	51	47	61	64	56
Denied Entry Before	0	0	3	0	3
Denied Entry After	0	0	259	0	259

17: SR 421 & I-95 NB Ramps Performance by movement

Total Delay (hr)	0.8	1.0	9.0	0.3	3.6	1.6	16.3
Delay / Veh (s)	46.9	9.9	87.9	8.5	275.0	113.7	59.0
Total Stops	63	98	367	9	125	84	746
Travel Dist (mi)	7.2	38.1	40.1	8.0	14.5	14.0	121.9
Travel Time (hr)	1.0	2.0	9.9	0.5	4.0	2.0	19.4
Avg Speed (mph)	7	19	4	17	4	7	6
Fuel Used (gal)	0.5	2.6	3.4	0.2	1.2	0.8	8.6
HC Emissions (g)	2	76	19	4	30	3	134
CO Emissions (g)	154	2721	611	73	627	187	4372
NOx Emissions (g)	11	217	65	8	58	12	371
Vehicles Entered	67	345	366	108	57	57	1000
Vehicles Exited	60	361	371	111	38	48	989
Hourly Exit Rate	240	1444	1484	444	152	192	3956
Input Volume	381	2997	2374	682	181	257	6872
% of Volume	63	48	63	65	84	75	58
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0

18: SR 421 & I-95 SB Ramps Performance by movement

Total Delay (hr)	3.7	0.3	2.3	10.4	2.5	0.0	2.6	22.0
Delay / Veh (s)	41.5	26.0	126.2	106.1	125.8	2.3	9509.0	91.8
Total Stops	183	14	80	282	49	0	0	608
Travel Dist (mi)	20.5	2.2	7.1	36.6	2.4	0.1	0.0	68.8
Travel Time (hr)	4.2	0.4	2.6	11.3	2.6	0.0	2.6	23.7
Avg Speed (mph)	5	6	4	5	1	20	0	4
Fuel Used (gal)	1.6	0.2	0.7	3.5	0.7	0.0	0.6	7.2
HC Emissions (g)	26	0	1	37	5	2	9	80
CO Emissions (g)	584	22	87	737	97	26	135	1687
NOx Emissions (g)	72	3	6	81	8	4	6	180
Vehicles Entered	314	43	70	352	67	3	1	850
Vehicles Exited	332	41	65	356	76	3	1	874
Hourly Exit Rate	1328	164	260	1424	304	12	4	3496
Input Volume	2160	269	446	2204	1210	19	687	6995
% of Volume	61	61	58	65	25	63	1	50
Denied Entry Before	0	0	0	3	4	0	0	7
Denied Entry After	0	0	5	15	2	0	3	25

Total Zone Performance

Total Delay (hr)	168.8
Delay / Veh (s)	5193.8
Total Stops	5257
Travel Dist (mi)	759.3
Travel Time (hr)	189.3
Avg Speed (mph)	5
Fuel Used (gal)	63.5
HC Emissions (g)	499
CO Emissions (g)	15870
NOx Emissions (g)	1424
Vehicles Entered	1259
Vehicles Exited	21
Hourly Exit Rate	84
Input Volume	27881
% of Volume	0
Denied Entry Before	10
Denied Entry After	388

Intersection: 1: SR 421 & Williamson Blvd

Movement(s) Served	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Maximum Green (s)	50.0	21.0	11.0	36.0	9.0	62.0	24.0	23.0
Minimum Green (s)	5.0	10.0	5.0	6.0	5.0	10.0	5.0	6.0
Recall	None	C-Min	None	None	None	C-Min	None	None
Avg. Green (s)	50.0	21.0	11.0	36.0	0.0	76.0	24.0	23.0
g/C Ratio	0.36	0.15	0.08	0.26	0.00	0.54	0.17	0.16
Cycles Skipped (%)	0	0	0	0	100	0	0	0
Cycles @ Minimum (%)	0	0	0	0	0	0	0	0
Cycles Maxed Out (%)	100	100	100	100	0	100	100	100
Cycles with Peds (%)	0	0	0	0	0	0	0	0

Average Cycle Length (s): 140.0
Number of Complete Cycles : 6

Intersection: 17: SR 421 & I-95 NB Ramps

Movement(s) Served	EBT	NBL	EBL	WBT	NBR
Maximum Green (s)	105.5	23.5	21.5	78.5	23.5
Minimum Green (s)	20.0	12.0	8.0	20.0	12.0
Recall	C-Min	None	None	C-Min	None
Avg. Green (s)	100.0	27.3	16.0	78.5	27.3
g/C Ratio	0.71	0.19	0.11	0.56	0.19
Cycles Skipped (%)	0	0	0	0	0
Cycles @ Minimum (%)	0	0	0	0	0
Cycles Maxed Out (%)	100	83	0	100	83
Cycles with Peds (%)	0	0	0	0	0

Average Cycle Length (s): 140.0
Number of Complete Cycles : 6

Intersection: 18: SR 421 & I-95 SB Ramps

Movement(s) Served	WBT	WBL	EBT	SBL
Maximum Green (s)	84.5	31.5	47.5	43.5
Minimum Green (s)	20.0	5.0	20.0	12.0
Recall	C-Min	None	C-Min	None
Avg. Green (s)	84.5	24.3	61.1	37.2
g/C Ratio	0.50	0.17	0.44	0.22
Cycles Skipped (%)	17	0	0	17
Cycles @ Minimum (%)	0	0	0	17
Cycles Maxed Out (%)	83	43	100	67
Cycles with Peds (%)	0	0	0	0

Average Cycle Length (s): 140.0
Number of Complete Cycles : 6

SimTraffic Five-Run Average Report

Summary of All Intervals

Start Time	6:55	6:55	6:55	6:55	6:55	6:55
End Time	7:15	7:15	7:15	7:15	7:15	7:15
Total Time (min)	20	20	20	20	20	20
Time Recorded (min)	15	15	15	15	15	15
# of Intervals	2	2	2	2	2	2
# of Recorded Intvls	1	1	1	1	1	1
Vehs Entered	2109	1886	2047	1953	2027	2004
Vehs Exited	1698	1471	1592	1506	1581	1569
Starting Vehs	519	538	577	544	552	544
Ending Vehs	930	953	1032	991	998	981
Denied Entry Before	14	23	29	6	15	18
Denied Entry After	555	792	683	626	620	656
Travel Distance (mi)	1909	1655	1767	1658	1759	1750
Travel Time (hr)	253.8	288.0	288.2	268.3	273.7	274.4
Total Delay (hr)	200.9	242.1	239.1	222.2	224.7	225.8
Total Stops	5718	6042	6618	5757	6337	6096
Fuel Used (gal)	108.8	110.0	113.2	105.4	110.2	109.5

Interval #0 Information Seeding

Start Time	6:55
End Time	7:00
Total Time (min)	5

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	7:15
Total Time (min)	15

Volumes adjusted by Growth Factors.

Vehs Entered	2109	1886	2047	1953	2027	2004
Vehs Exited	1698	1471	1592	1506	1581	1569
Starting Vehs	519	538	577	544	552	544
Ending Vehs	930	953	1032	991	998	981
Denied Entry Before	14	23	29	6	15	18
Denied Entry After	555	792	683	626	620	656
Travel Distance (mi)	1909	1655	1767	1658	1759	1750
Travel Time (hr)	253.8	288.0	288.2	268.3	273.7	274.4
Total Delay (hr)	200.9	242.1	239.1	222.2	224.7	225.8
Total Stops	5718	6042	6618	5757	6337	6096
Fuel Used (gal)	108.8	110.0	113.2	105.4	110.2	109.5

1: SR 421 & Williamson Blvd Performance by movement

Total Delay (hr)	21.8	7.6	5.1	0.8	0.1	4.4	5.5	16.9	15.1	7.3	84.6
Delay / Veh (s)	1122.4	1244.7	83.3	20.9	7.8	235.0	156.0	288.8	532.8	148.3	256.9
Total Stops	159	57	250	54	11	162	239	885	535	343	2695
Travel Dist (mi)	20.3	5.6	19.9	12.1	5.1	38.1	63.2	111.1	34.8	56.7	366.8
Travel Time (hr)	22.3	7.7	5.8	1.0	0.3	5.5	7.3	20.3	16.2	8.9	95.5
Avg Speed (mph)	1	1	3	12	17	8	11	6	2	6	4
Fuel Used (gal)	5.7	1.9	1.8	0.9	0.2	2.1	3.2	7.0	4.5	3.4	30.7
HC Emissions (g)	14	7	10	10	5	10	31	25	11	15	138
CO Emissions (g)	741	225	243	613	165	352	881	945	407	518	5090
NOx Emissions (g)	33	11	25	35	12	38	97	97	37	64	448
Vehicles Entered	89	34	236	134	56	77	127	239	123	169	1284
Vehicles Exited	50	10	206	133	55	58	127	185	81	184	1089
Hourly Exit Rate	200	40	824	532	220	232	508	740	324	736	4356
Input Volume	636	249	1560	986	488	312	528	1013	775	1016	7563
% of Volume	31	16	53	54	45	74	96	73	42	72	58
Denied Entry Before	0	1	0	0	0	1	2	4	0	0	8
Denied Entry After	74	27	1	0	0	8	8	22	0	0	140

3: SR 421 & Taylor Branch Rd. Performance by movement

Total Delay (hr)	0.2	0.1	20.2	0.1	20.6
Delay / Veh (s)	2.0	5.3	110.8	12.7	66.7
Total Stops	0	0	935	38	973
Travel Dist (mi)	39.3	8.0	208.6	2.1	257.9
Travel Time (hr)	1.2	0.4	25.0	0.2	26.8
Avg Speed (mph)	34	22	10	9	11
Fuel Used (gal)	2.0	0.2	10.3	0.1	12.7
HC Emissions (g)	58	3	101	1	162
CO Emissions (g)	2024	99	3117	15	5255
NOx Emissions (g)	174	10	309	2	494
Vehicles Entered	342	74	706	38	1160
Vehicles Exited	345	76	603	37	1061
Hourly Exit Rate	1380	304	2412	148	4244
Input Volume	2640	653	3026	132	6451
% of Volume	52	47	80	112	66
Denied Entry Before	0	0	4	0	4
Denied Entry After	0	0	57	0	57

17: SR 421 & I-95 NB Ramps Performance by movement

Total Delay (hr)	0.6	1.0	9.0	0.6	1.4	1.1	13.7
Delay / Veh (s)	42.2	10.3	68.2	14.8	116.7	64.9	44.5
Total Stops	54	102	458	14	55	56	739
Travel Dist (mi)	6.2	36.5	52.5	10.2	12.2	17.1	134.6
Travel Time (hr)	0.8	1.9	10.2	0.8	1.7	1.6	17.1
Avg Speed (mph)	7	19	5	16	7	11	8
Fuel Used (gal)	0.4	2.4	3.7	0.3	0.7	0.7	8.1
HC Emissions (g)	3	55	23	2	19	6	107
CO Emissions (g)	144	2267	694	54	416	279	3854
NOx Emissions (g)	10	165	76	5	43	22	321
Vehicles Entered	59	328	473	134	45	62	1101
Vehicles Exited	52	343	476	136	44	61	1112
Hourly Exit Rate	208	1372	1904	544	176	244	4448
Input Volume	381	2997	2374	682	181	257	6872
% of Volume	55	46	80	80	97	95	65
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	3	2	1	0	6

18: SR 421 & I-95 SB Ramps Performance by movement

Total Delay (hr)	3.7	0.3	3.5	7.9	1.7	0.0	2.7	19.9
Delay / Veh (s)	45.9	32.4	140.9	65.1	77.6	24.2	9622.7	76.3
Total Stops	149	13	107	301	50	0	0	620
Travel Dist (mi)	18.6	1.9	9.4	45.6	2.9	0.0	0.0	78.3
Travel Time (hr)	4.2	0.4	3.8	9.0	1.9	0.0	2.7	21.9
Avg Speed (mph)	4	5	3	7	2	3	0	4
Fuel Used (gal)	1.6	0.2	1.1	3.1	0.5	0.0	0.6	7.0
HC Emissions (g)	22	1	1	28	1	1	0	54
CO Emissions (g)	556	28	91	633	41	12	29	1389
NOx Emissions (g)	62	4	7	76	3	2	0	153
Vehicles Entered	286	37	93	439	78	1	1	935
Vehicles Exited	301	37	87	434	84	1	1	945
Hourly Exit Rate	1204	148	348	1736	336	4	4	3780
Input Volume	2160	269	446	2204	1210	19	687	6995
% of Volume	56	55	78	79	28	21	1	54
Denied Entry Before	0	0	0	2	0	0	1	3
Denied Entry After	0	0	3	13	2	0	3	21

