Florida Department of Transportation District Four

# INTERCHANGE OPERATIONAL ANALYSIS REPORT (IOAR)

INTERSTATE 95 AT GRIFFIN ROAD Broward County, Florida



4-26-2017

Interchange Operational Analysis Report (IOAR)



#### I-95 at Griffin Road Interchange

#### **Florida Department of Transportation** Determination of Engineering and Operational Acceptability

Acceptance of this document indicates successful completion of the review and determination of engineering and operational acceptability of the Interchange Access Request. Approval of the access request is contingent upon compliance with applicable Federal requirements, specifically the National Environmental Policy Act (NEPA) or Department's Project Development and Environment (PD&E) Procedures. Completion of the NEPA/PD&E process is considered approval of the project location design concept described in the environmental document.

Requestor	Jamie Polidora, P.E. Concent Development District 4	<u>4/3/17</u> Date
Interchange Review Coordinator	Scott Peterson, P.E. District 4 Project Development Manager	<u>4-4-17</u> Date
State Interchange Review Coordinator	Andrew You'ng Systems Planning Office – Central Office	<u>6/5/</u> 17 <sub>Date</sub>
State Chief Engineer	Courtney Drummond, P.E.	6/12/17 Date
Assistant Secretary Intermodal Systems Development	Tom Byron, P.E.	Date
Federal Highway	NIA	

Chad Thompson, P.E.

Date

# **Table of Contents**

1 Project Overview1
1.1 Introduction1
1.2 Project Location
2 Methodology
2.1 Area of Influence
2.2 Analysis Years
2.3 Travel Demand Forecasting
2.4 Operational Analysis Procedures3
2.5 LOS Standards
3 Roadway and Intersection Existing Conditions 4
3.1 Geometry
3.2 Functional Classifications5
3.3 Design Speed & Posted Speed Limits5
3.4 Typical Sections
3.5 Lighting
3.6 Interchange Ramp Design
3.7 Crash Analysis6
4 Traffic Operations
5 Existing Conditions
5.1 Existing Traffic Volumes7
5.2 Existing Traffic Operational Analysis9
5.2.1 Intersection Analysis
6 Future Conditions
6.1 Future Traffic Volumes11
6.2 Future Traffic Operational Analysis14
6.2.1 Intersection Analysis14
7 Proposed Project Concept
7.1 Conceptual Improvement Plan
7.2 Typical Sections19
7.3 Roadway19
7.4 Vertical & Horizontal Clearances

7.5 Structures	19
7.6 Utilities	20
7.7 FDOT Standards	20
7.8 Environmental Impact Review/ETDM Desktop Review	20
7.9 Signing	20
7.10 Drainage	20
7.11 Consideration for Pedestrians and Bicyclists	20
7.12 Project Cost Estimates	21
7.13 Project Scope	21
7.14 Coordination	21
8 Benefit Cost Analysis	21
9 Conclusions and Recommendations	22
9.1 Transportation Systems Management and Operations (TSM&O)	22
9.2 Schedule	24
9.3 Funding	24
10 Assessment of FHWA's Policy on Access to Interstate System	24

#### List of Figures:

Figure 1 – Project Location Map	2
Figure 2 – I-95 and Griffin Road Existing Layout	5
Figure 3 – Existing Peak Hour Travel Demand Volumes	8
Figure 4 – Future 2020 Build Peak Hour Travel Demand Volumes	12
Figure 5 – Future 2040 Build Peak Hour Travel Demand Volumes	13
Figure 6 – Proposed Improvements	19
Figure 7 – TSM&O Considerations	23

#### List of Tables:

Table 1 – Delay and Level of Service Summary (Existing Conditions)	10
Table 2 – Queuing Analysis (Existing Conditions)	11
Table 3 – Delay and Level of Service Summary (No Build and Build Lane Geometry)	16
Table 4 – Queuing Analysis (No Build and Build Lane Geometry)	16

#### List of Appendices:

- Appendix A Existing Crash Data and Collision Diagrams
- Appendix B Interchange Master Plan Existing Volumes
- Appendix C Traffic Operations Analysis
- Appendix D Excerpt from Interchange Master Plan Existing Weaving Analysis Summary
- Appendix E Interchange Master Plan Future Traffic Volumes
- Appendix F Excerpt from Interchange Master Plan 2040 Weaving Analysis Summary
- Appendix G Conceptual Plan
- Appendix H Typical Sections
- Appendix I Environmental Features Identification Memorandum
- Appendix J Long Range Estimate (LRE)
- Appendix K Benefit Cost Analysis
- Appendix L Project Scope

#### 1 Project Overview

# 1.1 Introduction

The intent of this project is to address existing and short term operational conditions at the ramp terminal of SR 9 (I-95) and Griffin Road (SR 818). This Interchange Operational Analysis Report (IOAR) has been prepared to evaluate the impacts of signalizing the I-95 northbound right-turn movement and adding a second northbound right-turn lane at the I-95 northbound off ramp at Griffin Road. The Florida Department of Transportation (FDOT), District 4 is the applicant seeking approval of this IOAR that presents the necessary documentation for such improvements. The proposed improvements are intended to address queue backups to the I-95 northbound off-ramp termini intersection that occur during the AM and PM peak periods.

In 2003 the state of Florida established the Strategic Intermodal System (SIS), which consists of high priority transportation facilities and services of statewide and interregional significance. These SIS facilities are critical to the movement of people and goods in Florida, and their function is considered to be vital to Florida's economic competitiveness.

I-95, which is a designated SIS facility, is a north-south roadway that links northern and southern limits of Florida. It is a vital thoroughfare that links multi-modal hubs to facilitate the safe and efficient movement of goods and people. The interchange of I-95 at Griffin Road is a heavily traveled location.

As additional development is realized in Broward County and traffic volumes in the area continue to increase, the I-95 at Griffin Road interchange requires operational improvements to allow it to operate acceptably. The Florida Department of Transportation (FDOT) District 4 evaluated traffic operations at the I-95 interchange at Griffin Road and assessed short-term alternatives for improving traffic operations.

Field reviews were conducted in July of 2016 to observe traffic operations at the interchange of I-95 and Griffin Road. Congestion was observed during both the AM and PM peak hour along Griffin Road, as well as the northbound exit ramp termini intersection. In addition, excessive vehicular delay was noticed for the westbound through movements on Griffin Road, as well as the northbound left and right-turn movement on the exit ramp.

The purpose of this Interchange Operational Analysis Report (IOAR) is to document the need for and feasibility of short term improvements. Preliminary engineering plans were developed to address operational deficiencies within the existing right-of-way to minimize impacts and costs. Conceptual design plans for the improvements are provided in this report for the project, along with a cost estimate and documentation of the benefits of the project. The concept developed throughout this report is to:

> • Signalize the I-95 Northbound Right-Turn Movement and Add a Second Northbound Right-Turn Lane. By adding turn lanes and signalizing the I-95

northbound off-ramp right-turn movement at Griffin Road, the improvements would decrease delay for motorists to reach Griffin Road and to ensure that queues not impact I-95 mainline operations.

#### 1.2 Project Location

The interchange at I-95 and Griffin Road is located within the limits of the City of Dania Beach, located approximately 3.2 miles east of the Turnpike and 1.3 miles west of US 1. The intersection of Griffin Road and Old Griffin Road is approximately a quarter mile from the interchange. Griffin Road is an east-west arterial through Broward County. The project location map is depicted in **Figure 1**.





# 2 Methodology

# 2.1 Area of Influence

The IOAR study limits include the following road segment and project intersections, depicted in **Figure 1** Griffin Road from I-95 to Old Griffin Road including the intersection at I-95 northbound off ramp terminal and the intersection of Old Griffin Road and Griffin Road.

#### 2.2 Analysis Years

The Analysis years for the project are:

- Existing Year 2013
- Opening Year 2020
- Design Year 2040

#### 2.3 Travel Demand Forecasting

Traffic volumes used to evaluate alternatives in this IOAR have been developed using the annual growth rate determined by the I-95 Broward Interchange Master Plan. Section 6.1 of this IOAR provides further details concerning the development of future year travel demand volumes at the interchange.

#### 2.4 Operational Analysis Procedures

Traffic operational analyses were performed for existing conditions and future No-Build and Build alternatives. Level of Service (LOS) assessments were based on the Highway Capacity Manual (HCM) methodology, 2000 Edition. Analyses were performed using Synchro Version 9.1 for study signalized intersections and interchange ramp terminal intersections. The Synchro operational analyses were performed for the following conditions:

- 1. Existing year 2013 conditions, AM and PM
- 2. Opening Year 2020 conditions for No-Build and Build Alternative, AM and PM
- 3. Design Year 2040 conditions for No-Build and Build Alternative, AM and PM

#### 2.5 LOS Standards and Factors

FDOT Topic No. 525-000-006 provides LOS standards for the State Highway System (SHS). The following level of service (LOS) criteria were considered for this IOAR analysis since the study area is considered to be an Urbanized Area over 500,000 population.

- SIS Facilities LOS D
- Other State Roads LOS D

Analyses of the elements within the area of influence, were based on guidance, criteria and policies detailed in the latest 2015 Interchange Access Request User's Guide.

Delay and LOS were reported for the study intersections. The 95<sup>th</sup> percentile queue was utilized to determine the required storage length for the turn lanes at the northbound exit ramp termini.

A peak hour factor of 0.95 was utilized in the analysis and represents the congested conditions within the study area. A peak hour truck factor of 3% was incorporated to reflect heavy vehicle usage within the interchange and Griffin Road. Both factors are consistent with those utilized in the I-95 Broward Interchange Master Plan report

The forecast of directional design hour volumes (DDHV) and corresponding diurnal factors were utilized directly from the I-95 PD&E Study from Stirling Road to Linton Boulevard. The DDHV development involved the use of diurnal factors applied to the model estimated peak period volumes. They were developed from the peak period volumes obtained from the travel demand models for Opening Year – 2020 and Design Year – 2040. As part of the I-95 Broward County Interchange Master Plan report, the diurnal factors were defined as the ratio of the 1-hour peak period volume to the 3-hour peak period volume.

# 3 Roadway and Intersection Existing Conditions

# 3.1 Geometry

The ramp terminals have the following lane configuration:

- Northbound off-Ramp to eastbound Griffin Road: one channelized yield-controlled right turn lane.
- Northbound off-Ramp to westbound Griffin Road: two signalized left turn lanes.
- Southbound off-Ramp to eastbound Griffin Road: two signalized right turn lanes.
- Southbound off-Ramp to westbound Griffin Road: two signalized left turn lanes.

**Figure 2** shows the existing layout design of the study corridor including the I-95 northbound ramp terminal.



FIGURE 2 I-95 AND GRIFFIN ROAD EXISTING LAYOUT

#### 3.2 Functional Classifications

The Broward County MPO's Highway Functional Classifications Map shows I-95 within the project limits as a six-lane Urban Principal Arterial Interstate. Griffin Road is classified as a fourlane divided State Principal Arterial Other and Old Griffin Road is classified as a two-lane undivided Major Collector road.

#### 3.3 Design Speed & Posted Speed Limits

Griffin Road east and west of I-95 has a posted speed limit of 45 miles per hour. I-95 has a design and posted speed limit of 65 miles per hour north and south of Griffin Road. The design speed for Griffin Road from I-95 to the Old Griffin Road intersection is 45 miles per hour.

# 3.4 Typical Sections

The I-95 typical section at Griffin Road consists of an eight-lane divided section providing three general purpose lanes and one express lane with inside and outside shoulders.

The Griffin Road typical section within the limits of the right-of-way is a six-lane urban divided roadway with a raised, landscaped median. Underneath the I-95 overpass, the eastbound and

westbound lanes are separated by a median containing a raised concrete barrier wall as well as support piers for the I-95 overpass. In the eastbound direction, two left-turn lanes are provided for the I-95 northbound on-ramp and three through lanes on Griffin Road. In the westbound direction, two left turn lanes are provided for the I-95 southbound on-ramp and three through lanes on Griffin Road.

#### 3.5 Lighting

The I-95 Lighting system consist of high mast lighting along the I-95 on and off-ramps. The lighting on Griffin Road are the same High Mast light poles that run along the I-95 on and off-ramps.

#### 3.6 Interchange Ramp Design

The northbound off-ramp to Griffin Road is a single lane ramp, which becomes a free-flow rightturn lane and two signalized left turn lanes. The northbound on-ramp from westbound Griffin Road is a single lane ramp which merges with the dual lanes from eastbound Griffin Road. The southbound off-ramp to Griffin Road is a dual lane ramp, which widens out to two right turns and two left turns at a signalized intersection. The southbound on-ramp from Griffin Road provides a single lane which merges with the general purpose lanes. An aerial photograph of the existing interchange layout is shown in **Figure 1**.

#### 3.7 Crash Analysis

A crash analysis was conducted as part of the I-95 Interchange Master Plan to determine the types of crashes that occurred within the vicinity of the I-95 at Griffin Road interchange. The crash locations were then used to determine crash patterns in the vicinity of the interchange and identify potential countermeasures.

The crash data reported in the Interchange Master Plan Concept Development Report prepared for I-95 at Griffin Road was collected from Palm Beach County and from the FDOT Crash Data (Crash Analysis Reporting System - CARS) for the ramp terminal intersections and approaches. Based on the data collected, the following is a summary of the crashes that occurred on the I-95 ramps from 2008 to 2012.

- 2008 10 crashes
- 2009 13 crashes
- 2010 11 crashes
- 2011 14 crashes
- 2012 17 crashes

The FDOT crash data for the I-95 ramps revealed the following trends.<sup>1</sup>

<sup>&</sup>lt;sup>1</sup> I-95 at Griffin Road Interchange Master Plan Concept Development Report, January 2016.

- Crash Type
  - Predominant: Rear End (53.8 percent)
  - Second: Fixed Object (16.9 percent)
- Light Condition
  - Predominant: Daylight (60 percent)
  - Second: Dark (36.9 percent)
- Surface Condition
  - Predominant: Dry (73.8 percent)
  - Second: Wet (26.2 percent)

Based on FDOT's high crash segments and locations reports, neither I-95, Griffin Road, nor the associated on- and off-ramps within the study area appeared as a high crash location/segment. Collision diagrams and detailed lists of crash data are provided in Appendix A.

#### 4 Traffic Operations

The I-95 Interchange Master Plan identified the northbound off-ramp termini intersection as a candidate for short term improvements to address peak hour congestion. Excessive delay and congestion on Griffin Road affects the northbound off-ramp termini intersection operations. This particularly evident at the intersection of Old Griffin Road and Griffin Road, where eastbound queues spillback near the off-ramp. However, it is noted during the field review that no queues on the northbound off-ramp were observed approaching the I-95 mainline.

#### 5 Existing Conditions

#### 5.1 Existing Traffic Volumes

Existing Daily Traffic volumes and intersection turning movement volumes were provided by the Broward County Interchange Master Plan report for Griffin Road at I-95, via the I-95 PD&E Study from Stirling Road to Glades Road. This data was documented in a report dated March 2012. For consistency purposes, the existing volume data utilized in the Interchange Master Plan report for Griffin Road at I-95 will also be utilized for this interchange access request.

The peak hour intersection turning movement volumes from the Interchange Master Plan report for Griffin Road at I-95 are depicted on Figure 3. Additionally, the excerpted volumes from the I-95 Interchange Master Plan are included in Appendix B.



FIGURE 3 EXISTING PEAK HOUR TRAVEL DEMAND VOLUMES SOURCE: I-95 INTERCHANGE MASTER PLAN

#### 5.2 Existing Traffic Operational Analysis

#### 5.2.1 Intersection Analysis

Based on the AM and PM peak hour data, the interchange of Griffin Road and I-95 was analyzed using Synchro 9 and reported based on Highway Capacity Manual 2000 methodology. This analysis was performed to evaluate current traffic operational conditions. A summary of the analysis of the northbound and southbound ramp termini intersections are included in **Table 1**.

Results of the existing operational analysis reveal that the intersection of Griffin Road and the I-95 northbound off-ramp currently functions at Level of Service (LOS) B during the AM peak hour with overall vehicular delays of approximately 20 seconds per vehicle. However, during the PM peak hour, the I-95 northbound off-ramp signalized intersection operates at LOS C with 32 seconds of delay.

The northbound left-turn movement operates with nearly 52 seconds of delay during the PM peak hour, with queues extending approximately 400 feet. The northbound right turn currently operate at LOS D during the AM and PM peak hours with delays of about 36 and 44 seconds per vehicle, respectively. The corresponding AM peak hour queue for the northbound right-turn movement is about 270 feet, and about 105 feet during the PM peak hour. A summary of the queuing analysis of existing conditions is included in **Table 2**.

The I-95 southbound off-ramp termini intersection presently functions at LOS C during the AM and PM peak hours. Delays during the morning are approximately 33 seconds per vehicle, while during the afternoon delays are about 25 seconds per vehicle. A summary of existing traffic operations and queues are provided in **Tables 1 and 2**.

The HCM 2000 capacity worksheets and Synchro 9 queuing analysis of the existing traffic operational analyses results for the study area are provided in Appendix C.

The I-95 Interchange Master Plan also evaluated the mainline and ramp operations near Griffin Road. It was found that the northbound I-95 freeway segment between the Stirling Road onramp and the Griffin Road off-ramp is a weaving segment. Analysis reported in the I-95 Interchange Master Plan indicated that this weaving segment currently operates at an acceptable level of service and that no improvements are needed for this weaving segment. An excerpt of the weaving analysis from the I-95 Interchange Master Plan is included in Appendix D.

			E	xisting Co	onditions					
Interception	America	N/h unot	Approa	ach	Overa	B C C				
intersection	Аррг.	www.	105	Delay	105					
			(sec/veh)	203	(sec/veh)	200				
		AM PEAK H	OUR							
	FB	LT	2.5	А						
		TH	1.1	А						
Griffin Rd at NB off Ramp	WB	TH	45.6	D	19.9	в				
Griffin Ku at ND Off Kamp		RT	15.6	В	15.5	Б				
	NB	LT	34.8	С						
	ND	RT	35.7	D						
Griffin Rd at SB off Ramp	FR	TH	53.8	D						
	ED	RT	39.6	D		С				
	WB	LT	3.1	А	22.0					
		TH	2.0	А	55.0					
	CP	LT	56.6	E						
	30	RT	56.3	E						
		PM PEAK HO	OUR							
	FR	LT	4.5	А		6				
	ED	TH	1.8	А						
Criffin Del et ND off Doma		TH	57.8	Е	22.4					
Griffin Ru at NB Off Ramp	VV D	RT	20.7	С	32.4	С				
		LT	51.5	D						
	ND	RT	44.1	D						
	ED	TH	36.5	D						
	ED	RT	25.8	С						
Criffin Dd at SD off Demo	M/R	LT	4.9	А	24.0	B C C				
Griffin ku at SB off kamp	WD	TH	0.9	А	24.9	L				
	CD	LT	45.9	D						
	30	RT	32.5	С						

#### TABLE 1 DELAY AND LEVEL OF SERVICE SUMMARY (EXISTING CONDITIONS)

		Storago	95th Percentile Queue Length (ft) Existing Conditions						
Intersection	Movement	(ft)	AM Peak Hour	PM Peak Hour					
8	EBL	170	5	7					
in Rd at NE ff-Ramp	EBT		0	0					
	WBT		113	303					
	WBR	330	35	108					
niff 0	NBL	475	268	409					
9	NBR	650	269	105					
off-	EBT		270	302					
SB (	EBR	550	328	60					
at (	WBL	170	8	5					
ffin Rd Rar	WBT		0	0					
	SBL	830	212	157					
Gri	SBR	550	500	190					

#### TABLE 2 QUEUING ANALYSIS (EXISTING CONDITIONS)

Notes:

1) 95th percentile queue length based on Synchro 9 methodology

#### 6 Future Conditions

# 6.1 Future Traffic Volumes

To evaluate the future traffic operations of the I-95 and Griffin Road interchange, weekday travel demand forecasts are needed for the peak hour turning movements at each intersection within the study area. Consistent with the Interchange Master Plan study, AM and PM peak hour projections from the I-95 Corridor Planning Study were utilized. Opening Year (2020) and Design year (2040) volumes previously prepared and approved by the Department and documented in those reports are used for this study. This maintains consistency throughout the Planning Study, Master Plan, and Interchange Access Reports prepared for the interchange at I-95 and Griffin Road.

The 2020 and 2040 peak hour intersection turning movement volumes from the Interchange Master Plan report for Griffin Road at I-95 are depicted on Figures 4 and 5. Excerpts of the projected future year traffic volumes from the Interchange Master Plan are included in Appendix E.



FIGURE 4 FUTURE 2020 BUILD PEAK HOUR TRAVEL DEMAND VOLUMES SOURCE: I-95 INTERCHANGE MASTER PLAN



FIGURE 5 FUTURE 2040 BUILD PEAK HOUR TRAVEL DEMAND VOLUMES SOURCE: I-95 INTERCHANGE MASTER PLAN

#### 6.2 Future Traffic Operational Analysis

The I-95 Interchange Master Plan evaluated the future (2040) mainline and weaving operations near Griffin Road. It was found that the northbound I-95 freeway segment between the Stirling Road on-ramp and the Griffin Road off-ramp will operate at an acceptable level of service under 2040 No Build conditions. No improvements are needed for this weaving segment. An excerpt of the future (2040) weaving analysis from the I-95 Interchange Master Plan is included in Appendix F.

#### 6.2.1 Intersection Analysis

Traffic operations analysis was conducted for the opening year (2020) and design year (2040) for both the No Build and Build scenarios using Highway Capacity Manual 2000 methodology. Future year analyses of the No Build and Build scenarios included an optimization of the intersection's signal timing splits, while maintaining current phasing and cycle lengths employed during the AM and PM peak hour. Summaries of the future year traffic operational analysis results for both the No Build and Build conditions are included in **Tables 3 and 4**.

- No Build Condition
  - This development scenario assumes that no improvements are made to the I-95 interchange. Analytical Measures of Effectiveness (MOEs) reported include delay, Level of Service, and queue length. A summary of the MOEs for future year conditions is provided in Tables 3 and 4. The HCM 2000 intersection analysis worksheets of the future 2020 and 2040 No Build conditions traffic operational analyses are provided in Appendix C.
- 2020 AM Peak Hour
  - Under 2020 AM peak hour No Build conditions, the I-95 northbound off-ramp termini intersection will operate at an overall LOS D with about 36 seconds of delay per vehicle. The northbound left- and right-turn movements will individually operate at LOS E with estimated queue lengths of 395 feet and 580 feet, respectively.
- <u>2020 PM Peak Hour</u>
  - Under 2020 PM peak hour No Build conditions, the I-95 northbound off-ramp termini intersection will operate at an overall LOS D with approximately 45 seconds of delay per vehicle. Similar to AM peak conditions, the northbound leftand right-turn movements will function at LOS E during the afternoon. Queue lengths estimated for 2020 PM peak hour conditions under the No Build scenario are 455 feet and 285 feet, respectively.
- <u>2040 AM Peak Hour</u>

- During the 2040 AM peak hour, if no improvements are made to the interchange, the overall intersection will further degrade and operate at LOS E. Overall vehicular delays at the I-95 northbound ramp termini are expected to be 75 seconds per vehicle. The northbound left-turn and right-turn will operate at LOS E. The northbound left-turn movement queue in 2040 will be approximately 450 feet if no improvements are constructed. The northbound right-turn movement queue is estimated to be approximately 920 feet by 2040. If realized, this queue will occupy much of the off-ramp and block access to the northbound left-turn lanes.
- <u>2040 PM Peak Hour</u>
  - Results indicate that without capacity improvements at the I-95 northbound offramp termini intersection, 2040 PM peak hour operations would degrade as compared to current conditions. Analysis of the No Build scenario (2040) indicates that the overall intersection will operate at LOS F with nearly 85 seconds of delay per vehicle.

The northbound left-turn movement will operate at LOS E with 67 seconds of delay per vehicle, while the right-turn movement will function at LOS F with 88 seconds of delay per vehicle. Queue lengths for the northbound left-turn movement will exceed 535 feet during the 2040 PM peak period. The northbound right-turn movement is projected to have a 2040 PM peak hour queue of more than 750 feet. Similar conditions during the morning peak period, such a queue would utilize much of the off-ramp, and block entry into the left-turn lanes at the ramp termini.

The HCM 2000 intersection analysis worksheets of the future 2020 and 2040 No Build conditions traffic operational analyses are provided in Appendix C.