Total Zone Performance

Total Delay (hr)	138.8
Delay / Veh (s)	3309.5
Total Stops	5027
Travel Dist (mi)	837.7
Travel Time (hr)	161.3
Avg Speed (mph)	6
Fuel Used (gal)	58.6
HC Emissions (g)	462
CO Emissions (g)	15588
NOx Emissions (g)	1416
Vehicles Entered	1421
Vehicles Exited	16
Hourly Exit Rate	64
Input Volume	27881
% of Volume	0
Denied Entry Before	15
Denied Entry After	224

Intersection: 1: SR 421 & Williamson Blvd

Directions Served	T	T	T	R	L	L	T	T	R	L	L	T
Maximum Queue (ft)	800	1347	1606	183	486	476	472	156	303	255	324	2469
Average Queue (ft)	477	955	1334	39	479	362	180	56	24	177	198	1526
95th Queue (ft)	1125	1660	1956	170	502	511	495	137	157	298	320	2810
Link Distance (ft)	1594	1594	1594		248	248	248	248	248			2754
Upstream Blk Time (%)		13	51		42	28						1
Queuing Penalty (veh)		0	0		257	170						0
Storage Bay Dist (ft)				200						300	300	
Storage Blk Time (%)	7		95	1						1	2	3
Queuing Penalty (veh)	0		237	3						3	4	9

Intersection: 1: SR 421 & Williamson Blvd

Directions Served	T	R	R	L	L	T	T	T	T
Maximum Queue (ft)	2502	325	312	289	340	1824	1821	2170	2150
Average Queue (ft)	1666	322	307	113	339	1693	1544	749	732
95th Queue (ft)	2820	334	319	293	342	2119	2273	1932	1931
Link Distance (ft)	2754					1748	1748	2790	2790
Upstream Blk Time (%)	2					57	36		
Queuing Penalty (veh)	0					0	0		
Storage Bay Dist (ft)		300	300	240	240				
Storage Blk Time (%)	3	34	41		77	26			
Queuing Penalty (veh)	35	91	108		390	200			

Intersection: 3: SR 421 & Taylor Branch Rd.

Directions Served	T	T	T	T	T	R
Maximum Queue (ft)	3	257	1514	1527	1476	104
Average Queue (ft)	0	146	841	953	849	61
95th Queue (ft)	5	340	1864	1913	1857	106
Link Distance (ft)	545		1657	1657	1657	251
Upstream Blk Time (%)			6	7	5	
Queuing Penalty (veh)			0	0	0	
Storage Bay Dist (ft)		250				
Storage Blk Time (%)		6	15			
Queuing Penalty (veh)		46	117			

Intersection: 17: SR 421 & I-95 NB Ramps

Directions Served	L	L	T	T	T	T	T	T	R	L	R	R
Maximum Queue (ft)	176	175	181	193	220	598	572	572	471	314	318	161
Average Queue (ft)	101	96	83	93	127	459	524	546	150	218	157	101
95th Queue (ft)	186	179	181	200	256	728	624	602	533	370	450	173
Link Distance (ft)	485	485	485	485	485	545	545	545	545		1438	
Upstream Blk Time (%)						18	24	42	3			
Queuing Penalty (veh)						133	182	315	24			
Storage Bay Dist (ft)										330		330
Storage Blk Time (%)										9		
Queuing Penalty (veh)										22		

Intersection: 18: SR 421 & I-95 SB Ramps

Directions Served	T	T	T	L	T	T	L	L	R
Maximum Queue (ft)	254	363	359	487	509	530	195	204	194
Average Queue (ft)	118	319	346	382	438	486	82	150	191
95th Queue (ft)	248	455	383	556	628	581	225	290	196
Link Distance (ft)	124	124	124	485	485	485	51	51	51
Upstream Blk Time (%)	13	26	47	7	17	22	20	51	100
Queuing Penalty (veh)	102	208	378	61	140	188	95	241	474
Storage Bay Dist (ft)									
Storage Blk Time (%)			47						
Queuing Penalty (veh)			126						

Zone Summary

Zone wide Queuing Penalty: 4359

Intersection: 1: SR 421 & Williamson Blvd

Movement(s) Served	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Maximum Green (s)	50.0	21.0	11.0	36.0	9.0	82.0	24.0	23.0
Minimum Green (s)	5.0	10.0	5.0	6.0	5.0	10.0	5.0	6.0
Recall	None	C-Min	None	None	None	C-Min	None	None
Avg. Green (s)	50.0	21.0	11.0	36.0	0.0	76.0	24.0	23.0
g/C Ratio	0.36	0.15	0.08	0.26	0.00	0.54	0.17	0.16
Cycles Skipped (%)	0	0	0	0	100	0	0	0
Cycles @ Minimum (%)	0	0	0	0	0	0	0	0
Cycles Maxed Out (%)	100	100	100	100	0	100	100	100
Cycles with Peds (%)	0	0	0	0	0	0	0	0

Average Cycle Length (s): 140.0
Number of Complete Cycles : 6

Intersection: 17: SR 421 & I-95 NB Ramps

Movement(s) Served	EBT	NBL	EBL	WBT	NBR
Maximum Green (s)	105.5	23.5	21.5	78.5	23.5
Minimum Green (s)	20.0	12.0	8.0	20.0	12.0
Recall	C-Min	None	None	C-Min	None
Avg. Green (s)	102.2	26.5	14.6	82.1	26.5
g/C Ratio	0.73	0.19	0.10	0.59	0.19
Cycles Skipped (%)	0	0	0	0	0
Cycles @ Minimum (%)	0	0	0	0	0
Cycles Maxed Out (%)	100	50	0	100	50
Cycles with Peds (%)	0	0	0	0	0

Average Cycle Length (s): 140.0
Number of Complete Cycles : 6

Intersection: 18: SR 421 & I-95 SB Ramps

Movement(s) Served	WBT	WBL	EBT	SBL
Maximum Green (s)	84.5	31.5	47.5	43.5
Minimum Green (s)	20.0	5.0	20.0	12.0
Recall	C-Min	None	C-Min	None
Avg. Green (s)	93.0	34.5	61.0	43.1
g/C Ratio	0.53	0.25	0.36	0.25
Cycles Skipped (%)	20	0	17	20
Cycles @ Minimum (%)	0	0	0	0
Cycles Maxed Out (%)	80	67	83	60
Cycles with Peds (%)	0	0	0	0

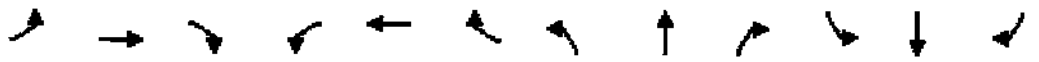
Average Cycle Length (s): 140.0
Number of Complete Cycles : 6

ULTIMATE IMPROVEMENTS EVALUATION

Synchro HCS Printout

Lane Configurations		↑↑↑↑	↱	↰↰	↑↑	↱	↰↰	↑↑	↱↱	↰↰	↑↑	
Volume (vph)	0	636	249	1560	975	488	312	528	1013	775	1016	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	12	12
Total Lost time (s)		6.0	5.0	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	
Lane Util. Factor		0.86	1.00	0.97	0.95	1.00	0.97	0.95	0.88	0.97	0.95	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		6471	1583	3351	3574	1568	3319	3539	2814	3351	3574	
Flt Permitted		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		6471	1583	3351	3574	1568	3319	3539	2814	3351	3574	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	684	268	1677	1048	525	335	568	1089	833	1092	0
RTOR Reduction (vph)	0	0	2	0	0	245	0	0	0	0	0	0
Lane Group Flow (vph)	0	684	266	1677	1048	280	335	568	1089	833	1092	0
Heavy Vehicles (%)	5%	1%	2%	1%	1%	3%	2%	2%	1%	1%	1%	1%
Turn Type			pm+ov	Prot		Perm	Prot		pt+ov	Prot		
Protected Phases		2	3	1	6		3	8	8 1	7	4	
Permitted Phases			2			6						
Actuated Green, G (s)		15.0	26.0	52.0	72.0	72.0	11.0	19.0	76.0	27.0	35.0	
Effective Green, g (s)		15.0	26.0	52.0	72.0	72.0	11.0	19.0	71.0	27.0	35.0	
Actuated g/C Ratio		0.11	0.19	0.39	0.53	0.53	0.08	0.14	0.53	0.20	0.26	
Clearance Time (s)		6.0	5.0	5.0	6.0	6.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		719	305	1291	1906	836	270	498	1480	670	927	
v/s Ratio Prot		c0.11	0.07	c0.50	0.29		0.10	c0.16	0.39	0.25	c0.31	
v/s Ratio Perm			0.10			0.18						
v/c Ratio		0.95	0.87	1.30	0.55	0.33	1.24	1.14	0.74	1.24	1.18	
Uniform Delay, d1		59.6	52.9	41.5	20.8	17.9	62.0	58.0	24.7	54.0	50.0	
Progression Factor		1.00	1.00	0.93	0.71	0.12	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		23.6	22.7	138.5	0.8	0.7	135.8	85.1	1.9	121.8	91.4	
Delay (s)		83.2	75.5	177.3	15.6	2.8	197.8	143.1	26.7	175.8	141.4	
Level of Service		F	E	F	B	A	F	F	C	F	F	
Approach Delay (s)		81.0			97.0			88.6			156.3	
Approach LOS		F			F			F			F	

HCM Average Control Delay	107.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.24		
Actuated Cycle Length (s)	135.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	110.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Lane Configurations		↑↑↑↑↱		↰↰	↑↑↑↑					↰↰↰		↱↱
Volume (vph)	0	1805	294	321	2204	0	0	0	0	1210	0	819
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5		5.5	6.5					5.5		5.5
Lane Util. Factor		0.81		0.97	0.86					0.94		0.88
Frt		0.98		1.00	1.00					1.00		0.85
Flt Protected		1.00		0.95	1.00					0.95		1.00
Satd. Flow (prot)		7334		3467	6346					5040		2814
Flt Permitted		1.00		0.95	1.00					0.95		1.00
Satd. Flow (perm)		7334		3467	6346					5040		2814
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	1941	316	345	2370	0	0	0	0	1301	0	881
RTOR Reduction (vph)	0	20	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	2237	0	345	2370	0	0	0	0	1301	0	881
Heavy Vehicles (%)	0%	3%	1%	1%	3%	0%	0%	0%	0%	1%	0%	1%
Turn Type				Prot						Prot		custom
Protected Phases		6		5	2					3		3
Permitted Phases												
Actuated Green, G (s)		48.8		23.1	76.4					46.6		46.6
Effective Green, g (s)		48.8		23.1	76.4					46.6		46.6
Actuated g/C Ratio		0.36		0.17	0.57					0.35		0.35
Clearance Time (s)		5.5		5.5	6.5					5.5		5.5
Vehicle Extension (s)		3.0		3.0	3.0					3.0		3.0
Lane Grp Cap (vph)		2651		593	3591					1740		971
v/s Ratio Prot		c0.30		0.10	c0.37					0.26		c0.31
v/s Ratio Perm												
v/c Ratio		0.84		0.58	0.66					0.75		0.91
Uniform Delay, d1		39.6		51.5	20.3					39.0		42.1
Progression Factor		0.77		1.14	0.14					1.00		1.00
Incremental Delay, d2		1.3		1.0	0.7					1.8		11.9
Delay (s)		31.7		60.0	3.6					40.8		54.0
Level of Service		C		E	A					D		D
Approach Delay (s)		31.7			10.8			0.0			46.1	
Approach LOS		C			B			A			D	