			No Build (2020)				Build Option (2020)				No Build (2040)				Build Option (2040)			
			Approac	h	Overal	I	Approa	ch	Overa	dl 👘	Approac	h	Overa	ıll	Approac	:h	Overa	all
Intersection	Appr.	Mvmt.	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh )	LOS	Delay (sec/veh)	LOS	Delay (sec/veh )	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
AM PEAK HOUR																		
	50	LT	3.4	Α			3.4	Α			10.3	В			10.3	В		
	ED	TH	1.4	А			1.4	Α			4.2	Α			4.2	Α		
Griffin Rd at	W/R	TH	87.5	F	20.0		87.5	F			267.8	F	70.7	-	267.8	F	75.4	-
NB off Ramp	VV D	RT	32.9	С	36.0	U	32.9	С	34.3	C	80.9	F	/9./	E	80.9	F	75.4	E
	ND	LT	58.5	Е			58.5	Е			60.7	Е			60.7	Ε		
	IND	RT	71.6	Е			58.9	Е			105.6	F			63.7	Ε		
Griffin Rd at SB off Ramp	FR	TH	175.7	F			175.7	F			403.8	F			403.8	F	143.3	
		RT	40.7	D	71.3		40.7	D		E	54.1	D		F	54.1	D		
	M/R	LT	4.2	Α		E	4.2	А	A 71.3 E		4.7	Α	143.3		4.7	Α		-
		TH	0.9	А			0.9	Α			1.1	А			1.1	А		- F
	CD	LT	55.7	Е			55.7	Е			95.5	F			95.5	F		
	30	RT	43.5	D			43.5	D			51.3	D			51.3	D		
							PM	PEAK	HOUR		-				-			
	FR	LT	4.3	Α			4.3	А			6.0	Α			6.0	Α		
	LD	TH	1.9	Α			1.9	Α			5.7	Α			5.7	Α		
Griffin Rd at	M/R	TH	89.2	F	44.0		89.2	F	110		206.4	F	01 C	-	206.4	E.	07 E	-
NB off Ramp	VV D	RT	34.3	С	44.9	U	34.3	С	44.0		70.5	Е	04.0	- <b>F</b>	70.5	Е	02.5	- F
	NR	LT	63.4	Е			63.4	Е			67.2	Е			67.2	Е		
	ND	RT	59.3	Е			57.3	Е			87.9	F			63.8	Е		
	FR	TH	83.4	F			83.4	F			203.7	F			203.7	F		
		RT	51.2	D			51.2	D			75.0	Е			75.0	Е		
Griffin Rd at	W/B	LT	3.3	Α	12.2	П	3.3	Α	122		5.6	А	01 0		5.6	Α	01 0	
SB off Ramp	W D	TH	2.5	Α	42.5		2.5	Α	42.5		4.8	А	01.0	۲.	4.8	А	01.0	<u>۲</u>
	SB	LT	58.6	E			58.6	E			61.9	Е			61.9	E		
	30	RT	59.1	Е			59.1	Е			69.6	Е			69.6	Е		

#### TABLE 3 DELAY AND LEVEL OF SERVICE SUMMARY (NO BUILD AND BUILD LANE GEOMETRY)

#### TABLE 4 QUEUING ANALYSIS (NO BUILD AND BUILD LANE GEOMETRY)

			95th	Percentil	<mark>e Queue Le</mark> n	gth (ft)	95th Percentile Queue Length (ft)						
		Storage			AM			PM					
Intersection	Movement	(ft)	No Build (2020)	No Build Build No Build (2020) (2020) (2040)		Build (2040)	No Build (2020)	Build (2020)	No Build (2040)	Build (2040)			
	EBL	170	m8	m8	m154	m154	7	7	m7	m7			
at mp	EBT		m0	m0	m0	m0	0	0	m0	m0			
Griffin Rd NB Off-Ra	WBT		260	260	#689	#689	393	393	#709	#709			
	WBR	330	195	195	#1269	#1269	338	338	#1246	#1246			
	NBL	475	395	395	453	453	455	455	538	538			
	NBR	650	581	363	#918	468	284	263	#752	415			
	EBT		#650	#650	#1076	#1076	374	374	#743	#743			
at mp	EBR	550	224	224	635	635	504	504	847	847			
Rd -Ra	WBL	170	8 8		m10	m10	m9	m9	m17	m17			
Off-	WBT		0	0	m0	m0	0	0	m0	m0			
SB Gri	SBL	830	320	320	809	809	248	248	335	335			
I	SBR	550	289	289	493	493	566	566	703	703			

Notes:

1) 95th percentile queue length based on Synchro 9 methodology

m - Volume for queue is metered by upstream signal

# - 95th percentile volume exceeds capacity; queue may be longer. Queue reported is maximum after two cycles.

- Build Condition
  - The Build scenario includes proposed improvements to signalize the I-95 northbound off-ramp right-turn movement, and add a second northbound right-turn lane. These improvements are intended to reduce the delay and queues formed at the I-95 northbound off-ramp termini intersection at Griffin Road.
- <u>2020 AM Peak Hour</u>
  - The proposed improvements to the I-95 northbound off-ramp at Griffin Road were analyzed to ascertain their traffic operational benefits. Results indicate that with the improvements, the I-95 northbound off-ramp termini intersection will operate at LOS C with overall intersection delays of approximately 34 seconds per vehicle. The northbound right-turn movement is expected to operate at LOS E with 59 seconds of delay, which represents a delay reduction when compared to No Build conditions. The northbound right-turn queue is estimated to be 365 feet, which is also a 38% reduction from No Build scenario. A summary of the Build condition traffic operational analysis results are included in Tables 3 and 4.
- <u>2020 PM Peak Hour</u>
  - Traffic operations results indicate that with the recommended improvements the traffic operations at the I-95 northbound off-ramp termini intersection would reduce delay and queues in 2020. Overall, if the recommended improvements are constructed, the ramp termini intersection will operate at LOS D with overall intersections delays of approximately 45 seconds. Delay for the northbound right-turn movement will be about 57 seconds per vehicle during the 2020 PM peak hour. As a result of the recommended improvements, the queue for the northbound right-turn movement will be reduced to 265 feet during the 2020 PM peak hour, which is an 8% reduction as compared to the No Build scenario.
- 2040 AM Peak Hour
  - The overall intersection of Griffin Road and I-95 northbound off-ramp termini intersection is projected to operate with reduced delay and traffic operational benefits if the proposed intersection improvements are constructed. Results indicate the overall intersection would operate at LOS E with delays of about 75 seconds per vehicle. The northbound right-turn movement will operate at LOS E with delays of approximately 64 seconds, which is about 40% less than the delay expected without improvements.
  - Queue lengths for the northbound right-turn movement will be reduced to about 470 feet during the 2040 AM peak hour. This represents a 50% decrease in queue length as compared to the No Build scenario. The projected queue can be accommodated by the proposed northbound right-turn laneage under the Build scenario. This will not affect operations on the off-ramp, nor will it block entry for the northbound left-turn lanes. A summary of the Build condition traffic operational analysis results are included in Tables 3 and 4.

- <u>2040 PM Peak Hour</u>
  - Traffic operations results indicate that with the recommended improvements, the intersection of Griffin Road and the I-95 northbound off-ramp termini would operate at LOS F in 2040 during the PM peak hour. The overall intersection delay in 2040 will be about 82 seconds per vehicle. The delay for the northbound right-turn movement will be reduced to 64 seconds per vehicle during the 2040 PM peak hour, which is a reduction of 27% as compared to the No Build scenario.
  - Queue lengths for the northbound right-turn movement during the 2040 PM peak hour under the Build scenario will be reduced to 415 feet. This equates to a reduction of 45% when compared to the No Build scenario. Such a queue can be accommodated by the available northbound right-turn laneage under the Build scenario. Traffic operational conditions under the Build scenario will not impact the I-95 northbound off-ramp, and will not block drivers from accessing the leftturn lanes at the ramp termini intersection.

# 7 Proposed Project Concept

#### 7.1 Conceptual Improvement Plan

All alternatives were analyzed and the Future Build alternative incorporates all the improvements described in Section 1.1 for the Build Alternative plus the following improvement:

- i. Add a second northbound right turn lane to the I-95 northbound off-ramp termini intersection
- ii. Signalize the northbound right-turn movement at the I-95 northbound off-ramp

These improvements will alleviate congestion and increase storage capacity on Griffin Road so that the queues on the I-95 northbound exit ramp will not affect I-95 mainline.

Additionally, a cursory review of the northbound weaving area was performed to ascertain if a dual exit ramp configuration would improve the northbound exit ramp operations. Conceptually, the modified northbound exit ramp would operate as an Auxiliary Lane Exit Only, along with a choice exit and continuous through lane, for the outside general purpose lane. However, findings indicated that the weaving area near the northbound exit ramp would not operate acceptably due to large mainline peak hour volumes on I-95. As a result, modifying the northbound exit ramp and weaving area configuration at the gore point on I-95 was not pursued as a component of this IOAR.

Depictions of the proposed conceptual improvements are contained in the Appendix G.



#### FIGURE 6 PROPOSED IMPROVEMENTS

#### 7.2 Typical Sections

The existing and conceptual design typical sections for Griffin Road and I-95 northbound exit ramp are provided in the Appendix H.

#### 7.3 Roadway

The proposed concepts were designed using the FDOT Plans Preparation Manual and the 2016 FDOT Design Standards.

#### 7.4 Vertical & Horizontal Clearances

There are no anticipated vertical and horizontal clearance concerns with the proposed design concept.

#### 7.5 Structures

New signal mast arms are necessary to provide signal control for the recommended signalization of the northbound off ramp. Mast arms will be required to include pedestrian signal heads.

#### 7.6 Utilities

The recommended improvement will not impact above ground utilities. Impacts to underground utilities, if any, will need to be identified and addressed during the design phase.

#### 7.7 FDOT Standards

The proposed conceptual design follows the current FDOT Design Standards and Plans Preparation Manual (PPM) and the Florida Intersection Design Guide 2015. No variations or exceptions are anticipated for this project.

#### 7.8 Environmental Impact Review/ETDM Desktop Review

A desktop review of possible environmental impacts was conducted in December of 2016 summarized in the environmental features identification memorandum. There are wetlands surrounding the project area including freshwater ponds, freshwater emergent wetlands, estuarine and marine wetland, and estuarine and marine deepwater. Endangered or threatened species were also identified including the Snail Kite, manatee and Mangrove Rivulus. In terms of water quality, the project corridor is a Mitigation Bank Service Area for Everglades, Loxahatchee, and Wetlands Bank Pembroke Pines. Areas of the project are located within the 100-year floodplain (Zone AE and Zone AH). Several community services, cultural resources, public parks and contamination sites were also found in the project area. The memorandum is included as Appendix I providing more details on these items. There are no anticipated impacts with these environmental features, however, further investigation will be needed on these impacts during design

#### 7.9 Signing

A separate signing plan is not required because there are no changes to the mainline. Sign posts along the ramp will need to be removed and new signs installed depicting the lane designations.

#### 7.10 Drainage

There are four inlets within the project limits which will need to be relocated with the widening. The westbound lanes will continue to drain to the swale west of the travel lanes.

#### 7.11 Consideration for Pedestrians and Bicyclists

Pedestrians and bicyclists have been considered in these concepts. This improvement will replace the yield controlled right turn lane with a signalized intersection providing more opportunities for pedestrians to cross the intersection. In addition, the current signals will be upgraded to mast arms with pedestrian count-down signals.

#### 7.12 Project Cost Estimates

A Long Range Estimate (LRE) of the construction cost indicated \$447,854.70 was necessary to build the improvements. Cost estimates were prepared based on an engineer's probable opinion of cost using current LRE base costs. The LRE is included in Appendix J. The major cost components are roadway widening, drainage, signing and signalization.

#### 7.13 Project Scope

A summary of the elements of the scope necessary to add a turn lane at the I-95 northbound offramp termini intersection are included in Appendix L. Specific details for elements such as Roadway, Structures, Signalization, and the Typical Section are provided.

#### 7.14 Coordination

This concept was coordinated internally with other departments for their input including construction and utilities on July 12, 2016, traffic operations on August 25, 2016 and consultant management on September 23, 2016. The concept was also coordinated with the I-95 Express Phase 3C project team on October 11, 2016, November 21, 2016 and December 8, 2016.

#### 8 Benefit Cost Analysis

A quantitative benefit-cost analysis was performed to assess the value of reducing delay and congestion at the interchange of I-95 and Griffin Road. The cost of AM and PM peak hour delay calculated for the interchange under the 2040 No Build Condition and the Build Condition was compared. Results indicate that the travel time savings because of the recommended Build Condition would save \$380,378 in 2040. This is based on a conservative estimate of the monetized value of delay of \$16.80 per vehicle-hour for South Florida commuters<sup>2</sup>.

The accumulated amortized monetary benefits of the Build Condition between 2020 and 2040 are expected to be approximately \$2.7 million in present day value. With an estimated cost of the project at \$447,854.70, the benefits of this short term improvement exceed its cost. The benefit analysis is included in Appendix K.

The Net Present Value (NPV) of these benefits was also calculated relative to the current cost of the proposed improvements. Given a discount rate of 4%, consistent with the NPV analysis conducted by FDOT, and assuming an opening year of 2020, the 2040 travel time savings were calculated for each year between 2020 and 2040. These annual travel time savings were amortized to a present day value of \$2.7 million in travel time savings benefits, which equates to a benefit-cost ratio of approximately 6.1. The resultant NPV, which reflects the difference

<sup>&</sup>lt;sup>2</sup> Southeast Florida Road and Transit User Cost Study – 2014 Update

between the net present value of the project's benefits and costs, is approximately \$2.3 million. The NPV analysis is included in Appendix K.

Overall, the recommended improvements will facilitate the safe and efficient flow of vehicles through the I-95 interchange with Griffin Road, and improve operations within the study area for the near future.

#### 9 Conclusions and Recommendations

Ever increasing traffic volumes during peak hours are projected to negatively impact traffic operations for the I-95 at Griffin Road interchange. In particular, the I-95 northbound off-ramp is anticipated to experience queues that spillback into the off-ramp and block entry to the left-turn lanes of the ramp termini intersection.

This Interchange Operational Analysis Report documents proposed improvements within existing right-of-way and can be quickly implemented. The recommended improvements were developed to improve mobility at the I-95 northbound off-ramp by reducing congestion and queues. A long range cost estimate and documentation of the project's benefits are included. The recommended improvement for the I-95 at Griffin Road interchange is to:

Signalize the I-95 Northbound Right-Turn Movement and Add a Second Northbound Right-Turn Lane with a storage of 468 feet. These two right-turn lanes would be signalized at the ramp termini intersection. They would improve vehicular storage on the northbound exit ramp while decreasing delay for right-turning vehicles.

Overall, the recommended improvements will reduce queue lengths on the I-95 northbound offramp termini intersection. Motorists will be safely stored in the respective right-turn storage areas and their impact upon the I-95 northbound off-ramp and the ramp termini intersection will be minimized.

#### 9.1 Transportation Systems Management and Operations (TSM&O)

The evaluated alternatives provide short term relief to the operational deficiencies at the interchange. Lengthy queues and delays are anticipated in 2040. Other low cost measures, such as those utilized in the Transportation Systems Management and Operations (TSM&O) could be considered. The Project Team has coordinated with the Traffic Operations Office concerning potential improvements that could be implemented.

Currently there are no TSM&O (Transportation System Management and Operations) applications in place along Griffin Road (SR 818) in proximity to the I-95 interchange. Due to the existing conditions and future developments in the area ITS (Intelligent Transportation System) and signal enhancements should be considered to increase the efficiency of the intersection and interchange. These systems require additional construction costs, reoccurring operations & maintenance costs, and increased stakeholder coordination. However, the benefit they provide

includes enhanced signal coordination, real time monitoring, potential incident management, and information dissemination.

The following TSM&O considerations are provided based on priority:

- 1) Upgrade vehicle/queue detection systems at signal and ramp This would involve upgrading the existing vehicle detection systems to allow for additional queue data to be captured at the exit ramp and signal for Griffin Road and Old Griffin Road. The map highlights, in blue, the 3 additional Video Detection System (VDS) that should be considered for upgrades. Enhanced queue detection on the NB I-95 ramp would provide relief to any congestion that could potentially back up on to the mainline of I-95. At the intersection of Griffin Road and Old Griffin Road this additional queue detection would allow for the traffic to be better managed for the new development that is anticipated to impact this intersection.
  - Estimated Cost = \$ 75,000.00 (upgrade detection at 1 intersection and 1 I-95 ramp)
- 2) Install ATMS/ ITS Devices Installing ATMS (Advanced Traffic Management Systems) devices would allow operators at the Broward TMC to actively manage the corridor based in real time data the devices are providing. These devices include:
  - CCTV for monitoring the interchanges or along Griffin Road which allows real time changes to be made and observed. Also used for incident monitoring and management.



• Estimated Cost = \$ 40,000.00 (Install 1 CCTV)

FIGURE 7 PROPOSED TSM&O CONSIDERATIONS

#### 9.2 Schedule

The concept is proposed to be included with the I-95 Express Phase 3C project, FM# 409354-2. This project is scheduled for design build advertisement in May of 2017 and a letting of March 2018.

#### 9.3 Funding

This concept is proposed to be funded through the I-95 Express Phase 3C project set for construction between midyear 2019 and midyear 2022.

#### 10 Assessment of FHWA's Policy on Access to Interstate System

The FHWA's Policy on Access to the Interstate System provides the requirements for the justification and documentation necessary to substantiate any proposed changes in access to the Interstate System. The policy is published under the Federal Register, Volume 74, Number 165, dated August 27, 2009. The responses provided herein for each of the eight policy statements demonstrate compliance with these requirements and justification for the proposed interchange improvements at I-95 and Griffin Road in Fort Lauderdale, Florida.

#### **Policy:**

It is in the national interest to preserve and enhance the Interstate System to meet the needs of the 21st Century by assuring that it provides the highest level of service in terms of safety and mobility. Full control of access along the Interstate mainline and ramps, along with control of access on the crossroad at interchanges, is critical to providing such service. Therefore, FHWA's decision to approve new or revised access points to the Interstate System must be supported by substantiated information justifying and documenting that decision. The FHWA's decision to approve a request is dependent on the proposal satisfying and documenting the following requirements.

#### **Considerations and Requirements:**

1. The need being addressed by the request cannot be adequately satisfied by existing interchanges to the Interstate, and/or local roads and streets in the corridor can neither provide the desired access, nor can they be reasonably improved (such as access control along surface streets, improving traffic control, modifying ramp terminals and intersections, adding turn bays or lengthening storage) to satisfactorily accommodate the design-year traffic demands (23 CFR 625.2(a)).

The Interchange Operational Access Report (IOAR) was developed to support the design-year traffic demands at the I-95 at Griffin Road interchange. The IOAR is the culmination of a traffic analysis process that examined numerous design concepts for improvements at the interchange and within the interchange influence area to meet the future traffic forecast. The recommended interchange improvements contained in the report would enhance access

and regional mobility. This need cannot be adequately satisfied by other network improvements.

The IOAR performed an operations analysis of the No Build Alternative. The analysis demonstrated that the No Build Alternative will not provide acceptable traffic operations to adequately serve the future transportation demand. In the future year (2040) analysis, the No Build Alternative would produce operational failures at the ramp termini intersection that would impact I-95 northbound off-ramp movements. At the intersection of Griffin Road and the I-95 northbound off-ramp, northbound right-turn traffic will operate at Level of Service F with vehicular delays of approximately 105 seconds. Northbound right-turn queues on the I-95 northbound off-ramp termini intersection would form that exceed 900 feet, and would effectively block left-turning motorists attempting to access westbound Griffin Road.

2. The need being addressed by the request cannot be adequately satisfied by reasonable transportation system management (such as ramp metering, mass transit, and HOV facilities), geometric design, and alternative improvements to the Interstate without the proposed change(s) in access (23 CFR 625.2(a)).

Transportation system management techniques are inadequate to address the traffic operational deficiencies at the I-95 northbound off-ramp termini intersection. The projected traffic volume increase at the ramp termini intersection will cause congestion and queues that impact the safe and efficient movement of people and goods.

The transit system is not anticipated to reduce future traffic volumes to substantially affect the I-95 northbound off-ramp termini. Further, ramp metering and high occupancy vehicle (HOV) facilities, which are currently present, are not expected to reduce demand at the interchange. Overall, traffic management and alternative mode strategies would not be effective in fully addressing the mobility needs at the I-95 and Griffin Road interchange.

3. An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis shall, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (23 CFR 625.2(a), 655.603(d) and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, shall be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)). Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request must also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d)).

The operational analysis conducted for the IOAR confirmed that the proposed new interchange improvements are not expected to have any adverse impacts on safety and

operations on the interstate facility (I-95). On the contrary, the improvements are expected to alleviate congestion and queues to improve operations and safety at the northbound off-ramp termini. Traffic operations for the Build Alternative indicate that the I-95 northbound off-ramp termini intersection will operate at Level of Service E or better during all time periods. The northbound right-turn movement will operate at Level of Service E or better with delays of 63 seconds per vehicle, which is about 40% less than what is expected under the No Build condition. In the Build Alternative, queues are significantly reduced, such that the northbound right-turning traffic does not block or impede the northbound left-turning vehicles during the peak hours. Northbound right-turn queues on the off-ramp will be reduced 50% to approximately 465 feet if the improvements are constructed.

The IOAR demonstrated that the Build Alternative will produce better traffic operations and mobility within the study area. Under the Build Alternative, northbound off-ramp queues do not extend upstream along the off-ramp nor do they impact the I-95 mainline. The proposed improvements will facilitate the storage of future demand while improving levels of service for the northbound off- ramp termini intersection.

The preliminary design plans indicate that the Build Alternative can be designed and implemented in accordance with all applicable safety standards, as dictated by FDOT and FHWA Highway Design Standards. The proposed project will not introduce any adverse safety conditions along I-95. Furthermore, with the expected overall improvements in traffic operations, it is anticipated that the I-95 interchange will experience a corresponding reduction in crash risk due to reduced congestion.

4. The proposed access connects to a public road only and will provide for all traffic movements. Less than ``full interchanges" may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)).

The IOAR at I-95 and Griffin Road will continue to provide and maintain all connections to/from both the interstate travel lanes. The proposed improvements only involve the traffic control mechanism, and will serve all movements between the two facilities. The improvements will be designed using the latest design criteria and safety techniques which will meet or exceed current FDOT standards and FHWA Design Standards for Interstate Systems. All existing and proposed connections involve public roads only.

5. The proposal considers and is consistent with local and regional land use and transportation plans. Prior to receiving final approval, all requests for new or revised access must be included in an adopted Metropolitan Transportation Plan, in the adopted Statewide or Metropolitan Transportation Improvement Program (STIP or TIP), and the Congestion Management Process within transportation management areas, as appropriate, and as specified in 23 CFR part 450, and the transportation conformity requirements of 40 CFR parts 51 and 93.

The proposed interchange improvements are consistent with the development plans that have been adopted by the Broward County Metropolitan Planning Organization (MPO) and is contained in 2040 Broward County MPO Long Range Transportation Plan (LRTP).

The proposed improvements to the I-95 northbound off-ramp termini intersection are consistent with congestion management objectives as outlined in the Broward County MPO's 2040 LRTP, where reducing congestion and improving signalized intersection operations were identified.

6. In corridors where the potential exists for future multiple interchange additions, a comprehensive corridor or network study must accompany all requests for new or revised access with recommendations that address all of the proposed and desired access changes within the context of a longer-range system or network plan (23 U.S.C. 109(d), 23 CFR 625.2(a), 655.603(d), and 771.111).

The IOAR addresses the existing and future interchange needs along I-95 within the study area. The proposed interchange improvements at I-95 and Griffin Road were developed, in part, based upon a comprehensive I-95 Interchange Master Plan (IMP). These were prepared consistent with the long-term vision for the corridor.

There are no additional planned interstate access points within the study area. Further, the interchange improvement plans at I-95 and Griffin Road will not affect potential improvements to adjacent interchanges or preclude implementation of the ultimate interchange concept identified through the IMP.

7. When a new or revised access point is due to a new, expanded, or substantial change in current or planned future development or land use, requests must demonstrate appropriate coordination has occurred between the development and any proposed transportation system improvements (23 CFR 625.2(a) and 655.603(d)). The request must describe the commitments agreed upon to assure adequate collection and dispersion of the traffic resulting from the development with the adjoining local street network and Interstate access point (23 CFR 625.2(a) and 655.603(d)).

The I-95 at Griffin Road interchange improvements are proposed to primarily serve regional mobility needs, and is not being driven by a proposed development or land use change. Regional mobility needs have steadily increased due to population and employment growth in the area and the resulting congestion on other regional roadways. No agreements regarding the completion of connecting facilities or other funding provisions affect the implementation of this project.

Access to the I-95 interstate system will remain unchanged from current conditions with the proposed improvements to the I-95 northbound off-ramp termini intersection at Griffin Road.

8. The proposal can be expected to be included as an alternative in the required environmental evaluation, review and processing. The proposal should include supporting information and current status of the environmental processing (23 CFR 771.111).

The proposed interchange improvements at I-95 and Griffin Road were developed, in part, based upon a comprehensive I-95 Interchange Master Plan (IMP). To date, no significant and adverse environmental impacts have been identified from a planning and environmental perspective concerning the recommended improvements at the NB off ramp.

Additional improvements with potential impacts were identified through the IMP and have been programmed for PD&E phase in FY 2026.