HCM Average Control Delay	28.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	135.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Configurations												
Volume (vph)	381	2984	0	0	2344	682	181	0	257	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	6.5			6.5		5.5		5.5			
Lane Util. Factor	0.97	0.91			0.76		1.00		0.88			
Frt	1.00	1.00			0.97		1.00		0.85			
Flt Protected	0.95	1.00			1.00		0.95		1.00			
Satd. Flow (prot)	3467	5085			8207		1687		2787			
Flt Permitted	0.95	1.00			1.00		0.95		1.00			
Satd. Flow (perm)	3467	5085			8207		1687		2787			
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	410	3209	0	0	2520	733	195	0	276	0	0	0
RTOR Reduction (vph)	0	0	0	0	36	0	0	0	0	0	0	0
Lane Group Flow (vph)	410	3209	0	0	3217	0	195	0	276	0	0	0
Heavy Vehicles (%)	1%	2%	0%	0%	2%	2%	7%	0%	2%	0%	0%	0%
Turn Type	Prot						Prot		custom			
Protected Phases	5	2			6		8		8			
Permitted Phases												
Actuated Green, G (s)	22.5	103.2			75.2		19.8		19.8			
Effective Green, g (s)	22.5	103.2			75.2		19.8		19.8			
Actuated g/C Ratio	0.17	0.76			0.56		0.15		0.15			
Clearance Time (s)	5.5	6.5			6.5		5.5		5.5			
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)	578	3887			4572		247		409			
v/s Ratio Prot	0.12	c0.63			0.39		c0.12		0.10			
v/s Ratio Perm												
v/c Ratio	0.71	0.83			0.70		0.79		0.67			
Uniform Delay, d1	53.2	10.2			21.8		55.6		54.6			
Progression Factor	0.56	1.04			1.00		1.00		1.00			
Incremental Delay, d2	3.3	1.6			0.9		15.3		4.4			
Delay (s)	32.8	12.2			22.7		70.9		58.9			
Level of Service	C	B			C		E		E			
Approach Delay (s)		14.6			22.7			63.9			0.0	
Approach LOS		B			C			E			A	

HCM Average Control Delay	21.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	135.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Configurations	↑↑↑	↱		↑↑↑↑		↱
Volume (veh/h)	2588	653	0	3026	0	132
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	2783	702	0	3254	0	142
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	633					
pX, platoon unblocked			0.60		0.60	0.60
vC, conflicting volume			2783		3596	928
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1638		2994	0
tC, single (s)			4.3		6.8	7.1
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.4
p0 queue free %			100		100	78
cM capacity (veh/h)			219		7	634

Volume Total	928	928	928	702	813	813	813	813	142
Volume Left	0	0	0	0	0	0	0	0	0
Volume Right	0	0	0	702	0	0	0	0	142
cSH	1700	1700	1700	1700	1700	1700	1700	1700	634
Volume to Capacity	0.55	0.55	0.55	0.41	0.48	0.48	0.48	0.48	0.22
Queue Length 95th (ft)	0	0	0	0	0	0	0	0	21
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.3
Lane LOS									B
Approach Delay (s)	0.0				0.0				12.3
Approach LOS									B

Average Delay	0.3		
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		

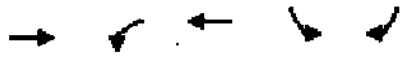
Synchro Queue Report

Lane Group Flow (vph)	684	268	1677	1048	525	335	568	1089	833	1092
v/c Ratio	0.95	0.84	1.30	0.55	0.49	1.24	1.14	0.69	1.24	1.18
Control Delay	83.0	54.3	172.1	15.7	1.2	185.2	135.9	23.9	166.1	135.0
Queue Delay	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Total Delay	83.0	54.3	172.1	15.7	1.4	185.2	135.9	23.9	166.1	135.0
Queue Length 50th (ft)	175	124	~987	279	0	~187	~305	371	~467	~602
Queue Length 95th (ft)	#240	#254	#1128	m307	m0	#287	#425	458	#595	#740
Internal Link Dist (ft)	1569			633			2748			1756
Turn Bay Length (ft)		200			500	300		300	240	
Base Capacity (vph)	719	319	1291	1906	1081	270	498	1584	670	927
Starvation Cap Reductn	0	0	0	0	125	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	0.95	0.84	1.30	0.55	0.55	1.24	1.14	0.69	1.24	1.18

~ 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.



Lane Group Flow (vph)	2257	345	2370	1301	881
v/c Ratio	0.84	0.58	0.66	0.75	0.91
Control Delay	31.5	62.3	3.6	42.1	56.0
Queue Delay	0.0	0.0	0.1	0.0	0.0
Total Delay	31.5	62.3	3.7	42.1	56.0
Queue Length 50th (ft)	394	106	63	351	412
Queue Length 95th (ft)	m405	158	64	407	#543
Internal Link Dist (ft)	633		477		
Turn Bay Length (ft)					
Base Capacity (vph)	2675	706	3592	1773	990
Starvation Cap Reductn	0	0	198	0	0
Spillback Cap Reductn	0	0	70	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.84	0.49	0.70	0.73	0.89

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.

Lane Group Flow (vph)	410	3209	3253	195	276
v/c Ratio	0.71	0.83	0.71	0.79	0.68
Control Delay	35.4	13.0	22.9	77.7	63.0
Queue Delay	0.0	0.5	0.0	0.0	0.0
Total Delay	35.4	13.5	22.9	77.7	63.0
Queue Length 50th (ft)	162	367	451	166	130
Queue Length 95th (ft)	m165	359	491	#253	181
Internal Link Dist (ft)		477	553		
Turn Bay Length (ft)				330	330
Base Capacity (vph)	619	3889	4608	281	465
Starvation Cap Reductn	0	270	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.66	0.89	0.71	0.69	0.59

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.

SimTraffic Single-Run Report

Summary of All Intervals

End Time	7:15
Total Time (min)	20
Time Recorded (min)	15
# of Intervals	2
# of Recorded Intvls	1
Vehs Entered	2694
Vehs Exited	2458
Starting Vehs	553
Ending Vehs	789
Denied Entry Before	21
Denied Entry After	13
Travel Distance (mi)	2494
Travel Time (hr)	170.4
Total Delay (hr)	100.0
Total Stops	5558
Fuel Used (gal)	1070.1

Interval #0 Information Seeding

Start Time	6:55
End Time	7:00
Total Time (min)	5

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	7:15
Total Time (min)	15

Volumes adjusted by Growth Factors.

Vehs Exited	2458
Starting Vehs	553
Ending Vehs	789
Denied Entry Before	21
Denied Entry After	13
Travel Distance (mi)	2494
Travel Time (hr)	170.4
Total Delay (hr)	100.0
Total Stops	5558
Fuel Used (gal)	1070.1

1: SR 421 & Williamson Blvd Performance by movement

Total Delay (hr)	3.1	0.8	7.2	1.0	0.3	6.6	4.6	3.7	7.6	9.1	44.0
Delay / Veh (s)	72.7	36.9	93.8	15.3	6.8	295.2	121.7	57.1	153.8	134.4	90.0
Total Stops	140	70	366	84	49	229	235	224	393	474	2264
Travel Dist (mi)	45.4	21.8	34.4	29.3	17.2	48.2	71.3	126.7	58.8	81.2	534.5
Travel Time (hr)	4.2	1.4	8.5	1.8	1.0	8.1	6.6	7.7	9.5	11.4	60.0
Avg Speed (mph)	11	17	4	16	18	6	11	18	6	7	9
Fuel Used (gal)	21.3	7.7	28.9	13.2	5.6	28.1	31.8	44.4	32.8	43.0	256.9
HC Emissions (g)	2	1	1	2	1	4	2	3	2	2	19
CO Emissions (g)	966	390	367	757	254	736	623	915	506	555	6068
NOx Emissions (g)	6	3	4	7	2	9	6	12	6	7	63
Vehicles Entered	153	71	289	245	137	94	144	248	194	257	1832
Vehicles Exited	152	77	267	242	138	69	127	224	165	230	1691
Hourly Exit Rate	608	308	1068	968	552	276	508	896	660	920	6764
Input Volume	636	249	1560	1008	488	312	528	1013	775	1016	7585
% of Volume	96	124	68	96	113	88	96	88	85	91	89
Denied Entry Before	0	1	0	0	0	4	1	2	0	0	8
Denied Entry After	0	1	0	0	0	0	0	1	0	0	2

3: SR 421 & Taylor Branch Rd. Performance by movement

Total Delay (hr)	0.7	0.4	10.7	0.3	12.0
Delay / Veh (s)	3.8	7.7	52.0	31.2	27.4
Total Stops	0	0	603	34	637
Travel Dist (mi)	74.0	17.6	237.8	1.8	331.1
Travel Time (hr)	2.4	0.9	16.3	0.4	20.0
Avg Speed (mph)	31	19	16	5	18
Fuel Used (gal)	40.1	5.5	87.6	1.0	134.1
HC Emissions (g)	7	0	11	0	19
CO Emissions (g)	3043	145	3714	11	6912
NOx Emissions (g)	26	2	34	0	61
Vehicles Entered	633	164	770	34	1601
Vehicles Exited	644	164	715	33	1556
Hourly Exit Rate	2576	656	2860	132	6224
Input Volume	2640	653	3026	132	6451
% of Volume	98	100	95	100	96
Denied Entry Before	1	0	11	0	12
Denied Entry After	0	0	0	0	0

17: SR 421 & I-95 NB Ramps Performance by movement

Total Delay (hr)	0.9	3.3	10.2	1.8	0.7	1.0	18.0
Delay / Veh (s)	31.7	16.4	67.5	42.4	59.1	61.9	39.7
Total Stops	96	328	566	84	38	51	1163
Travel Dist (mi)	10.2	81.1	61.1	11.8	11.9	15.8	191.8
Travel Time (hr)	1.2	5.8	11.6	2.2	1.0	1.4	23.3
Avg Speed (mph)	9	15	5	7	12	11	9
Fuel Used (gal)	5.9	46.9	43.7	7.7	5.0	6.4	115.7
HC Emissions (g)	1	6	3	0	2	1	12
CO Emissions (g)	192	2195	1174	117	373	263	4315
NOx Emissions (g)	2	21	10	2	4	3	41
Vehicles Entered	103	733	557	158	43	57	1651
Vehicles Exited	100	729	535	154	46	57	1621
Hourly Exit Rate	400	2916	2140	616	184	228	6484
Input Volume	381	2986	2374	682	181	257	6861
% of Volume	105	98	90	90	102	89	95
Denied Entry Before	0	0	0	1	0	0	1
Denied Entry After	0	0	3	3	0	2	8

18: SR 421 & I-95 SB Ramps Performance by movement

Total Delay (hr)	4.4	0.3	0.8	8.7	4.5	2.4	21.1
Delay / Veh (s)	32.8	21.0	37.1	65.4	52.3	41.8	47.1
Total Stops	320	36	30	539	320	171	1416
Travel Dist (mi)	56.3	6.0	8.6	52.1	48.8	32.5	204.2
Travel Time (hr)	6.2	0.5	1.1	9.9	6.1	3.5	27.5
Avg Speed (mph)	9	11	8	5	8	9	7
Fuel Used (gal)	36.9	3.0	4.4	43.6	26.7	14.8	129.4
HC Emissions (g)	4	0	0	4	2	1	11
CO Emissions (g)	1444	66	116	1591	1155	626	4999
NOx Emissions (g)	14	1	1	15	7	3	39
Vehicles Entered	487	60	79	501	294	198	1619
Vehicles Exited	478	56	85	455	326	212	1612
Hourly Exit Rate	1912	224	340	1820	1304	848	6448
Input Volume	2163	294	321	2213	1210	819	7020
% of Volume	88	76	106	82	108	104	92
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0

Total Network Performance

Total Delay (hr)	100.0
Delay / Veh (s)	139.7
Total Stops	5558
Travel Dist (mi)	2494.3
Travel Time (hr)	170.4
Avg Speed (mph)	15
Fuel Used (gal)	1070.1
HC Emissions (g)	114
CO Emissions (g)	40353
NOx Emissions (g)	399
Vehicles Entered	2694
Vehicles Exited	2458
Hourly Exit Rate	9832
Input Volume	41688
% of Volume	24
Denied Entry Before	21
Denied Entry After	13