# **Appendix A**

**Existing Crash Data and** 

**Collision Diagrams** 










	FLORIDA DEPARTMENT OF TRANSPORTATION CRASH SUMMARY ECTION: 86070000 STATE ROUTE: 9												
SECTION:			8607	0000				STA	TE ROUTE:		9		
ROADWAY	LIMITS:				I-95	M.P.	5.646	то	6.708	ENGINEER:	0		
STUDY PE	RIOD:		FROM	1/	08	TO	12/	08	-	COUNTY:	Broward		
No.	MILE	DATE	DAY	TIME	CRASH TYPE	FATAL	INJURY	PROP	DAY /	WET / DRY	CONTRIBUTING CAUSE		
	POST	02/26/00	14/ - J	1 1 0 0	Deex Fael	0		DAM	NIGHT	,			
2	5.663	03/26/08	vved Sat	1400	Rear-End Sidoswipo	0	1	0	Day	Dry	Careless Driving		
3	5.663	04/19/08	Sat	2100	Hit Other Fixed Ohiect	0	0	1	Night	Dry	No Improper Driving/Act		
4	5.663	06/18/08	Wed	1900	All Other	0	0	1	Dav	Wet	Failed To Maintain Equipment		
5	5.663	09/11/08	Thu	1400	Concrete Barrier Wall	0	1	0	Day	Dry	Unknown/Not Coded		
6	5.663	10/13/08	Mon	1700	Rear-End	0	0	1	Day	Dry	Unknown/Not Coded		
7	5.663	11/20/08	Thu	0800	All Other	0	4	0	Day	Dry	Unknown/Not Coded		
8	5.663	12/19/08	Fri	1800	Rear-End	0	3	0	Night	Dry	Unknown/Not Coded		
9	5.681	01/03/08	Thu	1700	All Other	0	0	1	Night	Dry	Improper Lane Change		
10	5.681	04/03/08	Thu	2300	Rear-End	0	1	0	Night	Dry	Careless Driving		
11	5.681	05/22/08	Thu	1600	Rear-End	0	0	1	Day	Dry	Unknown/Not Coded		
12	5.681	07/25/08	Mon	1200	Sideswipe	0	0	1	Day	Wet	Unknown/Not Coded		
13	5.681	08/18/08	Mon	2000	All Other	0	0	1	Night	Wet	Improper Lane Change		
15	5.681	10/23/08	Thu	1600	Rear-End	0	0	1	Day	Wet	Followed Too Closely		
16	5.681	10/25/08	Sat	2300	Rear-End	0	2	0	Night	Dry	Careless Driving		
17	5.681	10/25/08	Sat	2300	All Other	0	7	0	Night	Wet	Unknown/Not Coded		
18	5.681	12/23/08	Tue	1900	Overturned	0	1	0	Night	Wet	Unknown/Not Coded		
19	5.763	02/12/08	Tue	1600	Sideswipe	0	0	1	Day	Wet	Unknown/Not Coded		
20	5.784	07/24/08	Thu	0600	Sideswipe	0	0	1	Day	Wet	Failed To Maintain Equipment		
21	5.890	01/04/08	Fri	1300	All Other	0	0	1	Day	Dry	Unknown/Not Coded		
22	5.913	02/04/08	Mon	1500	Hit Guardrail	0	1	0	Day	Dry	Careless Driving		
23	5.913	02/15/08	Fri	0200	Concrete Barrier Wall	0	1	0	Night	Dry	Linknown/Not Coded		
24	5.913	03/16/08	Sun	1300		0	1	0	Dav	Dry	Unknown/Not Coded		
26	5.913	03/27/08	Thu	1400	Concrete Barrier Wall	0	2	0	Day	Dry	Unknown/Not Coded		
27	5.913	05/18/08	Sun	2200	Sideswipe	0	2	0	Night	Dry	Improper Lane Change		
28	5.913	07/16/08	Wed	2300	Sideswipe	0	0	1	Night	Dry	Improper Lane Change		
29	5.913	10/23/08	Thu	0100	Angle	0	1	0	Night	Wet	Careless Driving		
30	5.913	12/24/08	Wed	2200	Rear-End	0	4	0	Night	Wet	Improper Lane Change		
31	5.936	12/31/08	Wed	0900	Sideswipe	0	0	1	Day	Dry	Fleeing Police		
32	5.974	02/12/08	Tue	2300	All Other	0	0	1	Night	Wet	Improper Lane Change		
33	5.974	02/13/08	Wed	2000	Concrete Barrier Wall	0	0	1	Day	Dry	No Improper Driving/Act		
34	5.974	02/08/08	Suli	2000	Concrete Barrier Wall	0	3 0	1	Dav	Dry	Unknown/Not Coded		
36	6.021	04/22/08	Tue	1600	Rear-End	0	0	1	Day	Dry	Unknown/Not Coded		
37	6.030	08/09/08	Sat	1600	Rear-End	0	0	1	Day	Wet	Exceeded Safe Speed Limit		
38	6.033	03/01/08	Sat	2300	Angle	0	0	1	Night	Dry	Exceeded Safe Speed Limit		
39	6.063	02/08/08	Fri	1500	Sideswipe	0	0	1	Day	Dry	Improper Lane Change		
40	6.116	03/03/08	Mon	1600	Rear-End	0	0	1	Day	Dry	Unknown/Not Coded		
41	6.125	02/09/08	Sat	1900	Sideswipe	0	0	1	Night	Wet	Improper Lane Change		
42	6.135	07/20/08	Sun	0500	Angle	0	0	1	Night	Dry	Improper Lane Change		
43	6.135	07/24/08	Thu	0000	All Other	0	1	0	Night	Wet	Unknown/Not Coded		
44	6 144	01/20/08	- Sat Thu	1600	Redi-Ellu Overturned	0	2 1	0	Dav	Dry	Careless Driving		
45	6 162	02/12/08	Tue	2000	Concrete Barrier Wall	0	0	1	Night	Slinnery	Improper Lane Change		
47	6.162	04/04/08	Fri	0000	Rear-End	0	5	0	Night	Drv	Unknown/Not Coded		
48	6.162	07/24/08	Thu	0700	Rear-End	0	1	0	Day	Wet	Careless Driving		
49	6.181	11/30/08	Sun	2000	Sideswipe	0	0	1	Night	Wet	Improper Lane Change		
50	6.213	12/04/08	Thu	0800	Rear-End	0	1	0	Day	Dry	Unknown/Not Coded		
51	6.223	01/05/08	Sat	1500	All Other	0	1	0	Day	Dry	Improper Lane Change		
52	6.223	01/23/08	Wed	2200	Separation Of Units	0	0	1	Day	Dry	Unknown/Not Coded		
53	6.223	02/12/08	Tue	1600	Kear-End	0	0	1	Day	Wet	Careless Driving		
54	6.232	03/20/08	Thu	0900	All Other	0	0	1	Day	Dry	Unknown/Not Coded		
56	6.232	11/06/08	Thu	1800	Rear-End	0	4	0	Night	Dry	Careless Driving		
57	6.232	12/27/08	Sat	1100	All Other	0	0	1	Dav	Drv	Improper Lane Change		
58	6.280	10/26/08	Sun	0300	Rear-End	0	0	1	Night	Wet	Careless Driving		
59	6.298	04/21/08	Mon	1000	Sideswipe	0	0	1	Day	Dry	No Improper Driving/Act		
60	6.299	05/05/08	Mon	1500	Concrete Barrier Wall	0	1	0	Day	Dry	Careless Driving		
61	6.299	06/12/08	Thu	0800	Rear-End	0	1	0	Day	Dry	Unknown/Not Coded		
62	6.299	09/24/08	Wed	1700	Rear-End	0	0	1	Day	Wet	Unknown/Not Coded		
63	6.299	10/26/08	Sun	0000	Rear-End	0	1	0	Night	Dry	Careless Driving		
64	6.299	10/26/08	Sun	0300	Rear-End	0	10	0	Night	Wet	Careless Driving		
65	0.299 6 200	12/10/08	Sun	1900	Rear-End	0	4	1	Night	Dry	Unknown/Not Coded		
67	6 304	12/13/08	Sup	1400	Angla	0	1	1	Nigrit	Dry	Improper Lane Change		
68	6.318	04/30/08	Wed	1700	Rear-End	0	4	0	Day	Dry	Careless Driving		
69	6.346	05/23/08	Fri	0000	All Other	0	0	1	Night	Drv	Improper Lane Change		
70	6.348	04/21/08	Mon	0700	Sideswipe	0	0	1	Day	Dry	Improper Lane Change		
71	6.348	08/22/08	Fri	2300	Concrete Barrier Wall	0	1	0	Night	Wet	Unknown/Not Coded		
72	6.393	03/31/08	Mon	0900	All Other	0	1	0	Day	Dry	Improper Lane Change		
73	6.393	07/20/08	Sun	0400	All Other	0	1	0	Night	Dry	Improper Lane Change		

	FLORIDA DEPARTMENT OF TRANSPORTATION CRASH SUMMARY												
SECTION:			8607	0000				STA	TE ROUTE:		9		
ROADWAY	LIMITS:	-			I-95	M.P.	5.646	то	6.708	ENGINEER:	0		
STUDY PEF	RIOD:		FROM	1/	08	то	12/	08		COUNTY:	Broward		
No.	MILE POST	DATE	DAY	TIME	CRASH TYPE	FATAL	INJURY	PROP DAM	DAY / NIGHT	WET / DRY	CONTRIBUTING CAUSE		
74	6.393	08/07/08	Thu	0800	Angle	0	0	1	Day	Dry	No Improper Driving/Act		
75	6.454	01/07/08	Mon	0900	Concrete Barrier Wall	0	0	1	Day	Dry	No Improper Driving/Act		
76	6.454	01/25/08	Fri	0300	Rear-End	0	1	0	Day	Dry	Careless Driving		
77	6.454	02/15/08	Fri	0200	Coll. W/ Pedestrian	1	0	0	Night	Dry	Failed To Yield Right-Of-Way		
78	6.454	03/11/08	Tue	0700	Angle	0	1	0	Day	Dry	Unknown/Not Coded		
79	6.454	03/30/08	Sun	2000	Sideswipe	0	1	0	Night	Dry	Improper Lane Change		
80	6.454	03/30/08	Sun	2100	Rear-End	0	2	0	Night	Dry	Unknown/Not Coded		
81	6.454	05/27/08	Tue	1300	All Other	0	0	1	Day	Dry	Careless Driving		
82	6.454	07/20/08	Sun	0400	Rear-End	0	3	0	Night	Dry	Exceeded Safe Speed Limit		
83	6.488	02/12/08	Tue	0500	All Other	0	1	0	Night	Dry	Improper Lane Change		
84	6.488	02/23/08	Sat	0300	All Other	0	2	0	Night	Dry	No Improper Driving/Act		
85	6.488	02/23/08	Sat	0300	Rear-End	0	1	0	Night	Dry	Careless Driving		
86	6.536	03/11/08	Tue	1600	Sideswipe	0	0	1	Day	Dry	Improper Lane Change		
87	6.536	05/23/08	Fri	1600	Sideswipe	0	1	0	Day	Wet	Unknown/Not Coded		
88	6.536	05/26/08	Mon	1800	Rear-End	0	0	1	Day	Dry	Unknown/Not Coded		
89	6.536	08/19/08	Tue	0800	Angle	0	0	1	Day	Wet	Unknown/Not Coded		
90	6.690	04/27/08	Sun	0000	Coll. W/Mvble Obj On Road	0	0	1	Night	Dry	No Improper Driving/Act		
91	6.690	06/13/08	Fri	0700	Sideswipe	0	3	0	Day	Dry	Unknown/Not Coded		
92	6.690	09/25/08	Thu	0200	All Other	0	0	1	Night	Wet	Unknown/Not Coded		
93	6.690	10/09/08	Thu	2200	Rear-End	0	10	0	Night	Wet	Improper Lane Change		
94	6.690	10/28/08	Tue	0800	Rear-End	0	0	1	Day	Dry	Unknown/Not Coded		
95	6.690	11/12/08	Wed	0900	Sideswipe	0	0	1	Day	Dry	Careless Driving		
96	6.690	11/14/08	Fri	1700	Sideswipe	0	0	1	Day	Dry	Improper Lane Change		
97	6.690	12/08/08	Mon	2000	Rear-End	0	1	0	Night	Dry	Careless Driving		
						Left	Right	Rear		Ped/			
Iotal No.		Fatal	Injury	PDO	Angle	Turn	Turn	End	Side swipe	Bike			
97		2	49	#REF!	8	0	0	34	20	1			
		2.06%	50.52%	#REF!	8.25%	0.00%	0.00%	35.05%	20.62%	1.03%			
One						Excess							
Vehicle		Day	Night	Wet	Dry	Speed	FIYRW	DUI	<b></b>				
14		53	44	25	71	4	1	4					
14.43%	43% 54.04% 45.30% 25.77% 73.20% 4.12% 1.03% 4.12%												
	TOTAL ENTERING VEHICLES/ADT: 300,079								SEGMENT C	RASH RATE:	0.834		

	FLORIDA DEPARTMENT OF TRANSPORTATION CRASH SUMMARY												
SECTION:			8607	0000				STA	TE ROUTE:		9		
ROADWAY	LIMITS:		52.014		1-95	M.P.	5.646	то	6.708	ENGINEER:	0		
STUDY PE	RIOD:		FROM	1/	09	то	12/	09	DAY /	COUNTY:	Broward		
No.	POST	DATE	DAY	TIME	CRASH TYPE	FATAL	INJURY	DAM	DAY / NIGHT	WET / DRY	CONTRIBUTING CAUSE		
1	5.663	01/16/09	Fri	0500	Sideswipe	0	0	1	Day	Dry	Unknown/Not Coded		
2	5.663	02/03/09	Tue	2200	Rear-End	0	0	1	Day	Dry	Unknown/Not Coded		
3	5.663	06/23/09	Tue	2300	All Other	0	0	1	Night	Wet	Improper Lane Change		
4	5.663	08/06/09	Thu	1500		0	3	0	Dav	Dry	Unknown/Not Coded		
6	5.663	12/04/09	Fri	0000	Sideswipe	0	0	1	Day	Dry	Improper Lane Change		
7	5.681	01/03/09	Sat	0000	Rear-End	0	0	1	Night	Dry	Unknown/Not Coded		
8	5.681	06/11/09	Thu	1400	All Other	0	2	0	Day	Dry	Unknown/Not Coded		
9 10	5.681	07/20/09	Thu	1500	Rear-End Rear-End	0	1	0	Day	Dry	Careless Driving		
11	5.681	12/02/09	Wed	2000	Angle	0	2	0	Night	Dry	Improper Lane Change		
12	5.890	07/16/09	Thu	1900	Rear-End	0	1	0	Day	Dry	Followed Too Closely		
13	5.890	09/30/09	Wed	1100	Sideswipe	0	1	0	Day	Dry	Improper Lane Change		
14	5.913	03/20/09	Sat	0100	Concrete Barrier Wall	0	0	1	Night	Wet	Unknown/Not Coded		
16	5.913	05/15/09	Fri	0700	Rear-End	0	5	0	Day	Wet	Unknown/Not Coded		
17	5.913	06/17/09	Wed	1000	Coll. W/Mvble Obj On Road	0	0	1	Day	Dry	No Improper Driving/Act		
18	5.913	06/23/09	Tue	2100	All Other	0	1	0	Night	Wet	Improper Lane Change		
20	5.913	07/02/09	Mon	0700	All Other	0	2	1	Day Day	Drv	Careless Driving		
20	5.913	09/10/09	Thu	0100	Concrete Barrier Wall	0	0	1	Night	Wet	Unknown/Not Coded		
22	5.913	10/17/09	Sat	1200	Rear-End	0	0	1	Day	Wet	Unknown/Not Coded		
23	5.913	10/22/09	Thu	0800	Rear-End	0	2	0	Day	Wet	Unknown/Not Coded		
24	5.913	11/11/09	Wed	1100	Sideswipe All Other	0	0	1	Day	Dry Wet	Improper Lane Change		
25	5.974	02/18/09	Wed	0600	Angle	0	0	1	Day	Drv	Unknown/Not Coded		
27	5.974	03/16/09	Mon	1000	Rear-End	0	0	1	Day	Dry	Unknown/Not Coded		
28	5.974	08/24/09	Mon	0500	Jackknifed	0	0	1	Night	Dry	Careless Driving		
29	6.009	11/26/09	Thu	0100	Rear-End	0	4	0	Night	Wet	Careless Driving		
30	6.042	05/21/09	Thu	0200	Concrete Barrier Wall	0	1	0	Day Night	Dry	Unknown/Not Coded		
32	6.063	02/19/09	Thu	1700	Rear-End	0	0	1	Day	Dry	Unknown/Not Coded		
33	6.068	01/23/09	Fri	2300	Rear-End	0	0	1	Night	Dry	Improper Lane Change		
34	6.068	04/19/09	Sun	1700	Concrete Barrier Wall	0	2	0	Day	Dry	Careless Driving		
35	6.068	10/12/09	Mon	0800	Sideswipe	0	2	0	Night	Drv	Improper Lane Change		
37	6.087	03/08/09	Sun	0500	Concrete Barrier Wall	0	1	0	Night	Dry	Careless Driving		
38	6.087	07/04/09	Sat	0200	Angle	0	1	0	Night	Wet	Alchol-Under Influence		
39	6.087	08/09/09	Sun	0300	All Other	0	0	1	Night	Dry	Improper Lane Change		
40	6.087	09/23/09	Sat	1300	Angle	0	5	0	Dav	Ury Wet	Improper Lane Change		
42	6.116	01/30/09	Fri	1800	Rear-End	0	0	1	Night	Dry	Improper Lane Change		
43	6.116	08/30/09	Sun	1800	All Other	0	0	1	Day	Dry	Improper Lane Change		
44	6.125	03/28/09	Sat	0900	Rear-End	0	3	0	Day	Dry	Unknown/Not Coded		
45 46	6.125	07/20/09	Thu	1600	Sideswine	0	2	0	Day Day	Dry	Followed Too Closely		
40	6.144	04/28/09	Tue	0800	Rear-End	0	0	1	Day	Dry	Unknown/Not Coded		
48	6.159	11/20/09	Fri	0700	Angle	0	2	0	Day	Dry	Careless Driving		
49	6.162	07/10/09	Fri	2300	All Other	0	2	0	Night	Dry	Unknown/Not Coded		
50 51	6.201 6.223	10/16/09	Sat Fri	1200	Overturned Rear-End	0	2	0	Day Day	Dry	Careless Driving		
52	6.232	04/24/09	Fri	2100	All Other	0	0	1	Night	Dry	Obstructing Traffic		
53	6.232	04/27/09	Mon	0800	Sideswipe	0	1	0	Day	Dry	Improper Lane Change		
54	6.232	06/23/09	Tue	2300	Rear-End	0	1	0	Night	Wet	Unknown/Not Coded		
55 56	6.242 6.242	01/05/09	IVION Fri	2200	Angle Overturned	0	6 2	0	Night Dav	Ury Wet	IND IMPROPER DRIVING/ACT		
57	6.242	07/21/09	Tue	1400	Sideswipe	0	0	1	Day	Dry	Unknown/Not Coded		
58	6.242	08/30/09	Sun	1900	Angle	0	0	1	Day	Dry	Careless Driving		
59	6.242	09/18/09	Fri	0700	Rear-End	0	1	0	Day	Dry	Unknown/Not Coded		
60	6.251	04/02/09	I hu Wed	1/00	Kear-End	0	1	0	Day	Dry Dry	Unknown/Not Coded		
62	6.280	06/05/09	Fri	0900	All Other	0	0	1	Day	Dry	Improper Lane Change		
63	6.280	08/21/09	Fri	1500	All Other	0	0	1	, Day	, Dry	Improper Lane Change		
64	6.299	01/06/09	Tue	2300	Concrete Barrier Wall	0	2	0	Night	Dry	No Improper Driving/Act		
65	6.299	0//26/09	Sun	0400	Rear-End	0	2	0	Night	Dry	Unknown/Not Coded		
67	6.299	12/25/09	Fri	0300	Angle	0	1	0	Night	Dry	Improper Lane Change		
68	6.304	04/26/09	Sun	2200	Angle	0	1	0	Night	Dry	Unknown/Not Coded		
69	6.304	10/20/09	Tue	1700	Rear-End	0	0	1	Day	Dry	Unknown/Not Coded		
70	6.318	04/10/09	Fri	1700	Rear-End	0	3	0	Day	Dry	Unknown/Not Coded		
71	6 337	01/22/09	Sun Thu	1800	All Other Rear-End	0	2	0	Night	Dry	Unknown/Not Coded		
73	6.337	10/18/09	Sun	2100	Concrete Barrier Wall	0	1	0	Night	Dry	Careless Driving		

	FLORIDA DEPARTMENT OF TRANSPORTATION CRASH SUMMARY ECTION: 86070000 STATE ROUTE: 9													
SECTION:			8607	70000				STA	TE ROUTE:		9			
ROADWAY					1-95	MP	5,646	то	6.708	ENGINEER:	0			
STUDY PER	RIOD:		FROM	1/	09	то	12/	09		COUNTY:	Broward			
	MILE	1						PROP	DAY /					
No.	POST	DATE	DAY	TIME	CRASH TYPE	FATAL	INJURY	DAM	NIGHT	WET / DRY	CONTRIBUTING CAUSE			
74	6.348	02/07/09	Sat	1100	Head-On	0	1	0	Day	Dry	Unknown/Not Coded			
75	6.348	06/30/09	Tue	1900	Angle	0	0	1	Dav	Wet	Improper Lane Change			
76	6.374	08/10/09	Mon	1400	Rear-End	1	1	0	Day	Slippery	Unknown/Not Coded			
77	6.393	01/15/09	Thu	0200	Concrete Barrier Wall	0	0	1	Night	Dry	Careless Driving			
78	6.393	05/02/09	Sat	1200	Rear-End	0	0	1	Day	Dry	No Improper Driving/Act			
79	6.393	07/06/09	Mon	0700	Rear-End	0	0	1	Day	Dry	Unknown/Not Coded			
80	6.454	01/21/09	Wed	1900	Sideswipe	0	0	1	Night	Dry	Careless Driving			
81	6.454	01/31/09	Sat	2100	All Other	0	0	1	Night	Dry	Improper Lane Change			
82	6.454	02/28/09	Sat	0500	Sideswipe	0	3	0	Day	Dry	Unknown/Not Coded			
83	6.454	03/05/09	Thu	2100	Concrete Barrier Wall	0	1	0	Night	Drv	Alchol-Under Influence			
84	6.454	03/07/09	Sat	0300	Rear-End	0	1	0	Night	Drv	Careless Driving			
85	6.454	03/25/09	Wed	2300	All Other	0	0	1	Night	Dry	Improper Lane Change			
86	6.454	04/07/09	Tue	0700	Rear-End	0	1	0	Day	Dry	Unknown/Not Coded			
87	6.454	04/10/09	Fri	0000	Sideswipe	0	0	1	Day	Dry	Failed To Maintain Equipment			
88	6.454	04/19/09	Sun	0200	Concrete Barrier Wall	0	1	0	Night	Dry	Unknown/Not Coded			
89	6.454	05/30/09	Sat	1400	Rear-End	0	5	0	Day	Wet	Careless Driving			
90	6.454	06/02/09	Tue	2000	Rear-End	0	0	1	Night	Wet	Careless Driving			
91	6.454	08/12/09	Wed	1900	Rear-End	0	0	1	Day	Dry	Unknown/Not Coded			
92	6.454	08/19/09	Wed	1000	Sideswipe	0	0	1	Dav	Drv	Unknown/Not Coded			
93	6.454	09/03/09	Thu	1100	All Other	0	0	1	Dav	, Wet	Improper Lane Change			
94	6.454	10/14/09	Wed	2000	Angle	0	1	0	Night	Wet	Failed To Maintain Equipment			
95	6.454	12/17/09	Thu	2000	Concrete Barrier Wall	0	1	0	Night	Wet	Unknown/Not Coded			
96	6.519	05/31/09	Sun	1700	Sideswipe	0	0	1	Dav	Drv	Improper Lane Change			
97	6.519	11/02/09	Mon	1000	Coll, W/ My On Roadway	0	1	0	Dav	Drv	Careless Driving			
98	6.536	06/23/09	Tue	1500	Sideswipe	0	0	1	Dav	Drv	Improper Lane Change			
99	6.536	08/24/09	Mon	2200	Hit Guardrail	0	1	0	Night	, Drv	Failed To Maintain Equipment			
100	6.537	08/12/09	Wed	1100	Sideswipe	0	1	0	Dav	Drv	Improper Lane Change			
101	6.663	11/16/09	Mon	0400	Sideswipe	0	0	1	Night	Dry	Improper Lane Change			
102	6.704	01/06/09	Tue	1800	Rear-End	0	0	1	Night	Drv	Unknown/Not Coded			
103	6.704	01/18/09	Sun	0900	Concrete Barrier Wall	0	1	0	Dav	Drv	Unknown/Not Coded			
104	6.704	02/20/09	Fri	1800	Sideswipe	0	0	1	Night	Drv	Improper Lane Change			
105	6.704	04/12/09	Sun	0100	Angle	0	1	0	Night	Drv	Improper Lane Change			
106	6.704	04/19/09	Sun	1800	Angle	0	9	0	Dav	Drv	Unknown/Not Coded			
107	6.704	05/18/09	Mon	0700	All Other	0	1	0	Dav	Drv	Improper Lane Change			
108	6.704	07/02/09	Thu	1700	All Other	0	0	1	Dav	, Wet	Improper Lane Change			
109	6.704	08/15/09	Sat	0700	Rear-End	0	1	0	Night	Drv	Careless Driving			
110	6.704	09/08/09	Tue	0900	Angle	0	0	1	Day	Dry	Improper Lane Change			
						Left	Right	Rear	,	Ped/				
Total No.		Fatal	Iniury	PDO	Angle	Turn	Turn	End	Side swipe	Bike				
110		1	60	49	17	0	0	37	18	0				
		0.91%	54.55%	44.55%	15.45%	0.00%	0.00%	33.64%	16.36%	0.00%				
One						Excess								
Vehicle		Day	Night	Wet	Dry	Speed	FTYRW	DUI						
14		65	45	22	87	0	0	4						
12.73%		59.09%	40.91%	20.00%	79.09%	0.00%	0.00%	3.64%						
		TOTAL ENTE	RING VEHI	CLES/ADT:	285,099	SEGMENT CRASH RATE: 0.995								