Intersection: 1: SR 421 & Williamson Blvd

Movement(s) Served	WBL	EBT	NBL	SBT	WBT	SBL	NBT
Maximum Green (s)	52.0	15.0	11.0	35.0	72.0	27.0	19.0
Minimum Green (s)	8.0	13.0	8.0	9.0	13.0	8.0	9.0
Recall	None	C-Min	None	None	C-Min	None	None
Avg. Green (s)	52.0	15.0	11.0	35.0	72.0	27.0	19.0
g/C Ratio	0.39	0.11	0.08	0.26	0.53	0.20	0.14
Cycles Skipped (%)	0	0	0	0	0	0	0
Cycles @ Minimum (%)	0	0	0	0	0	0	0
Cycles Maxed Out (%)	100	100	100	100	100	100	100
Cycles with Peds (%)	0	0	0	0	0	0	0

Average Cycle Length (s): 135.0
Number of Complete Cycles : 6

Intersection: 17: SR 421 & I-95 NB Ramps

Movement(s) Served	EBT	EBL	WBT	NBL
Maximum Green (s)	100.5	24.1	70.9	22.5
Minimum Green (s)	23.0	8.0	23.0	15.0
Recall	C-Min	None	C-Min	None
Avg. Green (s)	103.1	23.4	74.2	20.3
g/C Ratio	0.76	0.17	0.55	0.15
Cycles Skipped (%)	0	0	0	0
Cycles @ Minimum (%)	0	0	0	14
Cycles Maxed Out (%)	100	50	100	29
Cycles with Peds (%)	0	0	0	0

Average Cycle Length (s): 135.0
Number of Complete Cycles : 6

Intersection: 18: SR 421 & I-95 SB Ramps

Movement(s) Served	WBT	SBL	WBL	EBT
Maximum Green (s)	75.5	47.5	27.5	43.5
Minimum Green (s)	23.0	8.0	23.0	15.0
Recall	C-Min	None	Min	C-Min
Avg. Green (s)	75.5	47.5	26.2	45.0
g/C Ratio	0.56	0.35	0.19	0.33
Cycles Skipped (%)	0	0	0	0
Cycles @ Minimum (%)	0	0	29	0
Cycles Maxed Out (%)	100	100	57	100
Cycles with Peds (%)	0	0	0	0

Average Cycle Length (s): 135.0
Number of Complete Cycles : 6

SimTraffic Five-Run Average Report

Summary of All Intervals

Start Time	6:55	6:55	6:55	6:55	6:55	6:55
End Time	7:15	7:15	7:15	7:15	7:15	7:15
Total Time (min)	20	20	20	20	20	20
Time Recorded (min)	15	15	15	15	15	15
# of Intervals	2	2	2	2	2	2
# of Recorded Intvls	1	1	1	1	1	1
Vehs Entered	2737	2746	2676	2598	2611	2672
Vehs Exited	2363	2448	2329	2292	2333	2351
Starting Vehs	484	502	500	518	478	500
Ending Vehs	858	800	847	824	756	817
Denied Entry Before	34	11	15	16	6	17
Denied Entry After	5	11	12	15	17	14
Travel Distance (mi)	2423	2468	2367	2344	2403	2401
Travel Time (hr)	184.8	166.5	165.1	170.8	146.6	0.0
Total Delay (hr)	116.5	96.7	98.4	104.9	78.9	99.1
Total Stops	5928	5463	5242	5572	4336	5307
Fuel Used (gal)	1079.3	1050.2	1016.0	1021.9	982.3	1029.9

Interval #0 Information Seeding

Start Time	6:55
End Time	7:00
Total Time (min)	5

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	7:15
Total Time (min)	15

Volumes adjusted by Growth Factors.

Vehs Entered	2737	2746	2676	2598	2611	2672
Vehs Exited	2363	2448	2329	2292	2333	2351
Starting Vehs	484	502	500	518	478	500
Ending Vehs	858	800	847	824	756	817
Denied Entry Before	34	11	15	16	6	17
Denied Entry After	5	11	12	15	17	14
Travel Distance (mi)	2423	2468	2367	2344	2403	2401
Travel Time (hr)	184.8	166.5	165.1	170.8	146.6	0.0
Total Delay (hr)	116.5	96.7	98.4	104.9	78.9	99.1
Total Stops	5928	5463	5242	5572	4336	5307
Fuel Used (gal)	1079.3	1050.2	1016.0	1021.9	982.3	1029.9

Total Network Performance

Total Delay (hr)	99.1
Delay / Veh (s)	142.2
Total Stops	5307
Travel Dist (mi)	2400.9
Travel Time (hr)	0.0
Avg Speed (mph)	693
Fuel Used (gal)	1029.9
HC Emissions (g)	107
CO Emissions (g)	38535
NOx Emissions (g)	377
Vehicles Entered	2672
Vehicles Exited	2351
Hourly Exit Rate	9404
Input Volume	41688
% of Volume	23
Denied Entry Before	17
Denied Entry After	14

Intersection: 1: SR 421 & Williamson Blvd

Directions Served	T	T	T	T	R	L	L	T	T	R	L	L
Maximum Queue (ft)	198	216	523	321	225	555	560	296	204	106	280	324
Average Queue (ft)	126	150	221	228	151	549	548	143	127	41	210	238
95th Queue (ft)	219	231	624	363	270	559	560	399	298	104	349	377
Link Distance (ft)	1595	1595	1595	1595		536	536	536	536			
Upstream Blk Time (%)			0			28	29	0				
Queuing Penalty (veh)			0			215	220	1				
Storage Bay Dist (ft)					200					500	300	300
Storage Blk Time (%)				18	7						2	14
Queuing Penalty (veh)				46	12						4	37

Intersection: 1: SR 421 & Williamson Blvd

Directions Served	T	T	R	R	L	L	T	T	T	T
Maximum Queue (ft)	572	602	313	304	281	339	1590	1509	217	175
Average Queue (ft)	378	393	281	269	235	321	1264	1141	74	55
95th Queue (ft)	771	748	361	330	312	392	1944	1847	336	290
Link Distance (ft)	2744	2744					1744	1744	2790	2790
Upstream Blk Time (%)							11	5		
Queuing Penalty (veh)							0	0		
Storage Bay Dist (ft)			300	300	240	240				
Storage Blk Time (%)	4	5	3	2	23	38	54			
Queuing Penalty (veh)	12	46	7	5	115	195	422			

Intersection: 3: SR 421 & Taylor Branch Rd.

Directions Served	T	T	T	T	T	R	T
Maximum Queue (ft)	10	205	461	840	1034	130	33
Average Queue (ft)	1	42	99	232	306	87	8
95th Queue (ft)	14	194	424	775	928	186	61
Link Distance (ft)	544		1657	1657	1657	251	659
Upstream Blk Time (%)						3	
Queuing Penalty (veh)						0	
Storage Bay Dist (ft)		250					
Storage Blk Time (%)		2	7				
Queuing Penalty (veh)		15	55				

Intersection: 17: SR 421 & I-95 NB Ramps

Directions Served	L	L	T	T	T	T	T	T	T	T	TR	L
Maximum Queue (ft)	234	223	383	403	442	207	498	546	568	597	536	226
Average Queue (ft)	154	143	263	287	347	77	235	353	401	439	453	142
95th Queue (ft)	247	240	429	433	491	176	573	609	689	744	655	234
Link Distance (ft)	496	496	496	496	496	544	544	544	544	544		
Upstream Blk Time (%)							9	15	17	8	6	
Queuing Penalty (veh)							56	90	104	50	0	
Storage Bay Dist (ft)											500	330
Storage Blk Time (%)										1	12	
Queuing Penalty (veh)										10	48	

Intersection: 17: SR 421 & I-95 NB Ramps

Directions Served	R	R
Maximum Queue (ft)	131	150
Average Queue (ft)	87	103
95th Queue (ft)	147	167
Link Distance (ft)	1437	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		330
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 18: SR 421 & I-95 SB Ramps

Directions Served	T	T	T	T	TR	L	L	T	T	T	T	L
Maximum Queue (ft)	108	296	320	453	496	166	180	532	539	552	511	331
Average Queue (ft)	31	115	226	272	350	76	70	456	468	346	280	121
95th Queue (ft)	80	287	374	492	566	166	180	648	642	691	624	381
Link Distance (ft)		536	536	536	536	496	496	496	496	496	496	834
Upstream Blk Time (%)				0	1			32	34	6	1	
Queuing Penalty (veh)				0	3			133	142	26	3	
Storage Bay Dist (ft)	400											
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 18: SR 421 & I-95 SB Ramps

Directions Served	L	L	L	R	R
Maximum Queue (ft)	492	514	472	658	596
Average Queue (ft)	305	318	329	487	321
95th Queue (ft)	544	550	494	844	652
Link Distance (ft)	834	834	834	834	834
Upstream Blk Time (%)	0	0		3	0
Queuing Penalty (veh)	0	0		0	0
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 2074

Intersection: 1: SR 421 & Williamson Blvd

Movement(s) Served	WBL	EBT	NBL	SBT	WBT	SBL	NBT
Maximum Green (s)	52.0	15.0	11.0	35.0	72.0	27.0	19.0
Minimum Green (s)	8.0	13.0	8.0	9.0	13.0	8.0	9.0
Recall	None	C-Min	None	None	C-Min	None	None
Avg. Green (s)	52.0	15.0	11.0	35.0	72.0	27.0	19.0
g/C Ratio	0.39	0.11	0.08	0.26	0.53	0.20	0.14
Cycles Skipped (%)	0	0	0	0	0	0	0
Cycles @ Minimum (%)	0	0	0	0	0	0	0
Cycles Maxed Out (%)	100	100	100	100	100	100	100
Cycles with Peds (%)	0	0	0	0	0	0	0

Average Cycle Length (s): 135.0
Number of Complete Cycles : 6

Intersection: 17: SR 421 & I-95 NB Ramps

Movement(s) Served	EBT	EBL	WBT	NBL
Maximum Green (s)	100.5	24.1	70.9	22.5
Minimum Green (s)	23.0	8.0	23.0	15.0
Recall	C-Min	None	C-Min	None
Avg. Green (s)	103.0	23.0	74.5	24.0
g/C Ratio	0.76	0.17	0.55	0.18
Cycles Skipped (%)	0	0	0	0
Cycles @ Minimum (%)	0	0	0	0
Cycles Maxed Out (%)	100	50	100	33
Cycles with Peds (%)	0	0	0	0

Average Cycle Length (s): 135.0
Number of Complete Cycles : 6

Intersection: 18: SR 421 & I-95 SB Ramps

Movement(s) Served	WBT	SBL	WBL	EBT
Maximum Green (s)	75.5	47.5	27.5	43.5
Minimum Green (s)	23.0	8.0	23.0	15.0
Recall	C-Min	None	Min	C-Min
Avg. Green (s)	86.9	55.1	27.4	54.3
g/C Ratio	0.64	0.41	0.20	0.40
Cycles Skipped (%)	0	0	0	0
Cycles @ Minimum (%)	0	0	17	0
Cycles Maxed Out (%)	100	100	33	100
Cycles with Peds (%)	0	0	0	0

Average Cycle Length (s): 135.0
Number of Complete Cycles : 6

EVALUATION WITH PIONEER TRAIL/I-95 INTERCHANGE

Synchro HCS Printout

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	154	645	242	1327	992	518	302	521	850	803	1003	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	12	12
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	
Lane Util. Factor	0.97	0.91		0.97	*0.83	1.00	0.97	0.95	0.88	0.97	0.95	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3224	4912		3351	3123	1568	3319	3539	2814	3351	3478	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3224	4912		3351	3123	1568	3319	3539	2814	3351	3478	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	166	694	260	1427	1067	557	325	560	914	863	1078	237
RTOR Reduction (vph)	0	48	0	0	0	245	0	0	0	0	14	0
Lane Group Flow (vph)	166	906	0	1427	1067	312	325	560	914	863	1301	0
Heavy Vehicles (%)	5%	1%	2%	1%	1%	3%	2%	2%	1%	1%	1%	1%
Turn Type	Prot			Prot		Perm	Prot		pt+ov	Prot		
Protected Phases	5	2		1	6		3	8	8 1	7	4	
Permitted Phases						6						
Actuated Green, G (s)	9.0	24.0		44.0	59.0	59.0	11.0	23.0	72.0	27.0	39.0	
Effective Green, g (s)	9.0	24.0		44.0	59.0	59.0	11.0	23.0	67.0	27.0	39.0	
Actuated g/C Ratio	0.06	0.17		0.31	0.42	0.42	0.08	0.16	0.48	0.19	0.28	
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	207	842		1053	1316	661	261	581	1347	646	969	
v/s Ratio Prot	0.05	c0.18		c0.43	0.34		c0.10	0.16	0.32	0.26	c0.37	
v/s Ratio Perm						0.20						
v/c Ratio	0.80	1.08		1.36	0.81	0.47	1.25	0.96	0.68	1.34	1.34	
Uniform Delay, d1	64.6	58.0		48.0	35.6	29.2	64.5	58.1	28.2	56.5	50.5	
Progression Factor	1.00	1.00		0.75	0.69	0.30	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	19.6	53.5		160.4	0.4	0.3	138.3	29.4	1.4	161.5	161.3	
Delay (s)	84.2	111.5		196.3	24.8	8.9	202.8	87.5	29.6	218.0	211.8	
Level of Service	F	F		F	C	A	F	F	C	F	F	
Approach Delay (s)		107.5			102.1			78.9			214.3	
Approach LOS		F			F			E			F	

Intersection Summary

HCM Average Control Delay	127.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.28		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	117.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↱	↰	↑↑					↰↰		↱
Volume (vph)	0	2016	283	358	2169	0	0	0	0	1192	0	547
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	4.0	5.5	6.5					5.5		5.5
Lane Util. Factor		0.91	1.00	1.00	0.95					0.97		1.00
Frt		1.00	0.85	1.00	1.00					1.00		0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (prot)		5036	1599	1787	3505					3467		1599
Flt Permitted		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (perm)		5036	1599	1787	3505					3467		1599
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	2168	304	385	2332	0	0	0	0	1282	0	588
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	2168	304	385	2332	0	0	0	0	1282	0	588
Heavy Vehicles (%)	0%	3%	1%	1%	3%	0%	0%	0%	0%	1%	0%	1%
Turn Type			Free	Prot						Prot		custom
Protected Phases		6		5	2					3		3
Permitted Phases			Free									
Actuated Green, G (s)		51.5	140.0	28.5	84.5					43.5		43.5
Effective Green, g (s)		51.5	140.0	28.5	84.5					43.5		43.5
Actuated g/C Ratio		0.37	1.00	0.20	0.60					0.31		0.31
Clearance Time (s)		5.5		5.5	6.5					5.5		5.5
Vehicle Extension (s)		3.0		3.0	3.0					3.0		3.0
Lane Grp Cap (vph)		1853	1599	364	2116					1077		497
v/s Ratio Prot		c0.43		0.22	c0.67					c0.37		0.37
v/s Ratio Perm			0.19									
v/c Ratio		1.17	0.19	1.06	1.10					1.19		1.18
Uniform Delay, d1		44.2	0.0	55.8	27.8					48.2		48.2
Progression Factor		0.80	1.00	1.29	0.24					1.00		1.00
Incremental Delay, d2		77.1	0.0	48.8	50.1					95.1		101.4
Delay (s)		112.5	0.0	120.5	56.7					143.3		149.7
Level of Service		F	A	F	E					F		F
Approach Delay (s)		98.7			65.8			0.0			145.3	
Approach LOS		F			E			A			F	

Intersection Summary

HCM Average Control Delay	98.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	106.5%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	300	2908	0	0	2325	665	202	0	287	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	6.5			6.5	4.0	5.5		5.5			
Lane Util. Factor	0.97	0.91			0.91	1.00	1.00		0.88			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	3467	5085			5085	1583	1687		2787			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	3467	5085			5085	1583	1687		2787			
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	323	3127	0	0	2500	715	217	0	309	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	323	3127	0	0	2500	715	217	0	309	0	0	0
Heavy Vehicles (%)	1%	2%	0%	0%	2%	2%	7%	0%	2%	0%	0%	0%
Turn Type	Prot					Free	Prot		custom			
Protected Phases	5	2			6		8		8			
Permitted Phases						Free						
Actuated Green, G (s)	17.5	102.5			79.5	140.0	25.5		25.5			
Effective Green, g (s)	17.5	102.5			79.5	140.0	25.5		25.5			
Actuated g/C Ratio	0.12	0.73			0.57	1.00	0.18		0.18			
Clearance Time (s)	5.5	6.5			6.5		5.5		5.5			
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)	433	3723			2888	1583	307		508			
v/s Ratio Prot	0.09	c0.61			0.49		c0.13		0.11			
v/s Ratio Perm						0.45						
v/c Ratio	0.75	0.84			0.87	0.45	0.71		0.61			
Uniform Delay, d1	59.1	13.0			25.7	0.0	53.7		52.7			
Progression Factor	0.45	0.95			1.00	1.00	1.00		1.00			
Incremental Delay, d2	0.7	0.2			3.8	0.9	12.9		5.3			
Delay (s)	27.2	12.6			29.5	0.9	66.6		58.0			
Level of Service	C	B			C	A	E		E			
Approach Delay (s)		14.0			23.1			61.6			0.0	
Approach LOS		B			C			E			A	

Intersection Summary

HCM Average Control Delay	21.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	106.5%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations	↑↑↑	↱		↑↑↑↑		↱
Volume (veh/h)	2562	633	0	2990	0	131
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	2755	681	0	3215	0	141
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	633					
pX, platoon unblocked			0.58		0.58	0.58
vC, conflicting volume			2755		3559	918
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1474		2868	0
tC, single (s)			4.3		6.8	7.1
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.4
p0 queue free %			100		100	77
cM capacity (veh/h)			245		8	609

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4	NW 1
Volume Total	918	918	918	681	804	804	804	804	141
Volume Left	0	0	0	0	0	0	0	0	0
Volume Right	0	0	0	681	0	0	0	0	141
cSH	1700	1700	1700	1700	1700	1700	1700	1700	609
Volume to Capacity	0.54	0.54	0.54	0.40	0.47	0.47	0.47	0.47	0.23
Queue Length 95th (ft)	0	0	0	0	0	0	0	0	22
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.7
Lane LOS									B
Approach Delay (s)	0.0				0.0				12.7
Approach LOS									B

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		

Synchro Queue Report

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	166	954	1427	1067	557	325	560	914	863	1315
v/c Ratio	0.80	1.07	1.36	0.81	0.61	1.25	0.96	0.63	1.34	1.34
Control Delay	91.5	102.0	191.6	25.3	3.6	189.1	87.1	26.9	204.5	197.9
Queue Delay	0.0	13.0	0.0	0.1	0.2	0.0	0.0	3.3	0.0	0.0
Total Delay	91.5	115.1	191.6	25.4	3.8	189.1	87.1	30.2	204.5	197.9
Queue Length 50th (ft)	78	~335	~874	439	28	~189	270	331	~525	~816
Queue Length 95th (ft)	#138	#431	m#727	m360	m25	#289	#388	409	#656	#958
Internal Link Dist (ft)		1569		280			2748			1756
Turn Bay Length (ft)	450					300		300	240	
Base Capacity (vph)	207	890	1053	1316	906	261	581	1447	646	983
Starvation Cap Reductn	0	0	0	17	48	0	0	0	0	0
Spillback Cap Reductn	0	26	0	0	0	0	0	419	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.80	1.10	1.36	0.82	0.65	1.25	0.96	0.89	1.34	1.34

Intersection Summary

~ 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.

Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	2168	304	385	2332	1282	588
v/c Ratio	1.17	0.19	1.06	1.10	1.19	1.18
Control Delay	110.4	0.0	114.3	60.9	137.1	143.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	110.4	0.0	114.3	60.9	137.1	143.6
Queue Length 50th (ft)	~859	0	~373	~1273	~724	~642
Queue Length 95th (ft)	m#735	m0	m#490	#1378	#861	#874
Internal Link Dist (ft)	273			477		
Turn Bay Length (ft)		200				
Base Capacity (vph)	1853	1599	364	2116	1077	497
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.17	0.19	1.06	1.10	1.19	1.18

Intersection Summary

~ 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.

Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	323	3127	2500	715	217	309
v/c Ratio	0.75	0.84	0.87	0.45	0.71	0.61
Control Delay	27.9	13.0	29.9	0.9	67.4	58.4
Queue Delay	0.0	6.0	0.0	0.0	0.0	0.0
Total Delay	27.9	19.0	29.9	0.9	67.4	58.4
Queue Length 50th (ft)	161	402	682	0	188	148
Queue Length 95th (ft)	m134	m342	752	0	282	205
Internal Link Dist (ft)		477	553			
Turn Bay Length (ft)	650				330	330
Base Capacity (vph)	433	3723	2888	1583	307	508
Starvation Cap Reductn	0	565	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.99	0.87	0.45	0.71	0.61

Intersection Summary

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

SimTraffic Single-Run Report

Summary of All Intervals

Start Time	6:55
End Time	7:15
Total Time (min)	20
Time Recorded (min)	15
# of Intervals	2
# of Recorded Intvls	1
Vehs Entered	2504
Vehs Exited	2063
Starting Vehs	531
Ending Vehs	972
Denied Entry Before	23
Denied Entry After	108
Travel Distance (mi)	2255
Travel Time (hr)	204.4
Total Delay (hr)	140.8
Total Stops	6712
Fuel Used (gal)	107.1

Interval #0 Information Seeding

Start Time	6:55
End Time	7:00
Total Time (min)	5

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	7:15
Total Time (min)	15

Volumes adjusted by Growth Factors.

Vehs Entered	2504
Vehs Exited	2063
Starting Vehs	531
Ending Vehs	972
Denied Entry Before	23
Denied Entry After	108
Travel Distance (mi)	2255
Travel Time (hr)	204.4
Total Delay (hr)	140.8
Total Stops	6712
Fuel Used (gal)	107.1

1: SR 421 & Williamson Blvd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.8	8.1	5.1	6.3	1.4	0.2	2.5	4.1	4.2	10.6	9.2	1.8
Delay / Veh (s)	85.7	183.7	318.5	107.6	30.1	8.0	128.2	108.8	72.5	226.4	168.3	146.6
St Del/Veh (s)	74.2	159.0	289.5	96.9	22.0	5.9	117.4	93.6	54.4	192.3	136.0	119.0
Total Stops	39	349	200	246	91	45	99	172	249	448	454	93
Travel Dist (mi)	9.9	48.4	18.1	19.0	15.4	9.3	39.5	74.8	116.7	58.5	67.5	15.0
Travel Time (hr)	1.0	9.2	5.6	7.0	1.8	0.6	3.7	6.3	7.8	12.4	11.1	2.3
Avg Speed (mph)	10	5	3	3	9	15	11	13	17	5	6	6
Vehicles Entered	34	165	66	221	165	98	78	140	228	183	219	50
Vehicles Exited	32	152	50	201	175	100	62	131	192	155	174	40
Hourly Exit Rate	128	608	200	804	700	400	248	524	768	620	696	160
Input Volume	154	645	242	1327	1004	518	302	521	850	803	1003	220
% of Volume	83	94	83	61	70	77	82	101	90	77	69	73
Denied Entry Before	1	1	1	0	0	0	0	0	1	0	0	0
Denied Entry After	0	0	0	0	0	0	0	1	1	0	0	0

1: SR 421 & Williamson Blvd Performance by movement

Movement	All
Total Delay (hr)	54.3
Delay / Veh (s)	125.8
St Del/Veh (s)	106.7
Total Stops	2485
Travel Dist (mi)	492.0
Travel Time (hr)	68.8
Avg Speed (mph)	7
Vehicles Entered	1647
Vehicles Exited	1464
Hourly Exit Rate	5856
Input Volume	7589
% of Volume	77
Denied Entry Before	4
Denied Entry After	2

3: SR 421 & Taylor Branch Rd. Performance by movement

Movement	NBT	NBR	SBT	NWR	All
Total Delay (hr)	0.4	0.3	31.6	0.2	32.6
Delay / Veh (s)	3.0	6.9	197.8	19.9	91.5
St Del/Veh (s)	0.2	0.0	160.9	19.7	72.9
Total Stops	0	0	1225	37	1262
Travel Dist (mi)	61.0	15.1	179.6	2.0	257.7
Travel Time (hr)	1.9	0.8	35.9	0.3	38.8
Avg Speed (mph)	32	20	7	7	9
Vehicles Entered	530	142	633	37	1342
Vehicles Exited	526	140	519	37	1222
Hourly Exit Rate	2104	560	2076	148	4888
Input Volume	2613	633	2990	131	6367
% of Volume	81	88	69	113	77
Denied Entry Before	0	0	13	0	13
Denied Entry After	0	0	100	0	100