	FLORIDA DEPARTMENT OF TRANSPORTATION CRASH SUMMARY											
SECTION:			8607	0000				STA	TE ROUTE:		9	
ROADWAY	LIMITS:		FROM		I-95	M.P.	5.646	TO	6.708	ENGINEER:	0	
STUDY PEI	RIOD: MILE	1	FRUIVI	1/	10	10	12/	PROP	DAY /	COUNTY:	Broward	
No.	POST	DATE	DAY	TIME	CRASH TYPE	FATAL	INJURY	DAM	NIGHT	WET / DRY	CONTRIBUTING CAUSE	
1	5.649	12/12/10	Sun	0000	All Other	0	0	1	Night	Dry	Unknown/Not Coded	
2	5.656	02/03/10	Wed	2200	All Other	0	1	0	Night	Dry	Careless Driving	
3	5.656	07/04/10	Sun	1200	Rear-End Bear-End	0	0	1	Night	Wet	No Improper Driving/Act	
5	5.656	11/28/10	Sun	0400	Rear-End	0	1	0	Night	Dry	Unknown/Not Coded	
6	5.679	03/18/10	Thu	0900	Head-On	0	0	1	Day	Dry	Improper Lane Change	
7	5.679	03/18/10	Thu	1000	Rear-End	0	0	1	Day	Dry	Unknown/Not Coded	
8	5.679	05/05/10	Wed	2200	Rear-End Sideswipe	0	3	0	Night	Dry	Careless Driving	
10	5.679	06/07/10	Mon	2100	All Other	0	3	0	Night	Wet	Unknown/Not Coded	
11	5.679	08/28/10	Sat	2100	Angle	0	2	0	Night	Wet	Careless Driving	
12	5.679	09/28/10	Tue	1600	Rear-End	0	0	1	Day	Wet	Improper Lane Change	
13	5.747	07/05/10	Mon	1200	Concrete Barrier Wall	0	0	1	Day	Wet	Unknown/Not Coded	
14	5.906	08/12/10	Thu	0700	Concrete Barrier Wall	0	0	1	Dav	Dry	No Improper Driving/Act	
16	5.906	05/19/10	Wed	1100	Rear-End	0	4	0	Day	Dry	Unknown/Not Coded	
17	5.906	07/04/10	Sun	0400	Rear-End	0	2	0	Night	Wet	Unknown/Not Coded	
18	5.906	08/04/10	Wed	0600	All Other	0	0	1	Day	Wet	Improper Lane Change	
20	5.906	08/04/10	Wed	0700	Kear-End Angle	0	0	1	Day	Wet	Careless Driving	
20	5.906	09/28/10	Tue	0900	Rear-End	0	2	0	Day	Wet	Careless Driving	
22	5.906	10/29/10	Fri	1400	Sideswipe	0	1	0	Day	Dry	Improper Lane Change	
23	5.906	11/17/10	Wed	1700	Rear-End	0	4	0	Day	Dry	Careless Driving	
24	5.906	11/27/10	Sat	1200	Rear-End	0	2	0	Day	Dry	Careless Driving	
25	5.929	12/22/10	Sat	0300	Concrete Barrier Wall	0	4	1	Night	Dry	Careless Driving	
27	5.940	02/22/10	Mon	2200	All Other	0	1	0	Night	Dry	Improper Lane Change	
28	5.956	06/01/10	Tue	0800	Rear-End	0	1	0	Day	Wet	Unknown/Not Coded	
29	5.967	01/17/10	Sun	1100	Rear-End	0	2	0	Day	Wet	No Improper Driving/Act	
30	5.967	10/20/10	Wed	2100	Separation Of Units	0	0	1	Night	Dry	Unknown/Not Coded	
32	5.967	12/17/10	Fri	2300	Rear-End	0	7	0	Night	Dry	Unknown/Not Coded	
33	6.006	10/26/10	Tue	1900	Angle	0	1	0	Night	Dry	Improper Lane Change	
34	6.056	12/01/10	Wed	1200	Rear-End	0	1	0	Day	Dry	Careless Driving	
35	6.061	04/21/10	Wed	1600	Rear-End Concrete Barrier Wall	0	5	0	Day	Dry Wet	Careless Driving	
37	6.061	06/20/10	Sun	0400	All Other	0	1	0	Night	Wet	Unknown/Not Coded	
38	6.061	07/03/10	Sat	1100	Angle	0	2	0	Day	Dry	No Improper Driving/Act	
39	6.061	07/17/10	Sat	2200	Angle	0	1	0	Night	Wet	No Improper Driving/Act	
40	6.061	10/02/10	Sat Fri	0400 1300	Concrete Barrier Wall	1	0	0	Night	Dry	Alchol-Under Influence	
42	6.099	01/11/10	Mon	1900	Concrete Barrier Wall	0	1	0	Night	Dry	Unknown/Not Coded	
43	6.099	03/29/10	Mon	1300	Rear-End	0	1	0	Day	Wet	Careless Driving	
44	6.118	11/21/10	Sun	1900	All Other	0	1	0	Night	Wet	Unknown/Not Coded	
45	6.128	06/20/10	Sun	1800	Angle All Other	0	4	0	Night Night	Wet	Improper Lane Change	
40	6.128	12/20/10	Mon	1300	All Other	0	0	1	Day	Dry	Unknown/Not Coded	
48	6.137	03/18/10	Thu	0900	All Other	0	0	1	, Day	Dry	Unknown/Not Coded	
49	6.137	04/03/10	Sat	0300	All Other	1	1	0	Night	Dry	Unknown/Not Coded	
50 51	6.137	04/15/10	Tue	1600	Rear-End Rear-End	0	1	0	Day	Wet	Unknown/Not Coded	
52	6.139	09/20/10	Mon	2000	Overturned	0	1	0	Night	Dry	Unknown/Not Coded	
53	6.145	08/01/10	Sun	0700	Angle	0	0	1	Day	Dry	Improper Lane Change	
54	6.156	04/03/10	Sat	0300	All Other	0	1	0	Night	Dry	Careless Driving	
55 56	6.173	12/05/10	Sun Tue	0100 1800	All Other Overturned	0	1	0	Night Night	Dry	Unknown/Not Coded	
57	6.199	06/22/10	Tue	1600	All Other	0	0	1	Day	Dry	Improper Lane Change	
58	6.209	08/03/10	Tue	1400	Sideswipe	0	0	1	Day	Dry	Improper Lane Change	
59	6.218	08/03/10	Tue	0200	Coll. W/Mvble Obj On Road	0	1	0	Night	Dry	No Improper Driving/Act	
60 61	6.218	11/04/10	Thu	0900	All Other	0	0	1	Night	Wet	No Improper Driving/Act	
62	6.247	09/01/10	Wed	1200	Angle	0	0	1	Dav	Drv	Unknown/Not Coded	
63	6.266	02/16/10	Tue	1300	Concrete Barrier Wall	0	3	0	Day	Dry	Improper Lane Change	
64	6.285	03/16/10	Tue	0600	Sideswipe	0	1	0	Day	Dry	Improper Lane Change	
65	6.285	06/15/10	Tue	0200	Sideswipe	0	2	0	Night	Dry	Improper Lane Change	
67	6.285	11/07/10	Sun	1000	All Other	0	1	1	Dav	Dry	Careless Driving	
68	6.304	03/22/10	Mon	1400	Rear-End	0	1	0	Day	Wet	Careless Driving	
69	6.379	02/06/10	Sat	1300	Coll. W/Mvble Obj On Road	0	0	1	Day	Dry	No Improper Driving/Act	
70	6.379	03/15/10	Mon	0800	Concrete Barrier Wall	0	1	0	Day	Dry	Unknown/Not Coded	
71	6 379	07/22/10	l hu Sat	2200	Ran Off Rd Into Water	0	0	1	Night	Ury Wet	IND IMPROPER DRIVING/ACT	
73	6.379	08/01/10	Sun	2300	Rear-End	0	0	1	Night	Dry	No Improper Driving/Act	

				TION							
SECTION			8607	0000	CIVIDI	1 JOIVIIVIAI		STA	TE ROUTE:		9
ROADWAY	I IMITS:				1-95	MP	5.646	то	6.708	ENGINEER:	0
STUDY PER	NOD:		FROM	1/	10	то	12/	10		COUNTY:	Broward
	MILE	1		_,				PROP	DAY /		
No.	POST	DATE	DAY	TIME	CRASH TYPE	FATAL	INJURY	DAM	NIGHT	WET / DRY	CONTRIBUTING CAUSE
74	6.379	09/22/10	Wed	0600	Angle	0	1	0	Day	Wet	Improper Lane Change
75	6.379	09/30/10	Thu	0800	Concrete Barrier Wall	0	1	0	Day	Wet	Unknown/Not Coded
76	6.381	11/15/10	Mon	2200	Concrete Barrier Wall	0	2	0	Night	Dry	Unknown/Not Coded
77	6.390	10/17/10	Sun	0500	Rear-End	0	0	1	Night	Dry	Careless Driving
78	6.440	02/12/10	Fri	1100	Sideswipe	0	2	0	Day	Dry	Unknown/Not Coded
79	6.440	02/17/10	Wed	1000	Sideswipe	0	0	1	Day	Dry	Improper Lane Change
80	6.440	02/18/10	Thu	1000	Hit Guardrail	0	1	0	Day	Dry	Unknown/Not Coded
81	6.440	03/11/10	Thu	1500	Sideswipe	0	0	1	Day	Dry	Improper Lane Change
82	6.440	03/16/10	Tue	2000	Occupant Fell From Veh	0	1	0	Night	Dry	No Improper Driving/Act
83	6.440	05/11/10	Tue	1400	Concrete Barrier Wall	0	0	1	Day	Dry	Improper Lane Change
84	6.440	05/27/10	Thu	1800	Rear-End	0	0	1	Day	Dry	No Improper Driving/Act
85	6.440	06/14/10	Mon	1600	Sideswipe	0	1	0	Day	Dry	Improper Lane Change
86	6.440	06/19/10	Sat	0600	Concrete Barrier Wall	0	1	0	Day	Dry	No Improper Driving/Act
87	6.440	07/02/10	Fri	1700	Angle	0	0	1	Day	Dry	Improper Lane Change
88	6.440	07/30/10	Fri	1900	All Other	0	2	0	Day	Dry	Improper Lane Change
89	6.440	07/31/10	Sat	1400	Concrete Barrier Wall	0	1	0	Day	Dry	Careless Driving
90	6.440	09/11/10	Sat	0100	Concrete Barrier Wall	0	1	0	Night	Dry	Careless Driving
91	6.440	09/24/10	Fri	1600	Sideswipe	0	0	1	Day	Wet	Improper Lane Change
92	6.440	09/29/10	Wed	0600	Overturned	0	1	0	Night	Wet	No Improper Driving/Act
93	6.440	10/20/10	Wed	1100	Rear-End	0	0	1	Day	Dry	Careless Driving
94	6.440	11/04/10	Thu	0200	Concrete Barrier Wall	0	1	0	Night	Wet	No Improper Driving/Act
95	6.519	06/11/10	Fri	0200	Sideswipe	0	3	0	Night	Dry	Careless Driving
96	6.519	09/06/10	Mon	1700	All Other	0	0	1	Day	Dry	Improper Lane Change
97	6.528	03/22/10	Mon	1300	Rear-End	0	1	0	Day	Wet	Unknown/Not Coded
98	6.528	09/29/10	Wed	1800	All Other	0	1	0	Night	Wet	Improper Lane Change
99	6.690	01/29/10	Fri	1400	Rear-End	0	3	0	Day	Dry	Careless Driving
100	6.690	02/12/10	Fri	2100	All Other	0	1	0	Night	Wet	Improper Lane Change
101	6.690	02/13/10	Sat	1100	Sideswipe	0	0	1	Day	Dry	Improper Lane Change
102	6.690	02/16/10	Tue	1400	Rear-End	0	0	1	Day	Dry	Careless Driving
103	6.690	02/22/10	Mon	0700	Rear-End	0	1	0	Day	Slippery	Unknown/Not Coded
104	6.690	02/22/10	Mon	0800	Rear-End	0	0	1	Day	Slippery	Unknown/Not Coded
105	6.690	02/24/10	Wed	2200	Concrete Barrier Wall	0	0	1	Night	Wet	Unknown/Not Coded
106	6.690	03/28/10	Sun	0700	Rear-End	0	1	0	Day	Dry	Unknown/Not Coded
107	6.690	04/07/10	Wed	1300	Angle	0	1	0	Day	Dry	Unknown/Not Coded
108	6.690	04/19/10	Mon	1700	Rear-End	0	1	0	Day	Dry	Unknown/Not Coded
109	6.690	08/10/10	Tue	0800	Rear-End	0	1	0	Day	Wet	Unknown/Not Coded
110	6.690	10/06/10	Wed	1300	Sideswipe	0	0	1	Day	Dry	Unknown/Not Coded
111	6.690	10/08/10	Fri	1600	Rear-End	0	1	0	Day	Dry	Unknown/Not Coded
112	6.690	11/12/10	Fri	0600	Head-On	0	1	0	Day	Wet	Exceeded Safe Speed Limit
113	6.690	12/03/10	Fri	1100	All Other	0	0	1	Night	Dry	No Improper Driving/Act
114	6.690	12/22/10	Wed	1400	All Other	0	0	1	Day	Dry	Unknown/Not Coded
						Left	Right	Rear		Ped/	
Total No.		Fatal	Injury	PDO	Angle	Turn	Turn	End	Side swipe	Bike	
114		2	66	46	11	0	0	35	15	0	
		1.75%	57.89%	40.35%	9.65%	0.00%	0.00%	30.70%	13.16%	0.00%	
One						Excess					
Vehicle		Day	Night	Wet	Dry	Speed	FTYRW	DUI			
23		66	48	37	75	1	0	8			
20.18%		57.89%	42.11%	32.46%	65.79%	0.88%	0.00%	7.02%			
					200 290	SEGMENT CRASH PATE: 1 002					
		TOTALENTE	KING VEHI	CLES/ADT:	209,280	SEGMENT CRASH RATE: 1.092					

	FLORIDA DEPARTMENT OF TRANSPORTATION CRASH SUMMARY											
SECTION:			8607	0000		SolutiA		STA	TE ROUTE:		9	
ROADWAY	LIMITS:				1-95	M.P.	5.646	то	6.708	ENGINEER:	0	
STUDY PEI	RIOD:	1	FROM	1/	11	то	12/			COUNTY:	Broward	
No.	POST	DATE	DAY	TIME	CRASH TYPE	FATAL	INJURY	DAM	NIGHT	WET / DRY	CONTRIBUTING CAUSE	
1	5.656	02/03/11	Thu	2000	All Other	0	0	1	Night	Dry	Unknown/Not Coded	
2	5.656	03/29/11	Tue	1700	Rear-End	0	1	0	Day	Wet	Careless Driving	
3 4	5.656	04/25/11	Tue	1100	Coll. W/Myble Obi On Road	0	0	1	Day Day	Dry	No Improper Driving/Act	
5	5.656	06/12/11	Sun	0700	Coll. W/ Mv On Roadway	0	0	1	Day	Dry	Careless Driving	
6	5.656	07/27/11	Wed	0800	Rear-End	0	0	1	Day	Dry	Unknown/Not Coded	
/ 8	5.656	09/03/11	Sat Fri	2000	Angle Bear-End	0	2	0	Night Night	Dry Dry	Unknown/Not Coded	
9	5.679	04/15/11	Fri	1200	All Other	0	1	0	Day	Dry	Unknown/Not Coded	
10	5.679	10/08/11	Sat	1900	All Other	0	0	1	Night	Wet	Unknown/Not Coded	
11	5.679	11/19/11 04/14/11	Sat Thu	1400	Coll. W/ MV On Roadway Angle	0	0	1	Day Day	Dry Dry	Careless Driving	
13	5.836	02/04/11	Fri	1100	Concrete Barrier Wall	0	3	0	Night	Dry	No Improper Driving/Act	
14	5.906	02/06/11	Sun	1600	Coll. W/ Mv On Roadway	0	0	1	Day	Dry	Unknown/Not Coded	
15	5.906	02/10/11	Tue	2000	All Other	0	2	0	Day Night	Dry Dry	No Improper Driving/Act	
17	5.906	07/28/11	Thu	1600	Rear-End	0	2	0	Day	Dry	Followed Too Closely	
18	5.906	08/09/11	Tue	2100	Hit Guardrail	0	0	1	Night	Wet	No Improper Driving/Act	
19	5.906	08/16/11	Tue	1800	Rear-End Bear-End	0	1	0	Day Night	Wet Dry	Careless Driving	
21	5.906	08/27/11	Sat	1900	All Other	0	0	1	Day	Dry	Unknown/Not Coded	
22	5.906	10/08/11	Sat	0200	Coll. W/ Mv On Roadway	0	0	1	Night	Wet	Unknown/Not Coded	
23	5.906	10/18/11	Tue	2200	All Other	0	3	0	Night	Wet	Unknown/Not Coded	
24	5.929	05/15/11	Sun	1300	Overturned	0	1	0	Day	Dry	No Improper Driving/Act	
26	5.932	05/13/11	Fri	0500	Rear-End	0	0	1	Night	Dry	Careless Driving	
27	5.956	11/07/11	Mon	1000	Concrete Barrier Wall	0	1	0	Day	Dry	No Improper Driving/Act	
28	5.956	03/16/11	Wed	2100	Rear-End Rear-End	0	1	0	Night	Dry	No Improper Driving/Act	
30	5.967	07/04/11	Mon	0100	Concrete Barrier Wall	0	0	1	Night	Wet	No Improper Driving/Act	
31	5.967	11/07/11	Mon	0100	Rear-End	0	0	1	Night	Dry	Exceeded Safe Speed Limit	
32	6.006	01/15/11	Sat	1500	Coll. W/ My On Roadway	0	0	1	Dav	Wet	Improper Driving/Act	
34	6.056	01/20/11	Thu	0400	Angle	0	1	0	Night	Dry	Unknown/Not Coded	
35	6.056	07/03/11	Sun	1700	All Other	0	1	0	Day	Dry	Unknown/Not Coded	
36	6.061	02/08/11	Tue	0800	Rear-End Rear-End	0	0	1	Day Day	Dry Dry	Careless Driving	
38	6.061	07/30/11	Sat	0100	Concrete Barrier Wall	0	0	1	Night	Wet	Careless Driving	
39	6.061	10/28/11	Fri	2300	Concrete Barrier Wall	0	1	0	Night	Wet	Careless Driving	
40	6.061	01/11/11	Tue	0200	Rear-End Rear-End	0	0	1	Dav	Drv	Unknown/Not Coded	
42	6.080	02/10/11	Thu	0300	All Other	0	0	1	Night	, Dry	Unknown/Not Coded	
43	6.080	09/12/11	Mon	2100	Rear-End	0	4	0	Night	Dry	No Improper Driving/Act	
44	6.090	06/20/11	Thu	1400	Coll. W/ My On Roadway	0	3	0	Day	Drv	No Improper Driving/Act	
46	6.099	08/02/11	Tue	1400	Cargo Loss Or Shift	0	0	1	Day	Dry	Unknown/Not Coded	
47	6.128	01/07/11	Fri	1800	Rear-End	0	0	1	Night	Dry	Unknown/Not Coded	
48	6.128	02/02/11	vvea Thu	0700	Rear-End	0	3	0	Day Dav	Dry Drv	Careless Driving	
50	6.137	08/20/11	Sat	0900	All Other	0	3	0	Day	Wet	Unknown/Not Coded	
51	6.147	10/13/11	Thu	1500	All Other	0	2	0	Day	Dry	Unknown/Not Coded	
52	6.179	04/02/11	Sat	0900	All Other	0	0	1	Day Dav	Dry Drv	Unknown/Not Coded Unknown/Not Coded	
54	6.209	09/15/11	Thu	1100	Coll. W/ Mv On Roadway	0	0	1	Day	Dry	Unknown/Not Coded	
55	6.218	05/17/11	Tue	0400	Rear-End	0	1	0	Night	Dry	Careless Driving	
50	6.228	02/10/11	Fri	1300	Rear-End Rear-End	0	 5	0	Day Dav	Dry Dry	Unknown/Not Coded	
58	6.247	08/30/11	Tue	2300	All Other	0	0	1	Night	Wet	Unknown/Not Coded	
59	6.247	11/24/11	Thu	1300	Rear-End	0	2	0	Day	Dry	Unknown/Not Coded	
60 61	6.285	05/27/11	Fri	1200	All Other	0	1	0	Day	Wet	Unknown/Not Coded	
62	6.285	07/18/11	Mon	1500	Rear-End	0	1	0	Day	Dry	Careless Driving	
63	6.290	09/22/11	Thu	1400	Rear-End	0	0	1	Day	Dry	No Improper Driving/Act	
65	6.304	11/30/11	Wed	1400	Angre All Other	0	0	1	Day Dav	Dry	Unknown/Not Coded	
66	6.324	11/21/11	Mon	1100	Coll. W/ Mv On Roadway	0	0	1	, Day	Wet	Improper Passing	
67	6.379	03/15/11	Tue	2300	Rear-End	0	1	0	Night	Dry	Careless Driving	
69	6.379	09/22/11	Thu	1600	Rear-End	0	0	1	Day Dav	Dry	No Improper Driving/Act	
70	6.390	10/05/11	Wed	0600	Angle	0	2	0	Night	Dry	Careless Driving	
71	6.433	03/22/11	Tue	0700	Rear-End	0	1	0	Day	Dry	No Improper Driving/Act	
72	6.440	04/03/11	Sun	0400	Rear-End	0	0	1	Night	Dry	Unknown/Not Coded	

	FLORIDA DEPARTMENT OF TRANSPORTATION CRASH SUMMARY													
SECTION:			8607	0000				STA	TE ROUTE:		9			
ROADWAY	LIMITS:				I-95	M.P.	5.646	то	6.708	ENGINEER:	0			
STUDY PER	RIOD:		FROM	1/	11	то	12/	11		COUNTY:	Broward			
No.	MILE POST	DATE	DAY	TIME	CRASH TYPE	FATAL	INJURY	PROP DAM	DAY / NIGHT	WET / DRY	CONTRIBUTING CAUSE			
74	6.440	05/21/11	Sat	1900	Rear-End	0	0	1	Night	Dry	No Improper Driving/Act			
75	6.440	06/28/11	Tue	1700	Angle	0	0	1	Day	Wet	Careless Driving			
76	6.440	07/17/11	Sun	1400	Concrete Barrier Wall	0	1	0	Day	Dry	Careless Driving			
77	6.440	07/18/11	Mon	1500	Coll. W/ Mv On Roadway	0	0	1	Day	Wet	Careless Driving			
78	6.440	07/27/11	Wed	1200	All Other	0	1	0	Day	Dry	No Improper Driving/Act			
79	6.440	08/19/11	Fri	1700	Coll. W/ Mv On Roadway	0	2	0	Day	Wet	Improper Passing			
80	6.440	10/11/11	Tue	0700	All Other	0	1	0	Day	Dry	Unknown/Not Coded			
81	6.440	12/09/11	Fri	1500	Jackknifed	0	0	1	Day	Wet	No Improper Driving/Act			
82	6.440	12/09/11	Fri	1200	Rear-End	0	0	1	Day	Wet	Careless Driving			
83	6.474	05/06/11	Fri	0800	All Other	0	0	1	Day	Wet	Unknown/Not Coded			
84	6.490	12/28/11	Wed	1800	Hit Guardrail	0	1	0	Night	Dry	Careless Driving			
85	6.519	03/17/11	Thu	0000	All Other	0	1	0	Night	Dry	Unknown/Not Coded			
86	6.528	05/05/11	Thu	1600	All Other	0	0	1	Day	Dry	Unknown/Not Coded			
87	6.528	12/29/11	Thu	1300	Rear-End	0	0	1	Day	Dry	Unknown/Not Coded			
88	6.560	05/15/11	Sun	0300	All Other	0	1	0	Night	Wet	Unknown/Not Coded			
89	6.590	12/27/11	Tue	1200	Coll. W/ Mv On Roadway	0	1	0	Day	Dry	No Improper Driving/Act			
90	6.690	01/07/11	Fri	1900	All Other	0	1	0	Night	Dry	Unknown/Not Coded			
91	6.690	04/03/11	Sun	0000	Coll. W/ Mv On Roadway	0	0	1	Night	Dry	Unknown/Not Coded			
92	6.690	04/18/11	Mon	1700	Rear-End	0	1	0	Day	Dry	Careless Driving			
93	6.690	05/06/11	Fri	2000	All Other	0	0	1	Day	Dry	Unknown/Not Coded			
94	6.690	07/04/11	Mon	2200	All Other	0	0	1	Night	Dry	Unknown/Not Coded			
95	6.690	08/01/11	Mon	1000	Rear-End	0	2	0	Day	Wet	Careless Driving			
96	6.690	08/03/11	Wed	1600	All Other	0	0	1	Day	Wet	Unknown/Not Coded			
97	6.690	08/10/11	Wed	1400	All Other	0	0	1	Day	Wet	Unknown/Not Coded			
98	6.690	08/22/11	Mon	1800	All Other	0	0	1	Day	Dry	Unknown/Not Coded			
99	6.690	09/06/11	Tue	1700	Rear-End	0	1	0	Day	Wet	Unknown/Not Coded			
100	6.690	09/27/11	Tue	0800	Rear-End	0	2	0	Day	Wet	Careless Driving			
101	6.690	09/27/11	Tue	2000	Angle	0	1	0	Night	Wet	Unknown/Not Coded			
102	6.690	10/13/11	Thu	0800	All Other	0	0	1	Day	Dry	Unknown/Not Coded			
103	6.690	10/23/11	Sun	1100	Concrete Barrier Wall	0	0	1	Day	Dry	Unknown/Not Coded			
104	6.690	12/11/11	Sun	1800	Rear-End	0	0	1	Night	Wet	No Improper Driving/Act			
						Left	Right	Rear		Ped/				
Total No.		Fatal	Injury	PDO	Angle	Turn	Turn	End	Side swipe	Bike				
104		0	52	52	10	0	0	39	0	0				
		0.00%	50.00%	50.00%	9.62%	0.00%	0.00%	37.50%	0.00%	0.00%				
One Vehicle		Day	Night	Wet	Drv	Excess Speed	FTYRW	DUI						
11		67	37	31	73	1	0	2						
10.58%		64.42%	35.58%	29.81%	70.19%	0.96%	0.00%	1.92%						
		TOTAL ENTE	RING VEHI	CLES/ADT:	268,078				SEGMENT C	RASH RATE:	1.001			

	FLORIDA DEPARTMENT OF TRANSPORTATION CRASH SUMMARY												
SECTION:			8607	0000				STA	TE ROUTE:		9		
ROADWAY	LIMITS:		52.014		I-95	M.P.	5.646	то	6.708	ENGINEER:	0		
STUDY PE	RIOD:		FROM	1/	12	то	12/	12	DAY /	COUNTY:	Broward		
No.	POST	DATE	DAY	TIME	CRASH TYPE	FATAL	INJURY	DAM	DAY / NIGHT	WET / DRY	CONTRIBUTING CAUSE		
1	5.656	02/17/12	Fri	1900	Rear-End	0	1	0	Night	Dry	Careless Driving		
2	5.656	05/29/12	Tue	1400	Rear-End	0	1	0	Day	Wet	Unknown/Not Coded		
3	5.656	06/28/12	Thu	2200	All Other	0	0	1	Night	Dry	Unknown/Not Coded		
4	5.656	09/04/12	Wed	0800	Rear-End	0	0	1	Day Day	Ury Wet	Careless Driving		
6	5.656	11/20/12	Tue	2300	Coll. W/ Mv On Roadway	0	3	0	Night	Dry	No Improper Driving/Act		
7	5.656	12/10/12	Mon	1500	Coll. W/ Mv On Roadway	0	1	0	Day	Dry	Unknown/Not Coded		
8	5.679	04/30/12	Mon	0900	All Other	0	0	1	Day	Wet	Unknown/Not Coded		
9 10	5.679	07/03/12	Thu	1700	Angle	0	0	0	Day	Dry	Unknown/Not Coded		
11	5.679	07/20/12	Fri	1700	Rear-End	0	1	0	Day	Dry	Careless Driving		
12	5.679	08/09/12	Thu	1500	Rear-End	0	0	1	Day	Dry	Careless Driving		
13	5.679	08/18/12	Sat	2200	All Other	0	0	1	Night	Dry	Unknown/Not Coded		
14	5.679	10/02/12	Tue	0800	Rear-End	0	0	1	Day Day	Wet	Careless Driving		
16	5.679	10/04/12	Thu	0500	Rear-End	0	0	1	Night	Wet	Careless Driving		
17	5.679	10/25/12	Thu	0800	Rear-End	0	5	0	Day	Wet	Careless Driving		
18	5.679	10/25/12	Thu	0800	All Other	0	0	1	Day	Wet	Unknown/Not Coded		
20	5.756	11/19/12	Mon	1600	Coll. W/ My On Roadway	0	2	0	Dav	Dry	Careless Driving		
21	5.856	03/03/12	Sat	2100	Rear-End	0	1	0	Night	Dry	No Improper Driving/Act		
22	5.856	10/15/12	Mon	1500	Coll. W/ Mv On Roadway	0	2	0	Day	Dry	No Improper Driving/Act		
23	5.856	10/15/12	Mon	1600	Rear-End	0	3	0	Day	Dry	Careless Driving		
24	5.890	11/13/12	Thu	1000	Hit Other Fixed Object	0	0	1	Day Day	Dry	Careless Driving		
26	5.906	01/27/12	Fri	1500	Coll. W/ Mv On Roadway	0	1	0	Day	Dry	No Improper Driving/Act		
27	5.906	02/10/12	Fri	1200	Coll. W/ Mv On Roadway	0	0	1	Day	Dry	No Improper Driving/Act		
28	5.906	04/05/12	Thu	1600	Coll. W/ Mv On Roadway	0	0	1	Day	Dry	No Improper Driving/Act		
30	5.906	04/24/12	Sat	0400	Coll. W/ My On Roadway	0	3	0	Night	Wet	Careless Driving		
31	5.906	05/29/12	Tue	1900	Coll. W/ Mv On Roadway	0	0	1	Night	Wet	Careless Driving		
32	5.906	06/29/12	Fri	1300	Rear-End	0	0	1	Day	Dry	Followed Too Closely		
33	5.906	07/05/12	Thu	1100	Rear-End	0	0	1	Day	Dry	Careless Driving		
35	5.906	07/31/12	Mon	1400	Concrete Barrier Wall	0	2	1	Day	Wet	No Improper Driving/Act		
36	5.906	09/23/12	Sun	0700	All Other	0	1	0	Day	Dry	Unknown/Not Coded		
37	5.906	10/02/12	Tue	1100	Coll. W/ Mv On Roadway	0	1	0	Day	Dry	Unknown/Not Coded		
38	5.906	11/03/12	Sat	1400	Coll. W/ Mv On Roadway	0	0	1	Day	Dry	Careless Driving		
40	5.929	03/13/12	Sat	1700	Rear-End	0	1	0	Day	Dry	Careless Driving		
41	5.956	08/14/12	Tue	1600	Rear-End	0	0	1	Day	Dry	Careless Driving		
42	5.967	02/19/12	Sun	0400	Angle	0	0	1	Night	Dry	No Improper Driving/Act		
43	5.967	0//11/12	Wed	1300	Concrete Barrier Wall	0	0	1	Night	Wet Dry	Unknown/Not Coded		
45	6.006	07/16/12	Mon	0000	Concrete Barrier Wall	0	1	0	Night	Wet	No Improper Driving/Act		
46	6.042	12/09/12	Sun	1700	Angle	0	1	0	Night	Dry	Careless Driving		
47	6.056	02/12/12	Sun	1400	Coll. W/ Mv On Roadway	0	1	0	Day	Dry	Unknown/Not Coded		
48 49	6.055	04/30/12	Sun	0300	Concrete Barrier Wall	0	1	0	Night	Drv	Careless Driving		
50	6.061	10/18/12	Thu	2000	All Other	0	0	1	Night	Dry	Unknown/Not Coded		
51	6.093	08/07/12	Tue	1500	Concrete Barrier Wall	0	1	0	Day	Dry	Careless Driving		
52	6.099	12/07/12	Fri	1600	Rear-End	0	0	1	Day	Dry	Exceeded Safe Speed Limit		
53	6.118	02/19/12	Sun	1100	All Other	0	0	0	Dav	Dry	No Improper Driving/Act		
55	6.118	12/20/12	Thu	1100	All Other	0	4	0	Day	Dry	Unknown/Not Coded		
56	6.128	07/02/12	Mon	1900	Concrete Barrier Wall	0	1	0	Night	Dry	No Improper Driving/Act		
57	6.137	05/19/12	Sat	0300	Concrete Barrier Wall	0	2	0	Night	Dry	Careless Driving		
58 59	6.151	01/25/12	Wed	1400	Hit Other Fixed Object	0	0	0	Day	Ury Wet	Unknown/Not Coded		
60	6.152	12/25/12	Tue	0300	Rear-End	0	0	1	Night	Dry	Careless Driving		
61	6.179	07/10/12	Tue	0700	Concrete Barrier Wall	0	0	1	Day	Dry	Careless Driving		
62	6.191	01/03/12	Tue	1800	All Other	0	0	1	Night	Dry	Unknown/Not Coded		
64	6.209	02/27/12	Mon	0600	Rear-End	0	2	0	Day	Dry	No Improper Driving/Act		
65	6.218	07/25/12	Wed	0800	Coll. W/ Mv On Roadway	0	0	1	Day	Dry	Careless Driving		
66	6.218	09/04/12	Tue	0800	Coll. W/ Mv On Roadway	0	0	1	Day	Dry	Unknown/Not Coded		
67	6.228	10/30/12	Tue	1100	All Other	0	0	1	Day	Dry	Unknown/Not Coded		
69 69	6.228 6.247	04/01/12	Sup	0600	All Other	0	0	1	Day Day	Dry	Careless Driving Unknown/Not Coded		
70	6.266	02/03/12	Fri	2100	Angle	0	1	0	Night	Wet	Unknown/Not Coded		
71	6.266	04/23/12	Mon	1600	Coll. W/ Mv On Roadway	0	0	1	Day	Dry	No Improper Driving/Act		
72	6.285	02/14/12	Tue	0700	Rear-End	0	2	0	Day	Dry	Followed Too Closely		
73	6.285	08/07/12	Tue	2100	COII. W/ MV On Roadway	0	0	1	Night	Dry	No Improper Driving/Act		

	FLORIDA DEPARTMENT OF TRANSPORTATION CRASH SUMMARY												
SECTION: STATE ROUTE: 9													
ROADWAY	LIMITS:	•			I-95	M.P.	5.646	то	6.708	ENGINEER:	0		
STUDY PER	RIOD:		FROM	1/	12	то	12/	12		COUNTY:	Broward		
No.	MILE POST	DATE	DAY	TIME	CRASH TYPE	FATAL	INJURY	PROP DAM	DAY / NIGHT	WET / DRY	CONTRIBUTING CAUSE		
74	6.285	08/16/12	Thu	2100	All Other	0	0	1	Night	Dry	Unknown/Not Coded		
75	6.285	11/18/12	Sun	0600	Concrete Barrier Wall	0	0	1	Night	Dry	Unknown/Not Coded		
76	6.290	01/27/12	Fri	1600	All Other	0	0	1	Day	Dry	Unknown/Not Coded		
77	6.290	10/25/12	Thu	1000	Concrete Barrier Wall	0	0	1	Day	Wet	Unknown/Not Coded		
78	6.304	10/18/12	Thu	1600	Rear-End	0	2	0	Day	Wet	Careless Driving		
79	6.379	08/25/12	Sat	1300	Rear-End	0	5	0	Day	Wet	No Improper Driving/Act		
80	6.390	09/28/12	Fri	0/00	Rear-End	0	0	1	Day	Dry	No Improper Driving/Act		
82	6 4 1 7	12/13/12	Thu	0000	Rear-End	0	2	0	Night	Dry	Unknown/Not Coded		
83	6.440	02/28/12	Tue	1000	Rear-End	0	0	1	Dav	Dry	Unknown/Not Coded		
84	6.440	03/04/12	Sun	2000	Rear-End	0	0	1	Night	Dry	Careless Driving		
85	6.440	03/07/12	Wed	0800	All Other	0	0	1	Day	Dry	Unknown/Not Coded		
86	6.440	05/17/12	Thu	1700	Rear-End	0	0	1	Day	Dry	Careless Driving		
87	6.440	06/17/12	Sun	0800	Coll. W/ Mv On Roadway	0	1	0	Day	Dry	No Improper Driving/Act		
88	6.440	07/06/12	Fri	0800	All Other	0	0	1	Day	Dry	Unknown/Not Coded		
89	6.440	07/23/12	Mon	0700	Rear-End	0	0	1	Day	Wet	Careless Driving		
90	6.440	07/30/12	Mon	1700	Rear-End	0	2	0	Day	Dry	No Improper Driving/Act		
91	6.440	08/07/12	Thue	1/00	Concrete Barrier Wall	0	0	1	Day	Dry	No Improper Driving/Act		
92	6.440	08/09/12	Tuo	1800	All Othor	0	5	0	Day	Dry	Linknown/Not Coded		
93	6 440	09/17/12	Mon	2200	All Other	0	0	1	Night	Dry	Unknown/Not Coded		
95	6.440	09/24/12	Mon	0300	Rear-End	0	0	1	Night	Wet	Careless Driving		
96	6.440	10/01/12	Mon	2100	All Other	0	0	1	Night	Wet	Unknown/Not Coded		
97	6.440	10/28/12	Sun	2200	All Other	0	0	1	Night	Dry	Unknown/Not Coded		
98	6.440	11/12/12	Mon	0900	Concrete Barrier Wall	0	0	1	Day	Wet	No Improper Driving/Act		
99	6.440	11/17/12	Sat	0000	All Other	0	0	1	Night	Wet	Unknown/Not Coded		
100	6.440	11/17/12	Sat	0000	All Other	0	2	0	Night	Dry	Unknown/Not Coded		
101	6.528	03/02/12	Fri	2000	Rear-End	0	2	0	Night	Dry	Careless Driving		
102	6.528	03/06/12	Tue	1600	Rear-End	0	1	0	Day	Dry	Careless Driving		
103	6.528	05/13/12	Sun	2200	Rear-End	0	0	1	Night	Dry	No Improper Driving/Act		
104	6.528	12/10/12	Mon	2200	Coll. W/ My On Roadway	0	0	1	Night	Dry	Caroloss Driving		
105	6 5 9 0	07/17/12	Tue	1700		0	0	1	Dav	Wot	Linknown/Not Coded		
100	6.656	10/23/12	Tue	1900	All Other	0	0	1	Night	Dry	Unknown/Not Coded		
108	6.690	02/06/12	Mon	0800	Rear-End	0	1	0	Dav	Dry	No Improper Driving/Act		
109	6.690	03/24/12	Sat	1000	Overturned	0	1	0	Day	Dry	No Improper Driving/Act		
110	6.690	05/17/12	Thu	0200	Rear-End	0	2	0	Night	Wet	No Improper Driving/Act		
111	6.690	05/22/12	Tue	1900	Concrete Barrier Wall	0	0	1	Night	Wet	Unknown/Not Coded		
112	6.690	07/08/12	Sun	1800	All Other	0	0	1	Day	Dry	Unknown/Not Coded		
113	6.690	07/22/12	Sun	1700	Angle	0	1	0	Day	Dry	Unknown/Not Coded		
114	6.690	08/24/12	Fri	1800	Coll. W/ Mv On Roadway	0	1	0	Day	Dry	Careless Driving		
115	6.690	09/16/12	Sun	0600	Rear-End	0	0	1	Night	Wet	Careless Driving		
110	6 690	09/23/12	Thu	1000	All Other	0	0	1	Dav	Dry	Unknown/Not Coded		
118	6.690	10/07/12	Sun	1900	All Other	0	0	1	Night	Wet	Unknown/Not Coded		
119	6.690	10/25/12	Thu	1000	All Other	0	2	0	Day	Wet	Unknown/Not Coded		
120	6.690	10/25/12	Thu	1700	All Other	0	0	1	Day	Wet	Unknown/Not Coded		
121	6.690	11/21/12	Wed	0000	Rear-End	0	2	0	Night	Dry	Careless Driving		
						Left	Right	Rear		Ped/			
Total No.		Fatal	Injury	PDO	Angle	Turn	Turn	End	Side swipe	Bike			
121		0	53	68	6	0	0	43	0	0			
		0.00%	43.80%	56.20%	4.96%	0.00%	0.00%	35.54%	0.00%	0.00%			
One						Excess	ET (S)						
Vehicle		Day	Night	Wet	Dry	Speed	FIYRW						
14 88%		62.81%	45 37 10%	26 15%	<mark>0</mark> ን 73 55%	1 65%	0.00%	0.83%					
14.00/0		02.01/0	57.13/0	20.45/0	/3.33/0	1.05% U.UU% U.85%							
		TOTAL ENTE	RING VEHI	CLES/ADT:	274,764				SEGMENT C	RASH RATE:	1.136		



#### **CRASH HISTOGRAMS**



















					FLORIDA DEPARTMI	ENT OF TRA	ANSPORTA	TION			
					CRASE	I SUMMAR	lΥ				
SECTION:			8607	0000				STA	TE ROUTE:		9
ROADWAY	LIMITS:			let internet interne	95 Ramps	M.P.	0.000	то	0.000	ENGINEER:	0
STUDY PER	RIOD:		FROM	1/	08	TO	12/	08		COUNTY:	Broward
No.	MILE	DATE	DAY	TIME	CRASH TYPE	FATAL	INJURY	PROP	DAY /	WET / DRY	CONTRIBUTING CAUSE
	POST							DAM	NIGHT		
1	0.000	03/06/08	Thu	1700	Rear-End	0	1	0	Day	Wet	Unknown/Not Coded
2	0.000	03/11/08	Tue	2300	Sideswipe	0	0	1	Night	Dry	Improper Lane Change
3	0.000	06/14/08	Sat	1000	Rear-End	0	1	0	Day	Dry	Unknown/Not Coded
4	0.892	06/16/08	Mon	1200	Sideswipe	0	0	1	Day	Dry	Improper Turn
5	0.892	07/24/08	Thu	1700	Rear-End	0	1	0	Day	Dry	Unknown/Not Coded
6	0.000	01/20/08	Sun	2300	Overturned	0	1	0	Night	Wet	Unknown/Not Coded
7	0.274	02/27/08	Wed	0000	Rear-End	0	1	0	Day	Dry	Unknown/Not Coded
8	0.274	03/17/08	Mon	1700	All Other	0	0	1	Day	Dry	No Improper Driving/Act
9	0.000	07/22/08	Tue	1500	Rear-End	0	0	1	Day	Dry	Careless Driving
10	0.151	02/10/08	Sun	0800	Backed Into	0	1	0	Day	Dry	Unknown/Not Coded
						Left	Right	Rear		Ped/	
Total No.		Fatal	Injury	PDO	Angle	Turn	Turn	End	Side swipe	Bike	
10		0	6	4	0	0	0	5	2	0	
		0.00%	60.00%	40.00%	0.00%	0.00%	0.00%	50.00%	20.00%	0.00%	
One						Excess					
Vehicle		Day	Night	Wet	Dry	Speed	FTYRW	DUI			
1		8	2	2	8	0	0	3			
10.00%		80.00%	20.00%	20.00%	80.00%	0.00%	0.00%	30.00%			
		TOTAL ENTE	RING VEHI	CLES/ADT:	0			:	SEGMENT C	RASH RATE:	#DIV/0!

	FLORIDA DEPARTMENT OF TRANSPORTATION CRASH SUMMARY													
SECTION:			8607	0000				STA	TE ROUTE:		9			
ROADWAY	LIMITS:			1-9	95 Ramps	M.P.	0.000	то	0.000	ENGINEER:	0			
STUDY PEP	RIOD:		FROM	1/	09	TO	12/	09		COUNTY:	Broward			
No.	MILE POST	DATE	DAY	TIME	CRASH TYPE	FATAL	INJURY	PROP DAM	DAY / NIGHT	WET / DRY				
1	0.000	08/10/09	Mon	1600	Rear-End	0	0	1	Day	Dry	Careless Driving			
2	0.133	01/25/09	Sun	2100	Concrete Barrier Wall	0	1	0	Night	Dry	Unknown/Not Coded			
3	0.179	10/16/09	Fri	0800	Rear-End	0	1	0	Day	Dry	Unknown/Not Coded			
4	0.000	06/25/09	Thu	00000	Rear-End	0	2	0	Night	Dry	Unknown/Not Coded			
5	0.000	07/26/09	Sun	1000	Hit Sign/Sign Post	0	2	0	Day	Dry	Unknown/Not Coded			
6	0.000	09/13/09	Sun	1500	Rear-End	0	0	1	Day	Dry	No Improper Driving/Act			
7	0.392	09/14/09	Mon	0700	Hit Sign/Sign Post	0	0	1	Night	Wet	Improper Lane Change			
8	0.642	01/02/09	Fri	1100	Concrete Barrier Wall	0	0	1	Day	Dry	Unknown/Not Coded			
9	0.854	11/16/09	Mon	2100	Sideswipe	0	0	1	Night	Dry	Improper Lane Change			
10	0.890	02/12/09	Thu	2300	Rear-End	0	0	1	Night	Dry	Unknown/Not Coded			
11	0.892	04/04/09	Sat	0000	All Other	0	2	0	Night	Dry	No Improper Driving/Act			
12	0.000	01/17/09	Sat	0200	Hit Sign/Sign Post	0	1	0	Night	Dry	Unknown/Not Coded			
13	0.038	10/14/09	Wed	1700	Rear-End	0	0	1	Day	Wet	Exceeded Safe Speed Limit			
						Left	Right	Rear		Ped/				
Total No.		Fatal	Injury	PDO	Angle	Turn	Turn	End	Side swipe	Bike				
13		0	6	7	0	0	0	6	1	0				
	0.00% 46.15% 53.85% 0.00%					0.00%	0.00%	46.15%	7.69%	0.00%				
One						Excess								
Vehicle		Day	Night	Wet	Dry	Speed	FTYRW	DUI						
4		6	7	2	11	1	0	2						
30.77%		46.15%	53.85%	15.38%	84.62%	7.69%	0.00%	15.38%						
		TOTAL ENTE	RING VEHI	CLES/ADT:	0				SEGMENT C	RASH RATE:	#DIV/0!			

					FLORIDA DEPARTMI CRASI	ENT OF TRA H SUMMAR	ANSPORTA IY	TION			
SECTION:			8607	0000				STA	TE ROUTE:		9
ROADWAY	LIMITS:			1-	95 Ramps	M.P.	0.000	то	0.000	ENGINEER:	0
STUDY PEF	RIOD:		FROM	1/	10	то	12/	10		COUNTY:	Broward
No.	MILE POST	DATE	DAY	TIME	CRASH TYPE	FATAL	INJURY	PROP DAM	DAY / NIGHT	WET / DRY	CONTRIBUTING CAUSE
1	0.000	12/21/10	Tue	1800	Rear-End	0	3	0	Night	Dry	Unknown/Not Coded
2	0.002	05/29/10	Sat	1400	Rear-End	0	0	1	Day	Dry	Careless Driving
3	0.179	01/08/10	Fri	1800	Rear-End	0	1	0	Night	Dry	Exceeded Safe Speed Limit
4	0.179	06/05/10	Sat	1700	Hit Other Fixed Object	0	1	0	Day	Dry	Careless Driving
5	0.179	12/09/10	Thu	0900	All Other	0	2	0	Day	Wet	Unknown/Not Coded
6	0.797	07/09/10	Fri	1600	Angle	0	0	1	Day	Dry	No Improper Driving/Act
7	0.883	02/25/10	Thu	0200	Rear-End	0	0	1	Night	Wet	Unknown/Not Coded
8	0.891	02/13/10	Sat	0300	Median Crossover	0	0	1	Night	Dry	Careless Driving
9	0.000	08/10/10	Tue	0900	Rear-End	0	1	0	Day	Wet	Careless Driving
10	0.272	05/30/10	Sun	0200	Hit Sign/Sign Post	0	0	1	Night	Dry	Unknown/Not Coded
11	0.113	03/20/10	Sat	0800	Hit Guardrail	0	0	1	Day	Dry	Unknown/Not Coded
						Left	Right	Rear		Ped/	
Total No.		Fatal	Injury	PDO	Angle	Turn	Turn	End	Side swipe	Bike	
11		0	5	6	1	0	0	5	0	0	
		0.00%	45.45%	54.55%	9.09%	0.00%	0.00%	45.45%	0.00%	0.00%	
One						Excess					
Vehicle		Day	Night	Wet	Dry	Speed	FTYRW	DUI			
3		6	5	3	8	1	0	3			
27.27%		54.55%	45.45%	27.27%	72.73%	9.09%	0.00%	27.27%			
		TOTAL ENTE	RING VEHI	CLES/ADT:	8,545			SEGMENT CRASH RATE: #DIV/0!			