17: SR 421 & I-95 NB Ramps Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBR	All
Total Delay (hr)	0.3	2.0	8.1	0.3	1.0	1.1	12.9
Delay / Veh (s)	20.3	12.6	69.4	11.4	93.0	54.6	36.2
St Del/Veh (s)	14.3	6.2	53.9	2.4	87.3	50.6	26.8
Total Stops	49	210	501	5	45	62	872
Travel Dist (mi)	6.7	63.0	46.4	8.3	11.2	19.7	155.3
Travel Time (hr)	0.6	3.8	9.1	0.6	1.3	1.6	17.0
Avg Speed (mph)	12	17	5	14	9	13	9
Vehicles Entered	65	570	417	109	41	73	1275
Vehicles Exited	58	596	422	111	38	70	1295
Hourly Exit Rate	232	2384	1688	444	152	280	5180
Input Volume	300	2919	2355	665	202	287	6728
% of Volume	77	82	72	67	75	98	77
Denied Entry Before	0	0	1	0	1	0	2
Denied Entry After	0	0	1	0	0	0	1

18: SR 421 & I-95 SB Ramps Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBT	SBR	All
Total Delay (hr)	5.8	0.5	4.1	6.9	3.9	0.0	1.5	22.7
Delay / Veh (s)	49.9	25.9	167.4	68.8	63.6	5.3	57.8	65.3
St Del/Veh (s)	40.9	19.0	152.2	52.6	60.6	0.4	53.5	55.3
Total Stops	266	29	154	414	110	1	50	1024
Travel Dist (mi)	26.9	3.3	9.5	38.7	7.4	0.1	3.3	89.2
Travel Time (hr)	6.4	0.5	4.4	7.9	4.2	0.0	1.7	25.2
Avg Speed (mph)	4	6	2	5	2	12	2	4
Vehicles Entered	417	64	89	368	225	3	98	1264
Vehicles Exited	420	62	87	358	216	3	95	1241
Hourly Exit Rate	1680	248	348	1432	864	12	380	4964
Input Volume	2022	283	358	2177	1192	18	547	6597
% of Volume	83	88	97	66	72	67	69	75
Denied Entry Before	1	0	0	1	2	0	0	4
Denied Entry After	0	0	0	0	3	0	0	3

Total Zone Performance

Total Delay (hr)	122.5
Delay / Veh (s)	2464.6
St Del/Veh (s)	2028.1
Total Stops	5643
Travel Dist (mi)	994.2
Travel Time (hr)	149.8
Avg Speed (mph)	7
Vehicles Entered	1488
Vehicles Exited	26
Hourly Exit Rate	104
Input Volume	27281
% of Volume	0
Denied Entry Before	23
Denied Entry After	106

SimTraffic Five-Run Average Report

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:55	6:55	6:55	6:55	6:55	6:55
End Time	7:15	7:15	7:15	7:15	7:15	7:15
Total Time (min)	20	20	20	20	20	20
Time Recorded (min)	15	15	15	15	15	15
# of Intervals	2	2	2	2	2	2
# of Recorded Intvls	1	1	1	1	1	1
Vehs Entered	2488	2504	2525	2422	2455	2479
Vehs Exited	2037	2050	2067	1993	1965	2022
Starting Vehs	520	540	508	520	542	526
Ending Vehs	971	994	966	949	1032	980
Denied Entry Before	6	5	10	6	10	6
Denied Entry After	47	133	142	198	114	126
Travel Distance (mi)	2232	2264	2248	2201	2148	2219
Travel Time (hr)	198.6	209.9	198.0	204.7	211.5	204.5
Total Delay (hr)	135.5	145.8	134.3	142.6	150.9	141.8
Total Stops	6913	6959	6466	6516	6805	6732
Fuel Used (gal)	105.7	108.9	105.5	105.9	105.8	106.4

Interval #0 Information Seeding

Start Time	6:55
End Time	7:00
Total Time (min)	5

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	7:15
Total Time (min)	15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2488	2504	2525	2422	2455	2479
Vehs Exited	2037	2050	2067	1993	1965	2022
Starting Vehs	520	540	508	520	542	526
Ending Vehs	971	994	966	949	1032	980
Denied Entry Before	6	5	10	6	10	6
Denied Entry After	47	133	142	198	114	126
Travel Distance (mi)	2232	2264	2248	2201	2148	2219
Travel Time (hr)	198.6	209.9	198.0	204.7	211.5	204.5
Total Delay (hr)	135.5	145.8	134.3	142.6	150.9	141.8
Total Stops	6913	6959	6466	6516	6805	6732
Fuel Used (gal)	105.7	108.9	105.5	105.9	105.8	106.4

Total Zone Performance By Run

Run Number	1	2	3	4	5	Avg
Total Delay (hr)	103.9	115.7	108.7	120.2	123.4	114.4
Delay / Veh (s)	2945.3	2686.3	2717.7	2865.5	2057.4	2606.2
St Del/Veh (s)	2346.4	2199.7	2236.3	2380.5	1718.9	2141.4
Total Stops	5242	5433	5087	5337	5435	5308
Travel Dist (mi)	974.0	992.8	985.1	953.8	963.8	973.9
Travel Time (hr)	130.6	142.9	135.7	146.3	149.7	141.0
Avg Speed (mph)	8	7	8	7	7	7
Vehicles Entered	1447	1481	1498	1376	1490	1458
Vehicles Exited	32	31	33	35	30	32
Hourly Exit Rate	128	124	132	140	120	128
Input Volume	27281	27281	27281	27281	27281	27281
% of Volume	0	0	0	1	0	0
Denied Entry Before	6	5	10	6	10	6
Denied Entry After	47	131	138	197	100	123

Intersection: 1: SR 421 & Williamson Blvd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	TR	L	L	T	T	R	L	L
Maximum Queue (ft)	128	284	930	969	250	489	459	473	192	189	261	284
Average Queue (ft)	81	117	584	717	249	488	376	238	146	66	201	213
95th Queue (ft)	137	340	1160	1296	251	493	488	452	201	152	316	331
Link Distance (ft)			1594	1594		248	248	248	248	248		
Upstream Blk Time (%)			0	1		43	48	0	0			
Queuing Penalty (veh)			0	0		245	272	0	0			
Storage Bay Dist (ft)	450	450			200						300	300
Storage Blk Time (%)			12	20	72						0	1
Queuing Penalty (veh)			19	92	155						1	2

Intersection: 1: SR 421 & Williamson Blvd

Movement	NB	NB	NB	NB	SB	SB	SB	SB	B14	B14
Directions Served	T	T	R	R	L	L	T	TR	T	T
Maximum Queue (ft)	366	462	305	306	290	340	1825	1821	1362	1328
Average Queue (ft)	228	278	233	226	256	323	1615	1478	461	441
95th Queue (ft)	353	466	342	320	337	395	2179	2255	1349	1344
Link Distance (ft)	2762	2762					1748	1748	2790	2790
Upstream Blk Time (%)							34	23		
Queuing Penalty (veh)							0	0		
Storage Bay Dist (ft)			300	300	240	240				
Storage Blk Time (%)	1	1	3	3	20	47	49			
Queuing Penalty (veh)	2	11	9	7	102	236	390			

Intersection: 3: SR 421 & Taylor Branch Rd.

Movement	SB	SB	SB	SB	NW
Directions Served	T	T	T	T	R
Maximum Queue (ft)	202	1671	1679	1673	87
Average Queue (ft)	97	1057	1126	1061	55
95th Queue (ft)	291	1963	1940	1990	95
Link Distance (ft)		1657	1657	1657	251
Upstream Blk Time (%)		14	16	14	
Queuing Penalty (veh)		0	0	0	
Storage Bay Dist (ft)	250				
Storage Blk Time (%)	2	8			
Queuing Penalty (veh)	13	58			

Intersection: 17: SR 421 & I-95 NB Ramps

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	T	T	T	T	R	L	R	R
Maximum Queue (ft)	128	129	297	302	327	584	602	573	114	338	501	185
Average Queue (ft)	83	82	254	260	290	364	534	557	16	230	200	118
95th Queue (ft)	137	134	338	344	381	626	658	574	126	392	496	190
Link Distance (ft)			491	491	491	545	545	545	545		1439	
Upstream Blk Time (%)						6	20	57				
Queuing Penalty (veh)						45	150	424				
Storage Bay Dist (ft)	650	650								330		330
Storage Blk Time (%)										12		
Queuing Penalty (veh)										34		

Intersection: 18: SR 421 & I-95 SB Ramps

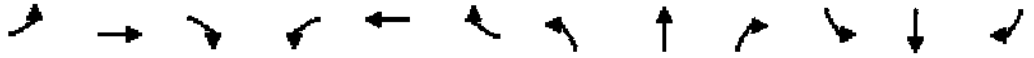
Movement	EB	EB	EB	WB	WB	WB	SB	SB	SB
Directions Served	T	T	T	L	T	T	L	L	R
Maximum Queue (ft)	363	370	360	402	515	523	195	198	206
Average Queue (ft)	358	359	350	240	466	504	191	192	193
95th Queue (ft)	376	376	392	424	605	553	202	201	204
Link Distance (ft)	123	123	123	491	491	491	54	54	54
Upstream Blk Time (%)	43	42	48	0	14	29	69	70	70
Queuing Penalty (veh)	328	324	365	4	116	241	402	409	409
Storage Bay Dist (ft)									
Storage Blk Time (%)			48						
Queuing Penalty (veh)			135						

Zone Summary

Zone wide Queuing Penalty: 4999

EVALUATION WITH MADELINE AVENUE EXTENSION

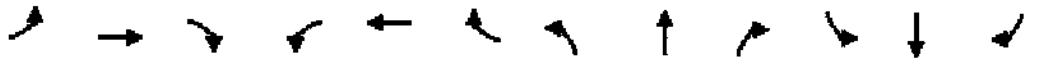
Synchro HCS Printout



Lane Configurations												
Volume (vph)	154	593	249	1560	912	481	312	528	1013	763	1016	189
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	12	12
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	
Lane Util. Factor	0.97	0.91		0.97	*0.83	1.00	0.97	0.95	0.88	0.97	0.95	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3224	4893		3351	3123	1568	3319	3539	2814	3351	3490	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3224	4893		3351	3123	1568	3319	3539	2814	3351	3490	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	166	638	268	1677	981	517	335	568	1089	820	1092	203
RTOR Reduction (vph)	0	50	0	0	0	245	0	0	0	0	10	0
Lane Group Flow (vph)	166	856	0	1677	981	272	335	568	1089	820	1285	0
Heavy Vehicles (%)	5%	1%	2%	1%	1%	3%	2%	2%	1%	1%	1%	1%
Turn Type	Prot			Prot		Perm	Prot		pt+ov	Prot		
Protected Phases	5	2		1	6		3	8	8 1	7	4	
Permitted Phases						6						
Actuated Green, G (s)	15.4	24.0		48.0	56.6	56.6	13.0	26.0	74.0	30.0	43.0	
Effective Green, g (s)	15.4	24.0		48.0	56.6	56.6	13.0	26.0	74.0	30.0	43.0	
Actuated g/C Ratio	0.10	0.16		0.32	0.38	0.38	0.09	0.17	0.49	0.20	0.29	
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	331	783		1072	1178	592	288	613	1388	670	1000	
v/s Ratio Prot	0.05	c0.17		c0.50	0.31		c0.10	0.16	0.39	0.24	c0.37	
v/s Ratio Perm						0.17						
v/c Ratio	0.50	1.09		1.56	0.83	0.46	1.16	0.93	0.78	1.22	1.29	
Uniform Delay, d1	63.7	63.0		51.0	42.4	35.2	68.5	61.1	31.4	60.0	53.5	
Progression Factor	1.00	1.00		0.77	0.76	0.32	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.2	60.4		256.7	3.2	0.4	104.7	22.2	3.0	113.8	135.9	
Delay (s)	64.9	123.4		295.8	35.4	11.6	173.2	83.2	34.4	173.8	189.4	
Level of Service	E	F		F	D	B	F	F	C	F	F	
Approach Delay (s)		114.4			169.0			71.7			183.3	
Approach LOS		F			F			E			F	