					FLORIDA DEPARTM CRASI	ENT OF TRA	ANSPORTA RY	TION			
SECTION:			8607	0000				STA	TE ROUTE:		9
ROADWAY	LIMITS:			I-S	95 Ramps	M.P.	0.000	то	0.000	ENGINEER:	0
STUDY PER	RIOD:		FROM	1/	11	то	12/	11		COUNTY:	Broward
No.	MILE POST	DATE	DAY	TIME	CRASH TYPE	FATAL	INJURY	PROP DAM	DAY / NIGHT	WET / DRY	CONTRIBUTING CAUSE
1	0.009	01/15/11	Sat	1400	Rear-End	0	0	1	Day	Dry	No Improper Driving/Act
2	0.642	12/16/11	Fri	1800	Rear-End	0	1	0	Night	Dry	Unknown/Not Coded
3	0.854	07/22/11	Fri	1300	Rear-End	0	1	0	Day	Dry	Unknown/Not Coded
4	0.887	12/17/11	Sat	0300	Coll. W/ Parked Car	0	0	1	Night	Wet	Exceeded Safe Speed Limit
5	0.888	09/06/11	Tue	0000	Rear-End	0	0	1	Night	Dry	Careless Driving
6	0.890	10/30/11	Sun	0400	All Other	0	0	1	Night	Wet	Unknown/Not Coded
7	0.892	01/06/11	Thu	1300	Rear-End	0	0	1	Day	Dry	Followed Too Closely
8	0.217	05/04/11	Wed	1400	Rear-End	0	0	1	Day	Dry	Careless Driving
9	0.265	10/11/11	Tue	2000	Rear-End	0	1	0	Night	Wet	Unknown/Not Coded
10	0.273	04/05/11	Tue	1700	Rear-End	0	4	0	Day	Dry	No Improper Driving/Act
11	0.274	07/19/11	Tue	1000	Rear-End	0	2	0	Day	Dry	Followed Too Closely
12	0.274	07/19/11	Tue	1000	Rear-End	0	1	0	Day	Dry	Followed Too Closely
13	0.274	12/14/11	Wed	0900	Rear-End	0	1	0	Day	Dry	Followed Too Closely
14	0.000	06/13/11	Mon	0000	Rear-End	0	1	0	Night	Dry	Unknown/Not Coded
						Left	Right	Rear		Ped/	
Total No.		Fatal	Injury	PDO	Angle	Turn	Turn	End	Side swipe	Bike	
14		0	8	6	0	0	0	12	0	0	
		0.00%	57.14%	42.86%	0.00%	0.00%	0.00%	85.71%	0.00%	0.00%	
One						Excess					
Vehicle		Day	Night	Wet	Dry	Speed	FTYRW	DUI			
2		8	6	3	11	1	0	0			
14.29%		57.14%	42.86%	21.43%	78.57%	7.14%	0.00%	0.00% 0.00%			
		TOTAL ENTE	RING VEHI	CLES/ADT:	12,321		SEGMENT CRASH RATE: #DIV/0!				#DIV/0!

					FLORIDA DEPARTMI	ENT OF TR	ANSPORTA	TION			
CECTION			0.007	0000	CRASE	1 SUMMAH	Y	CT A	TE DOUTE		
SECTION:			8607	0000				SIA	TE ROUTE:		9
ROADWAY	LIMITS:				95 Ramps	M.P.	0.000	10	0.000	ENGINEER:	0
STUDY PER	RIOD:	•	FROM	1/	12	10	12/	12	· · · ·	COUNTY:	Broward
No.	MILE POST	DATE	DAY	TIME	CRASH TYPE	FATAL	INJURY	PROP DAM	DAY / NIGHT	WET / DRY	CONTRIBUTING CAUSE
1	0.002	09/26/12	Wed	0800	Rear-End	0	1	0	Day	Dry	Careless Driving
2	0.003	09/17/12	Mon	1800	Rear-End	0	1	0	Night	Dry	Careless Driving
3	0.175	07/12/12	Thu	0900	Rear-End	0	0	1	Day	Dry	Followed Too Closely
4	0.392	06/23/12	Sat	0700	All Other	0	0	1	Day	Wet	Unknown/Not Coded
5	0.392	10/07/12	Sun	1600	Angle	0	0	1	Day	Wet	Unknown/Not Coded
6	0.392	11/16/12	Fri	1300	Coll. W/ Mv On Roadway	0	4	0	Day	Dry	No Improper Driving/Act
7	0.492	07/21/12	Sat	0300	Rear-End	0	1	0	Night	Dry	No Improper Driving/Act
8	0.854	01/26/12	Thu	1200	Rear-End	0	1	0	Day	Dry	Unknown/Not Coded
9	0.890	07/24/12	Tue	1300	All Other	0	1	0	Day	Dry	Unknown/Not Coded
10	0.890	09/22/12	Sat	0300	Rear-End	0	0	1	Night	Wet	No Improper Driving/Act
11	0.000	10/03/12	Wed	0800	Concrete Barrier Wall	0	1	0	Day	Wet	Careless Driving
12	0.009	06/14/12	Thu	2000	Concrete Barrier Wall	0	1	0	Night	Dry	Careless Driving
13	0.265	04/15/12	Sun	0700	All Other	0	1	0	Day	Dry	Unknown/Not Coded
14	0.265	07/13/12	Fri	0800	Angle	0	0	1	Day	Wet	Failed To Yield Right-Of-Way
15	0.269	02/26/12	Sun	0600	Angle	0	1	0	Night	Wet	Careless Driving
16	0.270	11/12/12	Mon	0700	Rear-End	0	0	1	Day	Wet	Unknown/Not Coded
17	0.274	10/20/12	Sat	0500	Hit Other Fixed Object	0	0	1	Night	Dry	No Improper Driving/Act
						Left	Right	Rear		Ped/	
Total No.		Fatal	Injury	PDO	Angle	Turn	Turn	End	Side swipe	Bike	
17		0	10	7	3	0	0	7	0	0	
		0.00%	58.82%	41.18%	17.65%	0.00%	0.00%	41.18%	0.00%	0.00%	
One						Excess					
Vehicle		Day	Night	Wet	Dry	Speed	FTYRW	DUI			
4		11	6	7	10	0	1	0			
23.53%		64.71%	35.29%	41.18%	58.82%	0.00%	5.88%	0.00%			
		TOTAL ENTE	RING VEHI	CLES/ADT:	11,706				SEGMENT C	RASH RATE:	#DIV/0!





							ANSPORTA	TION			
SECTION			8601	5000	CIASI	1 3010100		STA			919
			0001	.5000	riffin Road	MD	0 220	то	0 5/2		010
			ERONA	1/		то	9.250	<b>no</b>	9.545	COUNTY:	Broward
STUDTPER		1	FRUIVI	1/	08	10	12/		DAY /	COUNT.	Bioward
No.	WILL	DATE	DAY	TIME	CRASH TYPE	FATAL	INJURY	PROP	DAY/	WET / DRY	CONTRIBUTING CAUSE
	POST							DAM	NIGHT		
1	9.353	05/15/08	Thu	1600	All Other	0	1	0	Day	Dry	No Improper Driving/Act
2	9.353	05/18/08	Sun	0000	All Other	0	0	1	Night	Dry	Unknown/Not Coded
3	9.353	06/26/08	Thu	Thu 0800 Hit Sign/Sign Post 0 0 1 Day Dry		Dry	Unknown/Not Coded				
4	9.359	10/02/08	Thu	1400	All Other	0	0	1	Day	Dry	No Improper Driving/Act
5	9.363	02/17/08	Sun	0100	All Other	0	0	1	Night	Dry	Unknown/Not Coded
6	9.363	02/21/08	Thu	1300	Rear-End	0	0	1	Day	Dry	Followed Too Closely
7	9.363	06/17/08	Tue	1500	Sideswipe	0	0	1	Day	Dry	Improper Passing
8	9.375	02/08/08	Fri	0800	Sideswipe	0	0	1	Day	Dry	Unknown/Not Coded
9	9.384	03/10/08	Mon	1000	Sideswipe	0	0	1	Day	Dry	Unknown/Not Coded
10	9.439	09/12/08	Fri	2000	Head-On	0	0	1	Night	Dry	Disregarded Traffic Signal
11	9.446	07/07/08	Mon	1700	Angle	0	0	1	Day	Dry	Unknown/Not Coded
						Left	Right	Rear		Ped/	
Total No.		Fatal	Injury	PDO	Angle	Turn	Turn	End	Side swipe	Bike	
11		0	1	10	1	0	0	1	3	0	
		0.00%	9.09%	90.91%	9.09%	0.00%	0.00%	9.09%	27.27%	0.00%	
One						Excess					
Vehicle		Day	Night	Wet	Dry	Speed	FTYRW	DUI			
0		8	3	0	11	0	0	2			
0.00%		72.73%	27.27%	0.00%	100.00%	0.00%	0.00%	18.18%			
		TOTAL ENTE	RING VEHI	CLES/ADT:	40,500				SEGMENT C	RASH RATE:	2.377

					FLORIDA DEPARTME	ENT OF TRA		TION			
SECTION:			8601	5000				STA	TE ROUTE:		818
ROADWAY	LIMITS:			Gr	riffin Road	M.P.	9.230	то	9.543	ENGINEER:	0
STUDY PEF	RIOD:		FROM	1/	09	то	12/	09		COUNTY:	Broward
No.	MILE POST	DATE	DAY	TIME	CRASH TYPE	FATAL	INJURY	PROP DAM	DAY / NIGHT	WET / DRY	CONTRIBUTING CAUSE
1	9.293	03/09/09	Mon	0600	Rear-End	0	1	0	Day	Dry	No Improper Driving/Act
2	9.304	09/19/09	Sat	0100	Angle	0	0	1	Night	Dry	Unknown/Not Coded
3	9.353	02/26/09	Thu	0400	Angle	0	2	0	Night	Dry	Unknown/Not Coded
4	9.375	04/27/09	Mon	2100	All Other	0	0	1	Night	Wet	Unknown/Not Coded
5	9.375	06/03/09	Wed	1600	Head-On	0	0	1	Day	Dry	Disregarded Traffic Signal
6	9.384	06/27/09	Sat	2200	Utility/Light Pole	0	0	1	Night	Wet	Exceeded Safe Speed Limit
7	9.384	09/28/09	Mon	1700	Head-On	0	0	1	Day	Dry	Unknown/Not Coded
8	9.408	10/14/09	Wed	0700	Rear-End	0	0	1	Night	Dry	No Improper Driving/Act
9	9.426	03/06/09	Fri	1200	Rear-End	0	0	1	Day	Dry	Careless Driving
10	9.439	03/06/09	Fri	0500	Angle	0	0	1	Night	Dry	Unknown/Not Coded
11	9.439	05/22/09	Fri	1800	Rear-End	0	0	1	Day	Dry	Unknown/Not Coded
						Left	Right	Rear		Ped/	
Total No.		Fatal	Injury	PDO	Angle	Turn	Turn	End	Side swipe	Bike	
11		0	2	9	3	0	0	4	0	0	
		0.00%	18.18%	81.82%	27.27%	0.00%	0.00%	36.36%	0.00%	0.00%	
One						Excess					
Vehicle		Day	Night	Wet	Dry	Speed	FTYRW	DUI			
1		5	6	2	9	1	0	0			
9.09%		45.45%	54.55%	18.18%	81.82%	9.09%	0.00%	0.00%			
		TOTAL ENTE	RING VEHI	CLES/ADT:	30,500			:	SEGMENT C	RASH RATE:	3.157

					FLORIDA DEPARTM	ENT OF TRA	ANSPORTA XY	TION			
SECTION:			8601	5000				STA	TE ROUTE:		818
ROADWAY	LIMITS:			Gi	riffin Road	M.P.	9.230	то	9.543	ENGINEER:	0
STUDY PER	RIOD:		FROM	1/	10	то	12/	10		COUNTY:	Broward
No.	MILE POST	DATE	DAY	TIME	CRASH TYPE	FATAL	INJURY	PROP DAM	DAY / NIGHT	WET / DRY	CONTRIBUTING CAUSE
1	9.353	10/02/10	Sat	2200	Angle	0	0	1	Night	Dry	Unknown/Not Coded
2	9.353	12/05/10	Sun	2100	Left-Turn	0	1	0	Night	Dry	Unknown/Not Coded
3	9.353	12/18/10	Sat	1700	Angle	0	1	0	Night	Wet	No Improper Driving/Act
4	9.382	06/08/10	Tue	0600	Angle	0	0	1	Day	Slippery	Improper Lane Change
5	9.388	10/04/10	Mon	1900	Sideswipe	0	0	1	Night	Dry	Improper Lane Change
6	9.405	05/11/10	Tue	1400	Rear-End	0	1	0	Day	Dry	No Improper Driving/Act
7	9.408	08/18/10	Wed	0600	Rear-End	0	1	0	Night	Dry	Followed Too Closely
8	9.432	11/22/10	Mon	1300	Head-On	0	0	1	Day	Dry	Careless Driving
9	9.439	10/08/10	Fri	2100	Head-On	0	1	0	Night	Dry	Failed To Yield Right-Of-Way
						Left	Right	Rear		Ped/	
Total No.		Fatal	Injury	PDO	Angle	Turn	Turn	End	Side swipe	Bike	
9		0	5	4	3	1	0	2	1	0	
		0.00%	55.56%	44.44%	33.33%	11.11%	0.00%	22.22%	11.11%	0.00%	
One						Excess					
Vehicle		Day	Night	Wet	Dry	Speed	FTYRW	DUI			
0		3	6	1	7	0	1	0			
0.00%		33.33%	66.67%	11.11%	77.78%	0.00%	11.11%	0.00%			
		TOTAL ENTE	RING VEHI	CLES/ADT:	28,500			SEGMENT CRASH RATE: 2.764			

					FLORIDA DEPARTMI		ANSPORTA	TION			
CECTION:			9601	5000	CRASE	SUIVIIVIAN	(T	ста			010
SECTION.			8001	.5000	iffin Deed		0 330				010
	LIIVITS:		50014	G		IVI.P.	9.230	10	9.543	ENGINEER:	U
STUDY PER			FROIVI	1/	11	10	12/	11		COUNTY:	Broward
No.	MILE	DATE	DAY	TIME	CRASH TYPE	FATAL	INJURY	PROP	DAY /	WET / DRY	CONTRIBUTING CAUSE
	POST							DAM	NIGHT	,	
1	9.349	06/23/11	Thu	1200	Rear-End	0	1	0	Day	Dry	Unknown/Not Coded
2	9.353	04/10/11	Sun	1800	Rear-End	0	1	0	Day	Dry	Followed Too Closely
3	9.353	09/18/11	Sun	0700	Coll. W/ Mv On Roadway	0	1	0	Night	Dry	Unknown/Not Coded
4	9.372	09/27/11	Tue	1300	Rear-End	0	1	0	Day	Dry	Followed Too Closely
5	9.375	08/24/11	Wed	1800	Rear-End	0	0	1	Day	Dry	No Improper Driving/Act
6	9.384	09/09/11	Fri	1500	Rear-End	0	0	1	Night	Wet	Followed Too Closely
7	9.405	08/03/11	Wed	1100	Coll. W/ Mv On Roadway	0	0	1	Day	Dry	Unknown/Not Coded
8	9.417	05/14/11	Sat	1100	Coll. W/ Mv On Roadway	0	5	0	Day	Dry	Careless Driving
9	9.457	12/27/11	Tue	2300	Angle	0	1	0	Night	Dry	Failed To Yield Right-Of-Way
10	9.461	04/28/11	Thu	1900	Coll. W/ Mv On Roadway	0	0	1	Day	Dry	Unknown/Not Coded
						Left	Right	Rear		Ped/	
Total No.		Fatal	Injury	PDO	Angle	Turn	Turn	End	Side swipe	Bike	
10		0	6	4	1	0	0	5	0	0	
		0.00%	60.00%	40.00%	10.00%	0.00%	0.00%	50.00%	0.00%	0.00%	
One						Excess					
Vehicle		Day	Night	Wet	Dry	Speed	FTYRW	DUI			
0		7	3	1	9	0	1	0			
0.00%		70.00%	30.00%	10.00%	90.00%	0.00%	10.00%	0.00%			
		TOTAL ENTE	RING VEHI	CLES/ADT:	31,500		SEGMENT CRASH RATE: 2.779				

					FLORIDA DEPARTM	ENT OF TRA	ANSPORTA 2V	TION			
SECTION:			8601	5000	CIGO			STA	TE ROUTE:		818
ROADWAY	LIMITS:			Gr	iffin Road	M.P.	9.230	то	9.543	ENGINEER:	0
STUDY PER	RIOD:		FROM	1/	12	то	12/	12		COUNTY:	Broward
No.	MILE POST	DATE	DAY	TIME	CRASH TYPE	FATAL	INJURY	PROP DAM	DAY / NIGHT	WET / DRY	CONTRIBUTING CAUSE
1	9.262	09/05/12	Wed	0700	Rear-End	0	1	0	Day	Wet	Followed Too Closely
2	9.272	08/28/12	Tue	1900	Rear-End	0	1	0	Day	Dry	Careless Driving
3	9.304	01/28/12	Sat	2100	All Other	0	1	0	Night	Wet	Unknown/Not Coded
4	9.315	10/04/12	Thu	1800	Rear-End	0	1	0	Day	Dry	Failed To Yield Right-Of-Way
5	9.342	06/19/12	Tue	1700	Rear-End	0	2	0	Day	Dry	Followed Too Closely
6	9.351	02/06/12	Mon	0400	Rear-End	0	0	1	Night	Wet	No Improper Driving/Act
7	9.353	07/30/12	Mon	1700	Angle	0	1	0	Day	Dry	Unknown/Not Coded
8	9.353	09/17/12	Mon	0900	Rear-End	0	0	1	Day	Wet	Followed Too Closely
9	9.353	10/06/12	Sat	2300	All Other	0	1	0	Night	Wet	Unknown/Not Coded
10	9.353	10/06/12	Sat	0200	Coll. W/ Mv On Roadway	0	1	0	Night	Dry	Disregarded Traffic Signal
11	9.374	02/12/12	Sun	0500	Coll. W/ Parked Car	0	1	0	Night	Dry	Careless Driving
12	9.417	04/16/12	Mon	1600	Rear-End	0	0	1	Day	Dry	Improper Turn
13	9.439	05/15/12	Tue	2000	Rear-End	0	0	1	Night	Wet	No Improper Driving/Act
14	9.439	10/22/12	Mon	1300	Rear-End	0	0	1	Day	Dry	Failed To Yield Right-Of-Way
15	9.441	03/20/12	Tue	1300	Coll. W/ Mv On Roadway	0	0	1	Night	Dry	Unknown/Not Coded
16	9.446	01/05/12	Thu	2100	Angle	0	0	1	Night	Dry	Disregarded Traffic Signal
17	9.446	09/23/12	Sun	2200	Hit Other Fixed Object	0	0	1	Night	Wet	Exceeded Safe Speed Limit
18	9.531	07/06/12	Fri	1200	Rear-End	0	0	1	Day	Dry	Unknown/Not Coded
Total No.		Fatal	Iniury	PDO	Angle	Left Turn	Right Turn	Rear End	Side swipe	Ped/ Bike	
18		0	9	9	2	0	0	10	0	0	
		0.00%	50.00%	50.00%	11.11%	0.00%	0.00%	55.56%	0.00%	0.00%	
One						Excess					
Vehicle		Day	Night	Wet	Dry	Speed	FTYRW	DUI			
2		9	9	7	11	1	2	0			
11.11%		50.00%	50.00%	38.89%	61.11%	5.56%	11.11%	0.00%			
		TOTAL ENTE	RING VEHI	CLES/ADT:	33,500				SEGMENT C	RASH RATE:	4.703



### **CRASH HISTOGRAMS**



















## **Appendix B**

Interchange Master Plan

**Existing Volumes** 



February2015

# Appendix C

**Traffic Operations Analysis** 

# **Existing Conditions**

### Timings 603: I-95 NB Ramps & Griffin Road

	٦	-	+	•	٩.	۲						
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR	Ø1	Ø2	Ø3	Ø4	Ø6	Ø7
Lane Configurations	ሻሻ	<b>^</b>	11111	1	ሻሻ	1						
Traffic Volume (vph)	410	710	280	150	520	400						
Future Volume (vph)	410	710	280	150	520	400						
Turn Type	Prot	NA	NA	custom	Prot	Perm						
Protected Phases	8	58	5		67		1	2	3	4	6	7
Permitted Phases				567		67						
Detector Phase	8	58	5	567	67	67						
Switch Phase												
Minimum Initial (s)	12.0		12.0				2.0	12.0	2.0	4.0	4.0	2.0
Minimum Split (s)	22.0		18.0				7.0	24.0	8.0	10.0	10.0	7.0
Total Split (s)	99.0		33.0				7.0	86.0	15.0	68.0	60.0	8.0
Total Split (%)	49.5%		16.5%				4%	43%	8%	34%	30%	4%
Yellow Time (s)	5.0		5.0				4.0	5.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0		1.0				1.0	1.0	2.0	2.0	2.0	1.0
Lost Time Adjust (s)	0.0		0.0									
Total Lost Time (s)	6.0		6.0									
Lead/Lag	Lag		Lead				Lead	Lag	Lead		Lag	Lead
Lead-Lag Optimize?	Yes		Yes				Yes	Yes	Yes		Yes	Yes
Recall Mode	None		Min				None	Min	None	None	None	None
Act Effct Green (s)	47.9	71.4	17.4	58.1	34.6	34.6						
Actuated g/C Ratio	0.41	0.60	0.15	0.49	0.29	0.29						
v/c Ratio	0.31	0.25	0.37	0.19	0.55	0.68						
Control Delay	3.0	1.3	48.1	2.9	38.0	22.2						
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0						
Total Delay	3.1	1.4	48.1	2.9	38.0	22.2						
LOS	А	А	D	А	D	С						
Approach Delay		2.0	32.3									
Approach LOS		А	С									
Intersection Summary												
Cycle Length: 200												
Actuated Cycle Length: 118.	2											
Natural Cycle: 70												
Control Type: Actuated-Unco	oordinated											
Maximum v/c Ratio: 0.68												
Intersection Signal Delay: 18	3.1			In	tersectior	n LOS: B						
Intersection Capacity Utilizat	tion 93.1%			IC	U Level o	of Service	F					
Analysis Period (min) 15												

Splits and Phases: 603: I-95 NB Ramps & Griffin Road

#602#602		#602	2 Ø3	#602	#602
7 <mark>s</mark> 86 s		15 s		24 s	68 s
#603	#603	#603	#60: g	3 Ø8	
33 s	60 s	8 s	99 s		

I-95 Interchange Master Plan 09/04/2014 2013 Existing Conditions - AM Peak Hour

Lane Group	Ø9	
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Turn Type		
Protected Phases	9	
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	12.0	
Minimum Split (s)	18.0	
Total Split (s)	24.0	
Total Split (%)	12%	
Yellow Time (s)	5.0	
All-Red Time (s)	1.0	
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	
Lead-Lag Optimize?	Yes	
Recall Mode	None	
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

### Queues 603: I-95 NB Ramps & Griffin Road

	٦	-	+	•	1	1
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	432	747	295	158	547	421
v/c Ratio	0.31	0.25	0.37	0.19	0.55	0.68
Control Delay	3.0	1.3	48.1	2.9	38.0	22.2
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay	3.1	1.4	48.1	2.9	38.0	22.2
Queue Length 50th (ft)	4	0	68	0	179	125
Queue Length 95th (ft)	5	0	113	35	268	269
Internal Link Dist (ft)		184	813			
Turn Bay Length (ft)						
Base Capacity (vph)	2719	4027	1263	1087	1578	852
Starvation Cap Reductn	601	1681	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	0.20	0.32	0.23	0.15	0.35	0.49
Intersection Summary						

## HCM Signalized Intersection Capacity Analysis 603: I-95 NB Ramps & Griffin Road

10	)/1	8/2	201	6
----	-----	-----	-----	---

	≯	-	$\mathbf{r}$	4	+	•	1	t	۲	1	Ļ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻሻ	***			11111	1	ካካ		1	-	-	-
Traffic Volume (vph)	410	710	0	0	280	150	520	0	400	0	0	0
Future Volume (vph)	410	710	0	0	280	150	520	0	400	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	6.0	6.0		6.0			
Lane Util. Factor	0.97	0.91			*0.59	1.00	0.97		1.00			
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)	3400	5036			5442	1568	3400		1568			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	3400	5036			5442	1568	3400		1568			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.92	0.92
Adi, Flow (vph)	432	747	0	0	295	158	547	0	421	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	79	0	0	162	0	0	0
Lane Group Flow (vph)	432	747	0	0	295	79	547	0	259	0	0	0
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Prot	NA			NA	custom	Prot		Perm			
Protected Phases	8	58			5		67					
Permitted Phases						567			67			
Actuated Green, G (s)	47.9	71.3			17.4	59.0	35.6		35.6			
Effective Green, g (s)	47.9	71.3			17.4	59.0	35.6		35.6			
Actuated g/C Ratio	0.41	0.60			0.15	0.50	0.30		0.30			
Clearance Time (s)	6.0				6.0							
Vehicle Extension (s)	3.0				3.0							
Lane Grp Cap (vph)	1381	3045			803	784	1026		473			
v/s Ratio Prot	c0.13	c0.15			c0.05		0.16					
v/s Ratio Perm						0.05			c0.17			
v/c Ratio	0.31	0.25			0.37	0.10	0.53		0.55			
Uniform Delay, d1	23.8	10.8			45.3	15.5	34.2		34.4			
Progression Factor	0.10	0.10			1.00	1.00	1.00		1.00			
Incremental Delay, d2	0.1	0.0			0.3	0.1	0.5		1.3			
Delay (s)	2.5	1.1			45.6	15.6	34.8		35.7			
Level of Service	А	А			D	В	С		D			
Approach Delay (s)		1.6			35.1			35.2			0.0	
Approach LOS		А			D			D			А	
Intersection Summary												
HCM 2000 Control Delay			19.9	Н	CM 2000	) Level of	Service		В			
HCM 2000 Volume to Capa	city ratio		0.47									
Actuated Cycle Length (s)			117.9	S	um of los	st time (s)			30.0			
Intersection Capacity Utiliza	tion		93.1%	IC	CU Level	of Service	)		F			
Analysis Period (min)			15									
c Critical Lane Group												