HCM Average Control Delay	142.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.34		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	122.9%	ICU Level of Service	H
Analysis Period (min)	15		

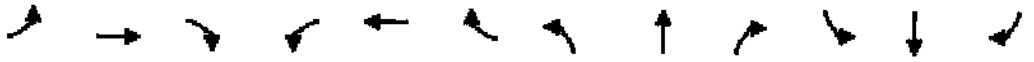
c Critical Lane Group



Lane Configurations		↑↑↑	↱	↰	↑↑					↰↰		↱
Volume (vph)	0	2100	269	321	2154	0	0	0	0	1200	0	669
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	4.0	5.5	6.5					5.5		5.5
Lane Util. Factor		0.91	1.00	1.00	0.95					0.97		1.00
Frt		1.00	0.85	1.00	1.00					1.00		0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (prot)		5036	1599	1787	3505					3467		1599
Flt Permitted		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (perm)		5036	1599	1787	3505					3467		1599
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	2258	289	345	2316	0	0	0	0	1290	0	719
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	2258	289	345	2316	0	0	0	0	1290	0	719
Heavy Vehicles (%)	0%	3%	1%	1%	3%	0%	0%	0%	0%	1%	0%	1%
Turn Type			Free	Prot						Prot		custom
Protected Phases		6		5	2					3		3
Permitted Phases			Free									
Actuated Green, G (s)		47.5	150.0	31.5	83.5					54.5		54.5
Effective Green, g (s)		47.5	150.0	31.5	83.5					54.5		54.5
Actuated g/C Ratio		0.32	1.00	0.21	0.56					0.36		0.36
Clearance Time (s)		5.5		5.5	6.5					5.5		5.5
Vehicle Extension (s)		3.0		3.0	3.0					3.0		3.0
Lane Grp Cap (vph)		1595	1599	375	1951					1260		581
v/s Ratio Prot		c0.45		0.19	c0.66					0.37		c0.45
v/s Ratio Perm			0.18									
v/c Ratio		1.42	0.18	0.92	1.19					1.02		1.24
Uniform Delay, d1		51.2	0.0	58.0	33.2					47.8		47.8
Progression Factor		0.89	1.00	1.32	0.33					1.00		1.00
Incremental Delay, d2		187.4	0.0	18.6	87.2					31.6		121.1
Delay (s)		232.9	0.0	94.9	98.2					79.3		168.9
Level of Service		F	A	F	F					E		F
Approach Delay (s)		206.5			97.8			0.0			111.4	
Approach LOS		F			F			A			F	

HCM Average Control Delay	139.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.33		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	111.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group



Lane Configurations												
Volume (vph)	371	2919	0	0	2284	682	181	0	257	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	6.5			6.5	4.0	5.5		5.5			
Lane Util. Factor	0.97	0.91			0.91	1.00	1.00		0.88			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	3467	5085			5085	1583	1687		2787			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	3467	5085			5085	1583	1687		2787			
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	399	3139	0	0	2456	733	195	0	276	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	399	3139	0	0	2456	733	195	0	276	0	0	0
Heavy Vehicles (%)	1%	2%	0%	0%	2%	2%	7%	0%	2%	0%	0%	0%
Turn Type	Prot					Free	Prot		custom			
Protected Phases	5	2			6		8		8			
Permitted Phases						Free						
Actuated Green, G (s)	23.0	114.0			85.5	150.0	24.0		24.0			
Effective Green, g (s)	23.0	114.0			85.5	150.0	24.0		24.0			
Actuated g/C Ratio	0.15	0.76			0.57	1.00	0.16		0.16			
Clearance Time (s)	5.5	6.5			6.5		5.5		5.5			
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)	532	3865			2898	1583	270		446			
v/s Ratio Prot	0.12	c0.62			0.48		c0.12		0.10			
v/s Ratio Perm						0.46						
v/c Ratio	0.75	0.81			0.85	0.46	0.72		0.62			
Uniform Delay, d1	60.7	11.3			26.8	0.0	59.8		58.7			
Progression Factor	0.61	0.94			1.00	1.00	1.00		1.00			
Incremental Delay, d2	0.6	0.1			3.3	1.0	15.4		6.3			
Delay (s)	37.4	10.7			30.1	1.0	75.3		65.1			
Level of Service	D	B			C	A	E		E			
Approach Delay (s)		13.7			23.4			69.3			0.0	
Approach LOS		B			C			E			A	

HCM Average Control Delay	21.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	111.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lane Configurations	↑↑↑	↱		↑↑↑↑		↱
Volume (veh/h)	2533	643	0	2966	0	132
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	2724	691	0	3189	0	142
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	633					
pX, platoon unblocked			0.62		0.62	0.62
vC, conflicting volume			2724		3521	908
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1625		2916	0
tC, single (s)			4.3		6.8	7.1
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.4
p0 queue free %			100		100	78
cM capacity (veh/h)			228		8	652

Volume Total	908	908	908	691	797	797	797	797	142
Volume Left	0	0	0	0	0	0	0	0	0
Volume Right	0	0	0	691	0	0	0	0	142
cSH	1700	1700	1700	1700	1700	1700	1700	1700	652
Volume to Capacity	0.53	0.53	0.53	0.41	0.47	0.47	0.47	0.47	0.22
Queue Length 95th (ft)	0	0	0	0	0	0	0	0	21
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0
Lane LOS									B
Approach Delay (s)	0.0				0.0				12.0
Approach LOS									B

Average Delay	0.3		
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		

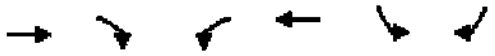
Synchro Queue Report

Lane Group Flow (vph)	166	906	1677	981	517	335	568	1089	820	1295
v/c Ratio	0.50	1.09	1.56	0.83	0.62	1.16	0.93	0.80	1.22	1.28
Control Delay	70.6	110.9	283.3	34.2	11.9	162.1	82.9	22.0	162.7	177.0
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.6	110.9	283.3	34.4	11.9	162.1	82.9	22.0	162.7	177.0
Queue Length 50th (ft)	81	~345	~920	401	36	~200	292	244	~507	~842
Queue Length 95th (ft)	#141	#441	m519	m260	m20	#304	#402	312	#638	#984
Internal Link Dist (ft)		1569		280			2748			1756
Turn Bay Length (ft)	450					300		300	240	
Base Capacity (vph)	331	834	1072	1291	879	288	613	1369	670	1010
Starvation Cap Reductn	0	0	0	31	12	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	0.50	1.09	1.56	0.78	0.60	1.16	0.93	0.80	1.22	1.28

~ 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.



Lane Group Flow (vph)	2258	289	345	2316	1290	719
v/c Ratio	1.42	0.18	0.92	1.19	1.02	1.24
Control Delay	222.6	0.0	93.5	102.8	78.1	161.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	222.6	0.0	93.5	102.8	78.1	161.5
Queue Length 50th (ft)	~1096	0	288	~1430	~690	~869
Queue Length 95th (ft)	m#997	m0	m#432	#1518	#827	#1119
Internal Link Dist (ft)	273			477		
Turn Bay Length (ft)		200				
Base Capacity (vph)	1595	1599	375	1951	1260	581
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.42	0.18	0.92	1.19	1.02	1.24

~ 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.

Lane Group Flow (vph)	399	3139	2456	733	195	276
v/c Ratio	0.75	0.81	0.85	0.46	0.72	0.62
Control Delay	37.7	10.9	30.5	1.0	76.4	66.1
Queue Delay	0.0	6.1	0.0	0.0	1.4	0.0
Total Delay	37.7	17.0	30.5	1.0	77.8	66.1
Queue Length 50th (ft)	213	291	707	0	186	147
Queue Length 95th (ft)	m149	m238	773	0	#305	203
Internal Link Dist (ft)		477	553			
Turn Bay Length (ft)	650				330	330
Base Capacity (vph)	566	3915	2898	1583	270	446
Starvation Cap Reductn	0	743	0	0	0	0
Spillback Cap Reductn	0	0	15	0	14	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.99	0.85	0.46	0.76	0.62

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.

SimTraffic Single-Run Report

Summary of All Intervals

Start Time	6:55
End Time	7:15
Total Time (min)	20
Time Recorded (min)	15
# of Intervals	2
# of Recorded Intvls	1
Vehs Entered	2339
Vehs Exited	1780
Starting Vehs	557
Ending Vehs	1116
Denied Entry Before	31
Denied Entry After	482
Travel Distance (mi)	1905
Travel Time (hr)	261.7
Total Delay (hr)	207.8
Total Stops	6266
Fuel Used (gal)	1096.9

Interval #0 Information Seeding

Start Time	6:55
End Time	7:00
Total Time (min)	5

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	7:15
Total Time (min)	15

Volumes adjusted by Growth Factors.

Vehs Entered	2339
Vehs Exited	1780
Starting Vehs	557
Ending Vehs	1116
Denied Entry Before	31
Denied Entry After	482
Travel Distance (mi)	1905
Travel Time (hr)	261.7
Total Delay (hr)	207.8
Total Stops	6266
Fuel Used (gal)	1096.9

1: SR 421 & Williamson Blvd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.6	3.5	2.3	21.7	9.9	3.4	3.5	2.9	5.4	15.2	9.8	1.0
Delay / Veh (s)	49.1	96.2	145.9	583.0	423.1	288.0	161.8	87.6	78.7	540.5	180.9	146.6
Total Stops	31	147	106	268	75	38	131	129	377	408	427	41
Travel Dist (mi)	12.9	40.1	18.7	11.8	7.6	4.0	44.0	62.8	132.7	33.1	67.8	7.8
Travel Time (hr)	0.9	4.5	2.8	22.1	10.0	3.6	4.8	4.8	9.5	16.2	11.8	1.3
Avg Speed (mph)	15	9	7	1	4	9	10	14	15	2	6	6
Fuel Used (gal)	5.1	19.4	9.9	53.7	25.5	9.0	20.1	24.8	48.4	43.5	41.7	4.4
HC Emissions (g)	1	1	1	0	1	3	1	3	3	0	2	0
CO Emissions (g)	237	707	388	286	256	399	298	710	866	289	574	38
NOx Emissions (g)	2	4	3	1	2	2	3	9	11	2	7	0
Vehicles Entered	42	136	61	143	80	43	86	113	253	125	203	24
Vehicles Exited	45	128	54	125	88	43	71	126	243	77	189	26
Hourly Exit Rate	180	512	216	500	352	172	284	504	972	308	756	104
Input Volume	154	593	249	1560	912	481	312	528	1013	763	1016	189
% of Volume	117	86	87	32	39	36	91	95	96	40	74	55
Denied Entry Before	0	0	1	15	7	1	0	0	1	0	0	0
Denied Entry After	0	0	0	91	57	24	5	2	11	0	0	0

1: SR 421 & Williamson Blvd Performance by movement

Movement	All
Total Delay (hr)	79.3
Delay / Veh (s)	226.3
Total Stops	2178
Travel Dist (mi)	443.3
Travel Time (hr)	92.3
Avg Speed (mph)	7
Fuel Used (gal)	305.5
HC Emissions (g)	16
CO Emissions (g)	5047
NOx Emissions (g)	47
Vehicles Entered	1309
Vehicles Exited	1215
Hourly Exit Rate	4860
Input Volume	7770
% of Volume	63
Denied Entry Before	25
Denied Entry After	190

3: SR 421 & Taylor Branch Rd. Performance by movement

Movement	NBT	NBR	SB	NWB	All
Total Delay (hr)	0.5	0.2	45.9	0.1	46.8
Delay / Veh (s)	3.6	6.7	376.6	11.6	152.5
Total Stops	0	0	1033	35	1068
Travel Dist (mi)	59.3	11.6	139.9	2.0	212.8
Travel Time (hr)	1.9	0.6	49.2	0.2	51.9
Avg Speed (mph)	31	20	4	9	6
Fuel Used (gal)	29.4	3.5	140.8	0.6	174.2
HC Emissions (g)	6	0	13	0	19
CO Emissions (g)	2289	96	3134	26	5545
NOx Emissions (g)	19	1	28	0	49
Vehicles Entered	520	108	524	37	1189
Vehicles Exited	521	108	354	36	1019
Hourly Exit Rate	2084	432	1416	144	4076
Input Volume	2584	643	2966	132	6325
% of Volume	81	67	48	109	64
Denied Entry Before	0	0	3	0	3
Denied Entry After	0	0	229	0	229