### Timings 603: I-95 NB Ramps & Griffin Road

	٦	-	+	•	•	۲						
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR	Ø1	Ø2	Ø3	Ø4	Ø6	Ø7
Lane Configurations	ሻሻ	<b>^</b>	11111	1	ካካ	1						
Traffic Volume (vph)	460	630	860	310	570	250						
Future Volume (vph)	460	630	860	310	570	250						
Turn Type	Prot	NA	NA	custom	Prot	Perm						
Protected Phases	8	58	5		67		1	2	3	4	6	7
Permitted Phases				567		67						
Detector Phase	8	58	5	567	67	67						
Switch Phase												
Minimum Initial (s)	12.0		12.0				2.0	12.0	2.0	4.0	4.0	2.0
Minimum Split (s)	22.0		18.0				7.0	24.0	8.0	10.0	10.0	7.0
Total Split (s)	95.0		40.0				7.0	90.0	16.0	61.0	57.0	8.0
Total Split (%)	47.5%		20.0%				4%	45%	8%	31%	29%	4%
Yellow Time (s)	5.0		5.0				4.0	5.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0		1.0				1.0	1.0	2.0	2.0	2.0	1.0
Lost Time Adjust (s)	0.0		0.0									
Total Lost Time (s)	6.0		6.0									
Lead/Lag	Lag		Lead				Lead	Lag	Lead		Lag	Lead
Lead-Lag Optimize?	Yes		Yes				Yes	Yes	Yes		Yes	Yes
Recall Mode	None		Min				None	Min	None	None	None	None
Act Effct Green (s)	64.8	104.1	33.2	83.6	44.3	44.3						
Actuated g/C Ratio	0.40	0.65	0.21	0.52	0.28	0.28						
v/c Ratio	0.35	0.20	0.59	0.35	0.64	0.43						
Control Delay	5.1	1.9	61.0	6.0	55.7	10.0						
Queue Delay	0.1	0.4	0.1	0.0	0.0	0.0						
Total Delay	5.3	2.4	61.1	6.0	55.7	10.0						
LOS	А	А	E	А	Е	А						
Approach Delay		3.6	46.5									
Approach LOS		А	D									
Intersection Summary												
Cycle Length: 200												
Actuated Cycle Length: 160.0	6											
Natural Cycle: 70												
Control Type: Actuated-Unco	ordinated											
Maximum v/c Ratio: 0.68												
Intersection Signal Delay: 30	.1			In	tersection	n LOS: C						
Intersection Capacity Utilizat	ion 104.5%	/o		IC	U Level	of Service	G					
Analysis Period (min) 15												

Splits and Phases: 603: I-95 NB Ramps & Griffin Road

#602#602			Ø3	#602	#602			
7 <mark>s</mark> 90 s		16 s		26 s	61s			
#603	#603	#603	#603 2	Ø8				
40 s	57 s	8 <mark>s</mark> 9	95 s					

I-95 Interchange Master Plan 09/04/2014 2013 Existing Conditions - PM Peak Hour

Lane Group	Ø9	
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Turn Type		
Protected Phases	9	
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	12.0	
Minimum Split (s)	18.0	
Total Split (s)	26.0	
Total Split (%)	13%	
Yellow Time (s)	5.0	
All-Red Time (s)	1.0	
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	
Lead-Lag Optimize?	Yes	
Recall Mode	None	
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		
### Queues 603: I-95 NB Ramps & Griffin Road

	٦	-	+	•	1	1
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	484	663	905	326	600	263
v/c Ratio	0.35	0.20	0.59	0.35	0.64	0.43
Control Delay	5.1	1.9	61.0	6.0	55.7	10.0
Queue Delay	0.1	0.4	0.1	0.0	0.0	0.0
Total Delay	5.3	2.4	61.1	6.0	55.7	10.0
Queue Length 50th (ft)	6	0	210	31	285	19
Queue Length 95th (ft)	7	0	303	108	409	105
Internal Link Dist (ft)		184	813			
Turn Bay Length (ft)						
Base Capacity (vph)	1915	3300	1608	1006	1105	671
Starvation Cap Reductn	590	2026	0	0	0	0
Spillback Cap Reductn	0	0	104	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.52	0.60	0.32	0.54	0.39
Intersection Summary						

# HCM Signalized Intersection Capacity Analysis 603: I-95 NB Ramps & Griffin Road

10	)/1	8/	20	01	6
----	-----	----	----	----	---

	≯	<b>→</b>	$\mathbf{\hat{z}}$	4	-	•	1	Ť	۲	1	ţ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻሻ	***			11111	1	ካካ		1	-	-	-
Traffic Volume (vph)	460	630	0	0	860	310	570	0	250	0	0	0
Future Volume (vph)	460	630	0	0	860	310	570	0	250	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	6.0	6.0		6.0			
Lane Util. Factor	0.97	0.91			0.81	1.00	0.97		1.00			
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)	3400	5036			7471	1568	3400		1568			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	3400	5036			7471	1568	3400		1568			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	484	663	0	0	905	326	600	0	263	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	125	0	0	172	0	0	0
Lane Group Flow (vph)	484	663	0	0	905	201	600	0	91	0	0	0
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Prot	NA			NA	custom	Prot		Perm			
Protected Phases	8	58			5		67					
Permitted Phases						567			67			
Actuated Green, G (s)	64.8	104.0			33.2	84.3	45.1		45.1			
Effective Green, g (s)	64.8	104.0			33.2	84.3	45.1		45.1			
Actuated g/C Ratio	0.40	0.65			0.21	0.53	0.28		0.28			
Clearance Time (s)	6.0				6.0							
Vehicle Extension (s)	3.0				3.0							
Lane Grp Cap (vph)	1376	3271			1549	825	957		441			
v/s Ratio Prot	c0.14	0.13			c0.12		c0.18					
v/s Ratio Perm						0.13			0.06			
v/c Ratio	0.35	0.20			0.58	0.24	0.63		0.21			
Uniform Delay, d1	33.1	11.3			57.2	20.6	50.2		43.9			
Progression Factor	0.13	0.15			1.00	1.00	1.00		1.00			
Incremental Delay, d2	0.1	0.0			0.6	0.2	1.3		0.2			
Delay (s)	4.5	1.8			57.8	20.7	51.5		44.1			
Level of Service	А	А			E	С	D		D			
Approach Delay (s)		2.9			48.0			49.2			0.0	
Approach LOS		А			D			D			А	
Intersection Summary												
HCM 2000 Control Delay			32.4	Н	CM 2000	) Level of	Service		С			
HCM 2000 Volume to Capa	city ratio		0.54									
Actuated Cycle Length (s)			160.1	S	um of los	st time (s)			30.0			
Intersection Capacity Utiliza	tion		104.5%	IC	CU Level	of Service	)		G			
Analysis Period (min)			15									
c Critical Lane Group												

## Timings 602: I-95 SB Ramps & Griffin Road

	-	$\mathbf{\hat{z}}$	4	+	1	~						
ane Group	EBT	EBR	WBL	WBT	SBL	SBR	Ø1	Ø3	Ø4	Ø5	Ø6	Ø7
ane Configurations	11111	1	ሻሻ	<b>^</b>	ሻሻ	77						
Traffic Volume (vph)	860	550	120	680	260	360						
Future Volume (vph)	860	550	120	680	260	360						
Furn Type	NA	custom	Prot	NA	Prot	custom						
Protected Phases	39	1349	2	23	14	149	1	3	4	5	6	7
Permitted Phases												
Detector Phase	39	1349	2	23	14	149						
Switch Phase												
Minimum Initial (s)			12.0				2.0	2.0	4.0	12.0	4.0	2.0
Minimum Split (s)			24.0				7.0	8.0	10.0	18.0	10.0	7.0
Total Split (s)			86.0				7.0	15.0	68.0	33.0	60.0	8.0
Total Split (%)			43.0%				4%	8%	34%	17%	30%	4%
fellow Time (s)			5.0				4.0	4.0	4.0	5.0	4.0	4.0
All-Red Time (s)			1.0				1.0	2.0	2.0	1.0	2.0	1.0
₋ost Time Adjust (s)			0.0									
Гotal Lost Time (s)			6.0									
_ead/Lag			Lag				Lead	Lead		Lead	Lag	Lead
_ead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	Yes
Recall Mode			Min				None	None	None	Min	None	None
Act Effct Green (s)	33.5	64.2	42.8	58.1	24.5	48.9						
Actuated g/C Ratio	0.28	0.54	0.36	0.49	0.21	0.41						
//c Ratio	0.57	0.52	0.10	0.29	0.39	0.33						
Control Delay	39.9	3.3	5.0	1.1	43.5	26.0						
Queue Delay	0.0	0.0	0.0	0.1	0.0	0.0						
Fotal Delay	39.9	3.3	5.0	1.2	43.5	26.0						
LOS	D	А	А	А	D	С						
Approach Delay	25.6			1.8								
Approach LOS	С			А								
ntersection Summary												
Cycle Length: 200												
Actuated Cycle Length: 118.2												
Natural Cycle: 70												
Control Type: Actuated-Uncoo	rdinated	ł										
Maximum v/c Ratio: 0.68												
ntersection Signal Delay: 20.6				In	tersectio	n LOS: C						
ntersection Capacity Utilization	n 93.1%	, D		IC	U Level	of Service	F					
Analysis Period (min) 15												

Splits and Phases: 602: I-95 SB Ramps & Griffin Road

#602#602		#60:	2 Ø3	#602	#602
7 <mark>s</mark> 86 s		15 s		24 s	68 s
#603	#603	#603	#60 g	3 Ø8	
33 s	60 s	8 s	99 s		

I-95 Interchange Master Plan 09/04/2014 2013 Existing Conditions - AM Peak Hour

Lane Group	Ø8	Ø9
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Turn Type		
Protected Phases	8	9
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	12.0	12.0
Minimum Split (s)	22.0	18.0
Total Split (s)	99.0	24.0
Total Split (%)	50%	12%
Yellow Time (s)	5.0	5.0
All-Red Time (s)	1.0	1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

### Queues 602: I-95 SB Ramps & Griffin Road

	-+	$\mathbf{r}$	<	-	1	-
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	905	579	126	716	274	379
v/c Ratio	0.57	0.52	0.10	0.29	0.39	0.33
Control Delay	39.9	3.3	5.0	1.1	43.5	26.0
Queue Delay	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay	39.9	3.3	5.0	1.2	43.5	26.0
Queue Length 50th (ft)	191	0	3	0	92	107
Queue Length 95th (ft)	302	60	5	0	157	190
Internal Link Dist (ft)	1272			184		
Turn Bay Length (ft)						
Base Capacity (vph)	1596	1437	2339	3464	1842	2065
Starvation Cap Reductn	0	0	0	1041	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.40	0.05	0.30	0.15	0.18
Intersection Summary						

# HCM Signalized Intersection Capacity Analysis 602: I-95 SB Ramps & Griffin Road

	۶	-	$\rightarrow$	4	+	*	1	Ť	۲	1	Ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		11111	1	ሻሻ	***					ሻሻ		11
Traffic Volume (vph)	0	860	550	120	680	0	0	0	0	260	0	360
Future Volume (vph)	0	860	550	120	680	0	0	0	0	260	0	360
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	5.0	6.0	6.0					5.0		5.0
Lane Util. Factor		*0.61	1.00	0.97	0.91					0.97		0.88
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)		5626	1568	3400	5036					3400		2760
Flt Permitted		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (perm)		5626	1568	3400	5036					3400		2760
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95
Adj. Flow (vph)	0	905	579	126	716	0	0	0	0	274	0	379
RTOR Reduction (vph)	0	0	353	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	905	226	126	716	0	0	0	0	274	0	379
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type		NA	custom	Prot	NA					Prot		custom
Protected Phases		39	1349	2	23					14		149
Permitted Phases												
Actuated Green, G (s)		33.5	64.0	42.9	58.1					24.5		48.8
Effective Green, g (s)		33.5	46.0	42.9	58.1					18.5		36.8
Actuated g/C Ratio		0.28	0.39	0.36	0.49					0.16		0.31
Clearance Time (s)				6.0								
Vehicle Extension (s)				3.0								
Lane Grp Cap (vph)		1598	611	1237	2481					533		861
v/s Ratio Prot		c0.16	0.14	0.04	c0.14					c0.08		0.14
v/s Ratio Perm												
v/c Ratio		0.57	0.37	0.10	0.29					0.51		0.44
Uniform Delay, d1		36.0	25.6	24.8	17.7					45.6		32.3
Progression Factor		1.00	1.00	0.20	0.05					1.00		1.00
Incremental Delay, d2		0.5	0.1	0.0	0.1					0.3		0.1
Delay (s)		36.5	25.8	4.9	0.9					45.9		32.5
Level of Service		D	С	А	Α					D		С
Approach Delay (s)		32.3			1.5			0.0			38.1	
Approach LOS		С			A			A			D	
Intersection Summary												
HCM 2000 Control Delay			24.9	Н	CM 2000	Level of S	Service		С			
HCM 2000 Volume to Capacit	y ratio		0.48									
Actuated Cycle Length (s)			117.9	S	um of los	t time (s)			30.0			
Intersection Capacity Utilization	n		93.1%	IC	CU Level	of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

## Timings 602: I-95 SB Ramps & Griffin Road

	-	$\mathbf{\hat{z}}$	4	←	1	~						
_ane Group	EBT	EBR	WBL	WBT	SBL	SBR	Ø1	Ø3	Ø4	Ø5	Ø6	Ø7
ane Configurations	11111	1	ሻሻ	***	ሻሻ	11						
Fraffic Volume (vph)	780	520	400	1030	310	720						
Future Volume (vph)	780	520	400	1030	310	720						
Furn Type	NA	custom	Prot	NA	Prot	custom						
Protected Phases	39	1349	2	23	14	149	1	3	4	5	6	7
Permitted Phases												
Detector Phase	39	1349	2	23	14	149						
Switch Phase												
Vinimum Initial (s)			12.0				2.0	2.0	4.0	12.0	4.0	2.0
Vinimum Split (s)			24.0				7.0	8.0	10.0	18.0	10.0	7.0
Total Split (s)			90.0				7.0	16.0	61.0	40.0	57.0	8.0
Total Split (%)			45.0%				4%	8%	31%	20%	29%	4%
Yellow Time (s)			5.0				4.0	4.0	4.0	5.0	4.0	4.0
All-Red Time (s)			1.0				1.0	2.0	2.0	1.0	2.0	1.0
_ost Time Adjust (s)			0.0									
Total Lost Time (s)			6.0									
_ead/Lag			Lag				Lead	Lead		Lead	Lag	Lead
_ead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	Yes
Recall Mode			Min				None	None	None	Min	None	None
Act Effct Green (s)	36.6	81.1	68.3	84.6	38.4	64.8						
Actuated g/C Ratio	0.23	0.50	0.43	0.53	0.24	0.40						
//c Ratio	0.48	0.58	0.29	0.41	0.40	0.68						
Control Delay	57.2	14.6	3.5	2.4	52.8	43.2						
Queue Delay	0.0	0.0	0.2	0.4	0.0	0.0						
Total Delay	57.2	14.6	3.8	2.8	52.8	43.2						
LOS	E	В	А	А	D	D						
Approach Delay	40.2			3.1								
Approach LOS	D			А								
ntersection Summary												
Cycle Length: 200												
Actuated Cycle Length: 160.6												
Natural Cycle: 70												
Control Type: Actuated-Uncoor	dinated	t										
Maximum v/c Ratio: 0.68												
ntersection Signal Delay: 27.7				In	tersectio	n LOS: C						
ntersection Capacity Utilizatior	n 104.5	%		IC	U Level	of Service	G					
Analysis Period (min) 15												

Splits and Phases: 602: I-95 SB Ramps & Griffin Road

#602#602		#602	83	#602	#602
7 <mark>s</mark> 90s		16 s		26 s	61s
#603	#603	#603	#603 2	Ø8	
40 s	57 s	8 <mark>s</mark>	95 s		

I-95 Interchange Master Plan 09/04/2014 2013 Existing Conditions - PM Peak Hour

Lane Group	Ø8	Ø9
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Turn Type		
Protected Phases	8	9
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	12.0	12.0
Minimum Split (s)	22.0	18.0
Total Split (s)	95.0	26.0
Total Split (%)	48%	13%
Yellow Time (s)	5.0	5.0
All-Red Time (s)	1.0	1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		
intersection ourninary		

### Queues 602: I-95 SB Ramps & Griffin Road

	-	$\mathbf{i}$	1	+	1	1
Lane Group	FRT	FBR	WRI	WBT	SBI	SBB
Lane Group Flow (vph)	821	547	421	1084	326	758
v/c Ratio	0.48	0.58	0.29	0.41	0.40	0.68
Control Delay	57.2	14.6	3.5	2.4	52.8	43.2
Queue Delay	0.0	0.0	0.2	0.4	0.0	0.0
Total Delay	57.2	14.6	3.8	2.8	52.8	43.2
Queue Length 50th (ft)	185	178	7	0	149	369
Queue Length 95th (ft)	270	328	8	0	212	500
Internal Link Dist (ft)	1272			184		
Turn Bay Length (ft)						
Base Capacity (vph)	1702	1088	1808	2765	1212	1438
Starvation Cap Reductn	0	0	750	1032	0	0
Spillback Cap Reductn	39	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.50	0.40	0.63	0.27	0.53
Intersection Summary						

# HCM Signalized Intersection Capacity Analysis 602: I-95 SB Ramps & Griffin Road

	۶	-	$\rightarrow$	4	+	×	1	Ť	۲	1	ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		11111	1	ካካ	***					55	-	11
Traffic Volume (vph)	0	780	520	400	1030	0	0	0	0	310	0	720
Future Volume (vph)	0	780	520	400	1030	0	0	0	0	310	0	720
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	5.0	6.0	6.0					5.0		5.0
Lane Util. Factor		0.81	1.00	0.97	0.91					0.97		0.88
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)		7471	1568	3400	5036					3400		2760
Flt Permitted		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (perm)		7471	1568	3400	5036					3400		2760
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	821	547	421	1084	0	0	0	0	326	0	758
RTOR Reduction (vph)	0	0	181	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	821	366	421	1084	0	0	0	0	326	0	758
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
		NA	custom	Prot	NA					Prot		custom
Protected Phases		39	1349	2	23					14		149
Permitted Phases												
Actuated Green, G (s)		36.5	80.8	68.3	84.5					38.3		64.6
Effective Green, g (s)		36.5	62.8	68.3	84.5					32.3		52.6
Actuated g/C Ratio		0.23	0.39	0.43	0.53					0.20		0.33
Clearance Time (s)				6.0								
Vehicle Extension (s)				3.0								
Lane Grp Cap (vph)		1703	615	1450	2657					685		906
v/s Ratio Prot		c0.11	c0.23	0.12	c0.22					0.10		c0.27
v/s Ratio Perm												
v/c Ratio		0.48	0.60	0.29	0.41					0.48		0.84
Uniform Delay, d1		53.6	38.6	30.0	22.7					56.4		49.8
Progression Factor		1.00	1.00	0.10	0.08					1.00		1.00
Incremental Delay, d2		0.2	1.0	0.1	0.1					0.2		6.5
Delay (s)		53.8	39.6	3.1	2.0					56.6		56.3
Level of Service		D	D	А	А					Е		E
Approach Delay (s)		48.1			2.3			0.0			56.4	
Approach LOS		D			Α			A			E	
Intersection Summary												
HCM 2000 Control Delay			33.0	Н	CM 2000	Level of S	Service		С			
HCM 2000 Volume to Capacity	y ratio		0.62									
Actuated Cycle Length (s)			160.1	S	um of los	t time (s)			30.0			
Intersection Capacity Utilizatio	n		104.5%	IC	CU Level	of Service	;		G			
Analysis Period (min)			15									
c Critical Lane Group												

No Build Conditions

## Timings 603: I-95 NB Ramps & Griffin Road

	٦	-	+	•	•	1						
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR	Ø1	Ø2	Ø3	Ø4	Ø6	Ø7
Lane Configurations	ሻሻ	<u>^</u>	11111	1	ሻሻ	1						
Traffic Volume (vph)	575	950	475	320	550	445						
Future Volume (vph)	575	950	475	320	550	445						
Turn Type	Prot	NA	NA	custom	Prot	Perm						
Protected Phases	8	58	5		67		1	2	3	4	6	7
Permitted Phases				567		67						
Detector Phase	8	58	5	567	67	67						
Switch Phase												
Minimum Initial (s)	12.0		12.0				2.0	12.0	2.0	4.0	4.0	2.0
Minimum Split (s)	22.0		18.0				7.0	24.0	8.0	10.0	10.0	7.0
Total Split (s)	99.0		33.0				7.0	86.0	15.0	68.0	60.0	8.0
Total Split (%)	49.5%		16.5%				4%	43%	8%	34%	30%	4%
Yellow Time (s)	5.0		5.0				4.0	5.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0		1.0				1.0	1.0	2.0	2.0	2.0	1.0
Lost Time Adjust (s)	0.0		0.0									
Total Lost Time (s)	6.0		6.0									
Lead/Lag	Lag		Lead				Lead	Lag	Lead		Lag	Lead
Lead-Lag Optimize?	Yes		Yes				Yes	Yes	Yes		Yes	Yes
Recall Mode	Max		Мах				Max	Мах	Max	Max	Max	Max
Act Effct Green (s)	93.0	126.0	27.0	95.0	62.0	62.0						
Actuated g/C Ratio	0.46	0.63	0.14	0.48	0.31	0.31						
v/c Ratio	0.38	0.32	0.68	0.40	0.55	0.80						
Control Delay	3.4	1.4	87.7	14.3	59.8	55.0						
Queue Delay	3.6	1.7	0.0	0.0	0.0	0.0						
Total Delay	7.0	3.1	87.7	14.3	59.8	55.0						
LOS	А	А	F	В	E	E						
Approach Delay		4.6	58.2									
Approach LOS		А	E									
Intersection Summary												
Cycle Length: 200												
Actuated Cycle Length: 200												
Offset: 7 (4%), Referenced to	phase 2:	WBTL ar	nd 5:, Sta	rt of Greer	า							
Natural Cycle: 70												
Control Type: Pretimed												
Maximum v/c Ratio: 1.18												
Intersection Signal Delay: 33	.4			In	tersectior	n LOS: C						
Intersection Capacity Utilizat	ion 110.0%	6		IC	CU Level o	of Service	Н					
Analysis Period (min) 15												

Splits and Phases: 603: I-95 NB Ramps & Griffin Road

#602#602		#602	2 Ø3	#602	#602 Ø4
7 <mark>s</mark> 86 s		15 s		24 s	68 s
#603	#603	#603	#60: 2	3 Ø8	
33 s	60 s	8 <mark>s</mark>	99 s		

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	12.0
Minimum Split (s)	18.0
Total Split (s)	24.0
Total Split (%)	12%
Yellow Time (s)	5.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	Max
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summarv	

### Queues 603: I-95 NB Ramps & Griffin Road

	≯	-	-	•	1	1
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	605	1000	500	337	579	468
v/c Ratio	0.38	0.32	0.68	0.40	0.55	0.80
Control Delay	3.4	1.4	87.7	14.3	59.8	55.0
Queue Delay	3.6	1.7	0.0	0.0	0.0	0.0
Total Delay	7.0	3.1	87.7	14.3	59.8	55.0
Queue Length 50th (ft)	8	0	216	110	329	418
Queue Length 95th (ft)	m8	m0	260	195	395	581
Internal Link Dist (ft)		184	813			
Turn Bay Length (ft)						
Base Capacity (vph)	1581	3172	734	849	1054	584
Starvation Cap Reductn	862	1929	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	0.84	0.80	0.68	0.40	0.55	0.80
Intersection Summary						

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

	≯	-	$\mathbf{F}$	1	-	•	1	1	1	1	Ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻሻ	<u> </u>			11111	1	ሻሻ		1			
Traffic Volume (vph)	575	950	0	0	475	320	550	0	445	0	0	0
Future Volume (vph)	575	950	0	0	475	320	550	0	445	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	6.0	6.0		6.0			
Lane Util. Factor	0.97	0.91			*0.59	1.00	0.97		1.00			
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)	3400	5036			5442	1568	3400		1568			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	3400	5036			5442	1568	3400		1568			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	605	1000	0	0	500	337	579	0	468	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	103	0	0	97	0	0	0
Lane Group Flow (vph)	605	1000	0	0	500	234	579	0	371	0	0	0
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Prot	NA			NA	custom	Prot		Perm			
Protected Phases	8	58			5		67					
Permitted Phases						567			67			
Actuated Green, G (s)	93.0	126.0			27.0	96.0	63.0		63.0			
Effective Green, g (s)	93.0	126.0			27.0	96.0	63.0		63.0			
Actuated g/C Ratio	0.46	0.63			0.14	0.48	0.32		0.32			
Clearance Time (s)	6.0				6.0							
Lane Grp Cap (vph)	1581	3172			734	752	1071		493			
v/s Ratio Prot	c0.18	0.20			c0.09		0.17					
v/s Ratio Perm						0.15			c0.24			
v/c Ratio	0.38	0.32			0.68	0.31	0.54		0.75			
Uniform Delay, d1	34.8	17.1			82.4	31.8	56.6		61.5			
Progression Factor	0.09	0.08			1.00	1.00	1.00		1.00			
Incremental Delay, d2	0.2	0.1			5.1	1.1	2.0		10.1			
Delay (s)	3.4	1.4			87.5	32.9	58.5		71.6			
Level of Service	А	А			F	С	E		E			
Approach Delay (s)		2.2			65.5			64.4			0.0	
Approach LOS		А			E			E			A	
Intersection Summary												
HCM 2000 Control Delay			36.0	Н	CM 2000	) Level of	Service		D			
HCM 2000 Volume to Capa	city ratio		0.60									
Actuated Cycle Length (s)			200.0	S	um of los	st time (s)			30.0			
Intersection Capacity Utiliza	tion		110.0%	IC	CU Level	of Service	;		Н			
Analysis Period (min)			15									