5: I-95 SB Ramps & Performance by movement

Movement	SBL	SBT	All
Total Delay (hr)	13.8	0.4	14.3
Delay / Veh (s)	135.3	94.5	133.3
Total Stops	541	20	561
Travel Dist (mi)	70.5	3.0	73.5
Travel Time (hr)	16.3	0.5	16.8
Avg Speed (mph)	4	6	5
Fuel Used (gal)	51.7	2.3	54.0
HC Emissions (g)	2	0	2
CO Emissions (g)	804	52	856
NOx Emissions (g)	7	0	8
Vehicles Entered	414	19	433
Vehicles Exited	323	14	337
Hourly Exit Rate	1292	56	1348
Input Volume	1869	130	1999
% of Volume	69	43	67
Denied Entry Before	1	0	1
Denied Entry After	38	1	39

6: SR 421 & Performance by movement

Movement	EBT	WBT	SWR	All
Total Delay (hr)	4.2	2.3	0.1	6.6
Delay / Veh (s)	33.7	26.5	32.7	30.8
Total Stops	245	109	8	362
Travel Dist (mi)	28.3	10.4	0.8	39.5
Travel Time (hr)	5.3	2.6	0.2	8.1
Avg Speed (mph)	5	4	5	5
Fuel Used (gal)	21.7	10.0	0.5	32.2
HC Emissions (g)	1	1	0	2
CO Emissions (g)	436	180	4	620
NOx Emissions (g)	5	2	0	8
Vehicles Entered	454	307	14	775
Vehicles Exited	449	308	14	771
Hourly Exit Rate	1796	1232	56	3084
Input Volume	2416	2823	130	5371
% of Volume	74	44	43	57
Denied Entry Before	0	0	0	0
Denied Entry After	1	0	0	1

17: SR 421 & I-95 NB Ramps Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBR	All
Total Delay (hr)	0.4	2.2	11.5	0.3	4.6	3.1	22.2
Delay / Veh (s)	27.2	14.1	161.4	11.6	534.4	205.9	75.0
Total Stops	57	186	357	20	77	81	778
Travel Dist (mi)	6.3	61.5	28.0	7.6	9.1	14.1	126.7
Travel Time (hr)	0.7	3.9	12.1	0.5	4.8	3.5	25.6
Avg Speed (mph)	10	16	2	14	2	4	5
Fuel Used (gal)	3.7	38.3	35.5	2.0	12.7	10.8	103.0
HC Emissions (g)	0	5	2	0	3	0	11
CO Emissions (g)	116	2237	679	40	574	200	3846
NOx Emissions (g)	1	18	6	0	5	2	31
Vehicles Entered	59	553	262	101	46	68	1089
Vehicles Exited	59	569	251	106	16	43	1044
Hourly Exit Rate	236	2276	1004	424	64	172	4176
Input Volume	371	2932	2313	682	181	257	6736
% of Volume	64	78	43	62	35	67	62
Denied Entry Before	0	0	0	1	0	0	1
Denied Entry After	0	0	5	0	1	7	13

18: SR 421 & I-95 SB Ramps Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBT	SBR	All
Total Delay (hr)	7.7	0.5	0.6	9.4	4.1	0.1	1.9	24.2
Delay / Veh (s)	71.0	35.1	66.5	151.6	65.0	75.8	74.9	85.8
Total Stops	260	21	26	305	96	3	51	762
Travel Dist (mi)	25.3	2.6	3.6	23.7	7.5	0.1	3.2	65.9
Travel Time (hr)	8.3	0.5	0.7	9.9	4.4	0.1	2.1	26.0
Avg Speed (mph)	3	5	5	3	2	1	2	3
Fuel Used (gal)	26.1	2.2	2.5	27.4	12.1	0.1	5.5	75.9
HC Emissions (g)	2	0	0	2	0	0	0	5
CO Emissions (g)	369	55	67	446	102	37	31	1108
NOx Emissions (g)	4	1	0	4	1	0	0	11
Vehicles Entered	390	50	34	228	228	3	94	1027
Vehicles Exited	390	48	33	218	222	3	89	1003
Hourly Exit Rate	1560	192	132	872	888	12	356	4012
Input Volume	2105	269	321	2154	1200	18	669	6736
% of Volume	74	71	41	40	74	67	53	60
Denied Entry Before	0	0	0	1	0	0	0	1
Denied Entry After	0	0	0	4	4	0	2	10

Total Network Performance

Total Delay (hr)	207.8
Delay / Veh (s)	363.4
Total Stops	6266
Travel Dist (mi)	1904.7
Travel Time (hr)	261.7
Avg Speed (mph)	9
Fuel Used (gal)	1096.9
HC Emissions (g)	104
CO Emissions (g)	32335
NOx Emissions (g)	320
Vehicles Entered	2339
Vehicles Exited	1780
Hourly Exit Rate	7120
Input Volume	49195
% of Volume	14
Denied Entry Before	31
Denied Entry After	482

SimTraffic Five-Run Average Report

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:55	6:55	6:55	6:55	6:55	6:55
End Time	7:15	7:15	7:15	7:15	7:15	7:15
Total Time (min)	20	20	20	20	20	20
Time Recorded (min)	15	15	15	15	15	15
# of Intervals	2	2	2	2	2	2
# of Recorded Intvls	1	1	1	1	1	1
Vehs Entered	2632	2283	2346	2384	2326	2396
Vehs Exited	2092	1721	1791	1882	1805	1856
Starting Vehs	532	582	555	554	558	558
Ending Vehs	1072	1144	1110	1056	1079	1091
Denied Entry Before	37	25	61	43	22	38
Denied Entry After	172	621	440	379	337	389
Travel Distance (mi)	2159	1815	1884	2054	1926	1968
Travel Time (hr)	230.9	287.7	276.2	245.5	240.3	0.0
Total Delay (hr)	169.9	236.1	222.9	187.4	186.0	200.5
Total Stops	6374	6441	6050	6076	6023	6192
Fuel Used (gal)	1099.4	1132.2	1129.1	1096.9	1058.8	1103.3

Interval #0 Information Seeding

Start Time	6:55
End Time	7:00
Total Time (min)	5

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	7:15
Total Time (min)	15

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2632	2283	2346	2384	2326	2396
Vehs Exited	2092	1721	1791	1882	1805	1856
Starting Vehs	532	582	555	554	558	558
Ending Vehs	1072	1144	1110	1056	1079	1091
Denied Entry Before	37	25	61	43	22	38
Denied Entry After	172	621	440	379	337	389
Travel Distance (mi)	2159	1815	1884	2054	1926	1968
Travel Time (hr)	230.9	287.7	276.2	245.5	240.3	0.0
Total Delay (hr)	169.9	236.1	222.9	187.4	186.0	200.5
Total Stops	6374	6441	6050	6076	6023	6192
Fuel Used (gal)	1099.4	1132.2	1129.1	1096.9	1058.8	1103.3

Total Network Performance

Total Delay (hr)	200.5
Delay / Veh (s)	340.1
Total Stops	6192
Travel Dist (mi)	1967.7
Travel Time (hr)	0.0
Avg Speed (mph)	-54
Fuel Used (gal)	1103.3
HC Emissions (g)	96
CO Emissions (g)	31514
NOx Emissions (g)	308
Vehicles Entered	2396
Vehicles Exited	1856
Hourly Exit Rate	7424
Input Volume	49195
% of Volume	15
Denied Entry Before	38
Denied Entry After	389

Intersection: 1: SR 421 & Williamson Blvd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	TR	L	L	T	T	R	L	L
Maximum Queue (ft)	88	292	737	771	250	483	447	436	342	435	309	322
Average Queue (ft)	59	101	458	557	249	481	362	250	183	106	248	268
95th Queue (ft)	105	289	779	880	251	484	476	514	374	369	371	390
Link Distance (ft)			1594	1594		248	248	248	248	248		
Upstream Blk Time (%)						56	54	6	3	0		
Queuing Penalty (veh)						270	261	29	15	1		
Storage Bay Dist (ft)	450	450			200						300	300
Storage Blk Time (%)			8	21	73						9	23
Queuing Penalty (veh)			13	93	145						23	61

Intersection: 1: SR 421 & Williamson Blvd

Movement	NB	NB	NB	NB	SB	SB	SB	SB	B14	B14
Directions Served	T	T	R	R	L	L	T	TR	T	T
Maximum Queue (ft)	749	797	325	312	289	340	1762	1764	2285	2397
Average Queue (ft)	452	480	286	265	260	336	1508	1439	768	802
95th Queue (ft)	917	946	375	347	340	352	2160	2144	2277	2405
Link Distance (ft)	2762	2762					1748	1748	2790	2790
Upstream Blk Time (%)							46	34	4	7
Queuing Penalty (veh)							0	0	0	0
Storage Bay Dist (ft)			300	300	240	240				
Storage Blk Time (%)	4	3	7	6	45	81	37			
Queuing Penalty (veh)	12	35	20	16	227	410	281			

Intersection: 3: SR 421 & Taylor Branch Rd.

Movement	NB	SB	SB	SB	SB	NW
Directions Served	T	T	T	T	T	R
Maximum Queue (ft)	12	274	1678	1682	1672	84
Average Queue (ft)	2	186	1032	1095	1020	53
95th Queue (ft)	15	375	2014	1988	2002	90
Link Distance (ft)	545		1657	1657	1657	251
Upstream Blk Time (%)			13	22	11	
Queuing Penalty (veh)			0	0	0	
Storage Bay Dist (ft)		250				
Storage Blk Time (%)		9	42			
Queuing Penalty (veh)		69	313			

Intersection: 5: I-95 SB Ramps &

Movement	SB	SB	SB	SB
Directions Served	L	L	L	T
Maximum Queue (ft)	1029	1040	1031	984
Average Queue (ft)	753	781	801	691
95th Queue (ft)	1233	1236	1189	1189
Link Distance (ft)	1012	1012	1012	1012
Upstream Blk Time (%)	13	15	15	1
Queuing Penalty (veh)	0	0	0	0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: SR 421 &

Movement	EB	EB	EB	WB	WB	SW
Directions Served	T	T	T	T	T	R
Maximum Queue (ft)	365	313	348	214	222	58
Average Queue (ft)	311	266	285	204	192	23
95th Queue (ft)	401	316	340	260	268	60
Link Distance (ft)	248	248	248	130	130	188
Upstream Blk Time (%)	23	23	34	31	35	
Queuing Penalty (veh)	185	180	272	437	490	
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 17: SR 421 & I-95 NB Ramps

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	T	T	T	T	R	L	R	R
Maximum Queue (ft)	200	183	341	333	352	585	582	580	428	354	1158	156
Average Queue (ft)	119	110	240	244	272	517	552	558	103	292	466	92
95th Queue (ft)	195	183	361	357	375	622	595	578	448	421	1208	180
Link Distance (ft)			491	491	491	545	545	545	545		1439	
Upstream Blk Time (%)						17	51	60	1		1	
Queuing Penalty (veh)						124	379	447	4		0	
Storage Bay Dist (ft)	650	650								330		330
Storage Blk Time (%)										47		
Queuing Penalty (veh)										120		

Intersection: 18: SR 421 & I-95 SB Ramps

Movement	EB	EB	EB	WB	WB	WB	SB	SB	SB
Directions Served	T	T	T	L	T	T	L	L	R
Maximum Queue (ft)	378	366	372	292	523	526	209	196	196
Average Queue (ft)	361	354	353	205	496	501	192	191	192
95th Queue (ft)	388	390	391	346	577	564	208	197	200
Link Distance (ft)	130	130	130	491	491	491	54	54	54
Upstream Blk Time (%)	65	64	64		39	45	70	70	73
Queuing Penalty (veh)	516	508	503		319	371	436	436	456
Storage Bay Dist (ft)									
Storage Blk Time (%)			64						
Queuing Penalty (veh)			171						

Network Summary

Network wide Queuing Penalty: 8647