### Timings 603: I-95 NB Ramps & Griffin Road

	٦	-	+	•	•	1						
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR	Ø1	Ø2	Ø3	Ø4	Ø6	Ø7
Lane Configurations	ሻሻ	<u> </u>	11111	1	ሻሻ	1						
Traffic Volume (vph)	550	820	1050	435	610	320						
Future Volume (vph)	550	820	1050	435	610	320						
Turn Type	Prot	NA	NA	custom	Prot	Perm						
Protected Phases	8	58	5		67		1	2	3	4	6	7
Permitted Phases				567		67						
Detector Phase	8	58	5	567	67	67						
Switch Phase												
Minimum Initial (s)	12.0		12.0				2.0	12.0	2.0	4.0	4.0	2.0
Minimum Split (s)	22.0		18.0				7.0	24.0	8.0	10.0	10.0	7.0
Total Split (s)	95.0		40.0				7.0	90.0	16.0	61.0	57.0	8.0
Total Split (%)	47.5%		20.0%				4%	45%	8%	31%	29%	4%
Yellow Time (s)	5.0		5.0				4.0	5.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0		1.0				1.0	1.0	2.0	2.0	2.0	1.0
Lost Time Adjust (s)	0.0		0.0									
Total Lost Time (s)	6.0		6.0									
Lead/Lag	Lag		Lead				Lead	Lag	Lead		Lag	Lead
Lead-Lag Optimize?	Yes		Yes				Yes	Yes	Yes		Yes	Yes
Recall Mode	Max		Мах				Max	Мах	Max	Max	Max	Max
Act Effct Green (s)	89.0	129.0	34.0	99.0	59.0	59.0						
Actuated g/C Ratio	0.44	0.64	0.17	0.50	0.30	0.30						
v/c Ratio	0.38	0.27	0.87	0.52	0.64	0.57						
Control Delay	4.3	1.9	89.2	20.5	64.8	29.0						
Queue Delay	2.1	1.1	2.1	0.5	0.0	0.0						
Total Delay	6.4	3.0	91.3	21.0	64.8	29.0						
LOS	А	A	F	С	E	С						
Approach Delay		4.4	70.7									
Approach LOS		A	E									
Intersection Summary												
Cycle Length: 200												
Actuated Cycle Length: 200												
Offset: 7 (4%), Referenced to	phase 2:	WBTL ar	nd 5:, Sta	rt of Greer	ı							
Natural Cycle: 70												
Control Type: Pretimed												
Maximum v/c Ratio: 0.87												
Intersection Signal Delay: 42	.2			In	tersectior	n LOS: D						
Intersection Capacity Utilizati	on 119.9%	6		IC	U Level o	of Service	Н					
Analysis Period (min) 15												

Splits and Phases: 603: I-95 NB Ramps & Griffin Road

#602#602 Ø2 (R)		#602	<b>Z</b> 3	#602	#602 Ø4
7 <mark>s</mark> 90 s		16 s		26 s	61s
#603	#603	#603	#603 2	Ø8	
40 s	57 s	8 <mark>s</mark> 8	95 s		

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	12.0
Minimum Split (s)	18.0
Total Split (s)	26.0
Total Split (%)	13%
Yellow Time (s)	5.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Hecall Mode	Max
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Hatio	
Control Delay	
Queue Delay	
l otal Delay	
LUS Armine ch. Deleu	
Approach Delay	
Approach LOS	
Intersection Summarv	

### Queues 603: I-95 NB Ramps & Griffin Road

	≯	-	+	•	1	1
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	579	863	1105	458	642	337
v/c Ratio	0.38	0.27	0.87	0.52	0.64	0.57
Control Delay	4.3	1.9	89.2	20.5	64.8	29.0
Queue Delay	2.1	1.1	2.1	0.5	0.0	0.0
Total Delay	6.4	3.0	91.3	21.0	64.8	29.0
Queue Length 50th (ft)	6	0	356	230	382	167
Queue Length 95th (ft)	7	0	393	338	455	284
Internal Link Dist (ft)		184	813			
Turn Bay Length (ft)						
Base Capacity (vph)	1513	3248	1270	876	1003	595
Starvation Cap Reductn	759	2052	0	137	0	0
Spillback Cap Reductn	0	0	74	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.72	0.92	0.62	0.64	0.57
Intersection Summary						

	٦	-	$\mathbf{r}$	1	+	•	1	1	1	1	ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ካካ	***			11111	1	ሻሻ		1			
Traffic Volume (vph)	550	820	0	0	1050	435	610	0	320	0	0	0
Future Volume (vph)	550	820	0	0	1050	435	610	0	320	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	6.0	6.0		6.0			
Lane Util. Factor	0.97	0.91			0.81	1.00	0.97		1.00			
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)	3400	5036			7471	1568	3400		1568			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	3400	5036			7471	1568	3400		1568			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	579	863	0	0	1105	458	642	0	337	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	100	0	0	132	0	0	0
Lane Group Flow (vph)	579	863	0	0	1105	359	642	0	205	0	0	0
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Prot	NA			NA	custom	Prot		Perm			
Protected Phases	8	58			5		67					
Permitted Phases						567			67			
Actuated Green, G (s)	89.0	129.0			34.0	100.0	60.0		60.0			
Effective Green, g (s)	89.0	129.0			34.0	100.0	60.0		60.0			
Actuated g/C Ratio	0.44	0.64			0.17	0.50	0.30		0.30			
Clearance Time (s)	6.0				6.0							
Lane Grp Cap (vph)	1513	3248			1270	784	1020		470			
v/s Ratio Prot	c0.17	0.17			c0.15		c0.19					
v/s Ratio Perm						0.23			0.13			
v/c Ratio	0.38	0.27			0.87	0.46	0.63		0.44			
Uniform Delay, d1	37.1	15.2			80.8	32.4	60.4		56.4			
Progression Factor	0.10	0.12			1.00	1.00	1.00		1.00			
Incremental Delay, d2	0.5	0.1			8.3	1.9	2.9		2.9			
Delay (s)	4.3	1.9			89.2	34.3	63.4		59.3			
Level of Service	A	A			F	С	E		E			
Approach Delay (s)		2.9			73.1			62.0			0.0	
Approach LOS		A			E			E			A	
Intersection Summary												
HCM 2000 Control Delay			44.9	Н	CM 2000	) Level of	Service		D			
HCM 2000 Volume to Capac	city ratio		0.60									
Actuated Cycle Length (s)			200.0	S	um of los	st time (s)			30.0			
Intersection Capacity Utilizat	ion		119.9%	IC	CU Level	of Service	)		Н			
Analysis Period (min)			15									

## Timings 602: I-95 SB Ramps & Griffin Road

	-	$\mathbf{r}$	4	←	1	~						
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR	Ø1	Ø3	Ø4	Ø5	Ø6	Ø7
Lane Configurations	11111	1	ሻሻ	<b>^</b>	ካካ	11						
Traffic Volume (vph)	1040	560	270	750	480	465						
Future Volume (vph)	1040	560	270	750	480	465						
Turn Type	NA	custom	Prot	NA	Prot	custom						
Protected Phases	39	1349	2	23	14	149	1	3	4	5	6	7
Permitted Phases												
Detector Phase	39	1349	2	23	14	149						
Switch Phase												
Minimum Initial (s)			12.0				2.0	2.0	4.0	12.0	4.0	2.0
Minimum Split (s)			24.0				7.0	8.0	10.0	18.0	10.0	7.0
Total Split (s)			86.0				7.0	15.0	68.0	33.0	60.0	8.0
Total Split (%)			43.0%				4%	8%	34%	17%	30%	4%
Yellow Time (s)			5.0				4.0	4.0	4.0	5.0	4.0	4.0
All-Red Time (s)			1.0				1.0	2.0	2.0	1.0	2.0	1.0
Lost Time Adjust (s)			0.0									
Total Lost Time (s)			6.0									
Lead/Lag			Lag				Lead	Lead		Lead	Lag	Lead
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	Yes
Recall Mode			Max				Max	Max	Max	Max	Max	Max
Act Effct Green (s)	33.0	109.0	80.0	95.0	70.0	94.0						
Actuated g/C Ratio	0.16	0.54	0.40	0.48	0.35	0.47						
v/c Ratio	1.18	0.56	0.21	0.33	0.42	0.38						
Control Delay	159.8	8.7	4.2	0.9	51.0	35.2						
Queue Delay	0.2	0.0	0.9	0.5	0.0	0.0						
Total Delay	159.9	8.7	5.2	1.4	51.0	35.2						
LOS	F	А	А	А	D	D						
Approach Delay	107.0			2.4								
Approach LOS	F			А								
Intersection Summary												
Cycle Length: 200												
Actuated Cycle Length: 200												
Offset: 7 (4%), Referenced to p	bhase 2	WBTL ar	nd 5:, Star	t of Greer	า							
Natural Cycle: 70												
Control Type: Pretimed												
Maximum v/c Ratio: 1.18												
Intersection Signal Delay: 60.2				In	tersectio	n LOS: E						
Intersection Capacity Utilization	n 110.0	%		IC	U Level	of Service	H					
Analysis Period (min) 15												

Splits and Phases: 602: I-95 SB Ramps & Griffin Road

#602#602 Ø2 (R)		#60:	2 Ø3	#602	#602
7 <mark>s</mark> 86 s		15 s		24 s	68 s
#603	#603	#603	#60 ©	3 Ø8	
33 s	60 s	8 <mark>6</mark>	99 s		

Lane Group	Ø8	Ø9
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Turn Type		
Protected Phases	8	9
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	12.0	12.0
Minimum Split (s)	22.0	18.0
Total Split (s)	99.0	24.0
Total Split (%)	50%	12%
Yellow Time (s)	5.0	5.0
All-Red Time (s)	1.0	1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes
Recall Mode	Max	Max
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summarv		

#### Queues 602: I-95 SB Ramps & Griffin Road

	-	$\mathbf{r}$	4	+	5	~
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	1095	589	284	789	505	489
v/c Ratio	1.18	0.56	0.21	0.33	0.42	0.38
Control Delay	159.8	8.7	4.2	0.9	51.0	35.2
Queue Delay	0.2	0.0	0.9	0.5	0.0	0.0
Total Delay	159.9	8.7	5.2	1.4	51.0	35.2
Queue Length 50th (ft)	~563	115	6	0	263	234
Queue Length 95th (ft)	#650	224	8	0	320	289
Internal Link Dist (ft)	1272			184		
Turn Bay Length (ft)						
Base Capacity (vph)	928	1053	1360	2392	1190	1297
Starvation Cap Reductn	0	0	811	1074	0	0
Spillback Cap Reductn	28	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.22	0.56	0.52	0.60	0.42	0.38

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.

	≯	-	$\rightarrow$	1	+	•	1	1	1	1	Ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		11111	1	ሻሻ	<u> </u>					ካካ		11
Traffic Volume (vph)	0	1040	560	270	750	0	0	0	0	480	0	465
Future Volume (vph)	0	1040	560	270	750	0	0	0	0	480	0	465
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	5.0	6.0	6.0					5.0		5.0
Lane Util. Factor		*0.61	1.00	0.97	0.91					0.97		0.88
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)		5626	1568	3400	5036					3400		2760
Flt Permitted		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (perm)		5626	1568	3400	5036					3400		2760
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95
Adj. Flow (vph)	0	1095	589	284	789	0	0	0	0	505	0	489
RTOR Reduction (vph)	0	0	238	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1095	351	284	789	0	0	0	0	505	0	489
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type		NA	custom	Prot	NA					Prot		custom
Protected Phases		39	1349	2	23					14		149
Permitted Phases												
Actuated Green, G (s)		33.0	109.0	80.0	95.0					70.0		94.0
Effective Green, g (s)		33.0	91.0	80.0	95.0					64.0		82.0
Actuated g/C Ratio		0.16	0.46	0.40	0.48					0.32		0.41
Clearance Time (s)				6.0								
Lane Grp Cap (vph)		928	713	1360	2392					1088		1131
v/s Ratio Prot		c0.19	c0.22	0.08	c0.16					0.15		0.18
v/s Ratio Perm												
v/c Ratio		1.18	0.49	0.21	0.33					0.46		0.43
Uniform Delay, d1		83.5	38.3	39.3	32.7					54.3		42.3
Progression Factor		1.00	1.00	0.10	0.02					1.00		1.00
Incremental Delay, d2		92.2	2.4	0.3	0.3					1.4		1.2
Delay (s)		175.7	40.7	4.2	0.9					55.7		43.5
Level of Service		F	D	А	А					Е		D
Approach Delay (s)		128.5			1.7			0.0			49.7	
Approach LOS		F			А			А			D	
Intersection Summary												
HCM 2000 Control Delay			71.3	Н	CM 2000	Level of S	Service		Е			
HCM 2000 Volume to Capacit	y ratio		0.58									
Actuated Cycle Length (s)			200.0	S	um of lost	t time (s)			30.0			
Intersection Capacity Utilization	on		110.0%	IC	CU Level of	of Service			Н			
Analysis Period (min)			15									

## Timings 602: I-95 SB Ramps & Griffin Road

	-	$\mathbf{r}$	4	+	1	~						
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR	Ø1	Ø3	Ø4	Ø5	Ø6	Ø7
Lane Configurations	11111	1	ሻሻ	<b>^</b>	ካካ	11						
Traffic Volume (vph)	1015	555	515	1145	355	775						
Future Volume (vph)	1015	555	515	1145	355	775						
Turn Type	NA	custom	Prot	NA	Prot	custom						
Protected Phases	39	1349	2	23	14	149	1	3	4	5	6	7
Permitted Phases												
Detector Phase	39	1349	2	23	14	149						
Switch Phase												
Minimum Initial (s)			12.0				2.0	2.0	4.0	12.0	4.0	2.0
Minimum Split (s)			24.0				7.0	8.0	10.0	18.0	10.0	7.0
Total Split (s)			90.0				7.0	16.0	61.0	40.0	57.0	8.0
Total Split (%)			45.0%				4%	8%	31%	20%	29%	4%
Yellow Time (s)			5.0				4.0	4.0	4.0	5.0	4.0	4.0
All-Red Time (s)			1.0				1.0	2.0	2.0	1.0	2.0	1.0
Lost Time Adjust (s)			0.0									
Total Lost Time (s)			6.0									
Lead/Lag			Lag				Lead	Lead		Lead	Lag	Lead
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	Yes
Recall Mode			Max				Max	Max	Max	Max	Max	Max
Act Effct Green (s)	36.0	105.0	84.0	100.0	63.0	89.0						
Actuated g/C Ratio	0.18	0.52	0.42	0.50	0.32	0.44						
v/c Ratio	0.79	0.64	0.38	0.48	0.35	0.66						
Control Delay	83.5	24.4	3.4	2.5	53.9	47.0						
Queue Delay	0.4	0.0	2.5	1.5	0.0	0.0						
Total Delay	83.9	24.4	5.9	4.0	53.9	47.0						
LOS	F	С	А	А	D	D						
Approach Delay	62.9			4.6								
Approach LOS	E			А								
Intersection Summary												
Cycle Length: 200												
Actuated Cycle Length: 200												
Offset: 7 (4%), Referenced to p	hase 2	:WBTL ar	nd 5:, Star	t of Greer	l							
Natural Cycle: 70												
Control Type: Pretimed												
Maximum v/c Ratio: 0.87												
Intersection Signal Delay: 37.1				In	tersectio	n LOS: D						
Intersection Capacity Utilization	n 119.9	%		IC	U Level	of Service	H					
Analysis Period (min) 15												

Splits and Phases: 602: I-95 SB Ramps & Griffin Road

#602#602		#602	<b>Ø</b> 3	#602	#602
7 <mark>s</mark> 90 s		16 s		26 s	61s
#603	#603	#603	#603 2	Ø8	
40 s	57 s	8 <mark>s</mark> 9	95 s		

Lane Group	Ø8	Ø9
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Turn Type		
Protected Phases	8	9
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	12.0	12.0
Minimum Split (s)	22.0	18.0
Total Split (s)	95.0	26.0
Total Split (%)	48%	13%
Yellow Time (s)	5.0	5.0
All-Red Time (s)	1.0	1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes
Recall Mode	Max	Max
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

### Queues 602: I-95 SB Ramps & Griffin Road

	-	$\mathbf{N}$	-	-	×	-
	-	•	•			
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	1068	584	542	1205	374	816
v/c Ratio	0.79	0.64	0.38	0.48	0.35	0.66
Control Delay	83.5	24.4	3.4	2.5	53.9	47.0
Queue Delay	0.4	0.0	2.5	1.5	0.0	0.0
Total Delay	83.9	24.4	5.9	4.0	53.9	47.0
Queue Length 50th (ft)	337	363	8	0	196	480
Queue Length 95th (ft)	374	504	m9	0	248	566
Internal Link Dist (ft)	1272			184		
Turn Bay Length (ft)						
Base Capacity (vph)	1344	919	1428	2518	1071	1228
Starvation Cap Reductn	0	0	735	1057	0	0
Spillback Cap Reductn	49	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.64	0.78	0.82	0.35	0.66
Intersection Summary						

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

	≯	-	$\rightarrow$	1	+	•	1	1	1	1	Ŧ	-
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		11111	1	ሻሻ	***					ሻሻ		11
Traffic Volume (vph)	0	1015	555	515	1145	0	0	0	0	355	0	775
Future Volume (vph)	0	1015	555	515	1145	0	0	0	0	355	0	775
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	5.0	6.0	6.0					5.0		5.0
Lane Util. Factor		0.81	1.00	0.97	0.91					0.97		0.88
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)		7471	1568	3400	5036					3400		2760
Flt Permitted		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (perm)		7471	1568	3400	5036					3400		2760
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1068	584	542	1205	0	0	0	0	374	0	816
RTOR Reduction (vph)	0	0	114	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1068	470	542	1205	0	0	0	0	374	0	816
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type		NA	custom	Prot	NA					Prot		custom
Protected Phases		39	1349	2	23					14		149
Permitted Phases												
Actuated Green, G (s)		36.0	105.0	84.0	100.0					63.0		89.0
Effective Green, g (s)		36.0	87.0	84.0	100.0					57.0		77.0
Actuated g/C Ratio		0.18	0.44	0.42	0.50					0.28		0.38
Clearance Time (s)				6.0								
Lane Grp Cap (vph)		1344	682	1428	2518					969		1062
v/s Ratio Prot		c0.14	0.30	0.16	c0.24					0.11		c0.30
v/s Ratio Perm												
v/c Ratio		0.79	0.69	0.38	0.48					0.39		0.77
Uniform Delay, d1		78.5	45.6	40.0	32.9					57.4		53.7
Progression Factor		1.00	1.00	0.07	0.06					1.00		1.00
Incremental Delay, d2		4.9	5.6	0.5	0.4					1.2		5.3
Delay (s)		83.4	51.2	3.3	2.5					58.6		59.1
Level of Service		F	D	А	А					E		E
Approach Delay (s)		72.0			2.8			0.0			58.9	
Approach LOS		E			А			А			E	
Intersection Summary												
HCM 2000 Control Delay			42.3	Н	CM 2000	Level of S	Service		D			
HCM 2000 Volume to Capaci	ty ratio		0.67									
Actuated Cycle Length (s)			200.0	S	um of los	t time (s)			30.0			
Intersection Capacity Utilization	on		119.9%	IC	CU Level of	of Service			Н			
Analysis Period (min)			15									

## Timings 603: I-95 NB Ramps & Griffin Road

	٦	-	+	•	•	1						
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR	Ø1	Ø2	Ø3	Ø4	Ø6	Ø7
Lane Configurations	ሻሻ	<u> </u>	11111	1	ሻሻ	1						
Traffic Volume (vph)	980	1550	965	745	620	555						
Future Volume (vph)	980	1550	965	745	620	555						
Turn Type	Prot	NA	NA	custom	Prot	Perm						
Protected Phases	8	58	5		67		1	2	3	4	6	7
Permitted Phases				567		67						
Detector Phase	8	58	5	567	67	67						
Switch Phase												
Minimum Initial (s)	12.0		12.0				2.0	12.0	2.0	4.0	4.0	2.0
Minimum Split (s)	22.0		18.0				7.0	24.0	8.0	10.0	10.0	7.0
Total Split (s)	99.0		33.0				7.0	86.0	15.0	68.0	60.0	8.0
Total Split (%)	49.5%		16.5%				4%	43%	8%	34%	30%	4%
Yellow Time (s)	5.0		5.0				4.0	5.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0		1.0				1.0	1.0	2.0	2.0	2.0	1.0
Lost Time Adjust (s)	0.0		0.0									
Total Lost Time (s)	6.0		6.0									
Lead/Lag	Lag		Lead				Lead	Lag	Lead		Lag	Lead
Lead-Lag Optimize?	Yes		Yes				Yes	Yes	Yes		Yes	Yes
Recall Mode	Max		Max				Max	Max	Max	Max	Max	Max
Act Effct Green (s)	93.0	126.0	27.0	95.0	62.0	62.0						
Actuated g/C Ratio	0.46	0.63	0.14	0.48	0.31	0.31						
v/c Ratio	0.65	0.51	1.38	1.00	0.62	1.00						
Control Delay	10.3	4.3	238.5	76.6	62.0	87.5						
Queue Delay	50.9	48.9	0.3	35.5	0.0	0.0						
Total Delay	61.3	53.2	238.8	112.1	62.0	87.5						
LOS	E	D	F	F	E	F						
Approach Delay		56.3	183.6									
Approach LOS		E	F									
Intersection Summary												
Cycle Length: 200												
Actuated Cycle Length: 200												
Offset: 7 (4%), Referenced to	o phase 2:	WBTL an	d 5:, Sta	rt of Greer	า							
Natural Cycle: 90			,									
Control Type: Pretimed												
Maximum v/c Ratio: 1.70												
Intersection Signal Delay: 10	)0.4			In	tersectior	1 LOS: F						
Intersection Capacity Utilizat	tion 157.9%	6		IC	U Level	of Service	Н					
Analysis Period (min) 15												

Splits and Phases: 603: I-95 NB Ramps & Griffin Road

#602#602		#602	Ø3	#602	#602 Ø4
7 <mark>s</mark> 86 s		15 s		24 s	68 s
#603	#603	#603	#60: g	3 Ø8	
33 s	60 s	8 <mark>s</mark>	99 s		

Lane Group	Ø9	
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Turn Type		
Protected Phases	9	
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	12.0	
Minimum Split (s)	18.0	
Total Split (s)	24.0	
Total Split (%)	12%	
Yellow Time (s)	5.0	
All-Red Time (s)	1.0	
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	
Lead-Lag Optimize?	Yes	
Recall Mode	Max	
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summarv		

#### Queues 603: I-95 NB Ramps & Griffin Road

	≯	-	-	•	1	1
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	1032	1632	1016	784	653	584
v/c Ratio	0.65	0.51	1.38	1.00	0.62	1.00
Control Delay	10.3	4.3	238.5	76.6	62.0	87.5
Queue Delay	50.9	48.9	0.3	35.5	0.0	0.0
Total Delay	61.3	53.2	238.8	112.1	62.0	87.5
Queue Length 50th (ft)	465	491	~598	959	381	636
Queue Length 95th (ft)	m154	m0	#689	#1269	453	#918
Internal Link Dist (ft)		184	813			
Turn Bay Length (ft)						
Base Capacity (vph)	1581	3172	734	787	1054	584
Starvation Cap Reductn	791	1832	0	78	0	0
Spillback Cap Reductn	0	0	37	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.31	1.22	1.46	1.11	0.62	1.00
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.

	≯	-	$\mathbf{r}$	1	-	•	1	1	1	1	Ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻሻ	<b>^</b>			11111	1	ሻሻ		1			
Traffic Volume (vph)	980	1550	0	0	965	745	620	0	555	0	0	0
Future Volume (vph)	980	1550	0	0	965	745	620	0	555	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	6.0	6.0		6.0			
Lane Util. Factor	0.97	0.91			*0.59	1.00	0.97		1.00			
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)	3400	5036			5442	1568	3400		1568			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	3400	5036			5442	1568	3400		1568			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	1032	1632	0	0	1016	784	653	0	584	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	43	0	0	97	0	0	0
Lane Group Flow (vph)	1032	1632	0	0	1016	741	653	0	487	0	0	0
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Prot	NA			NA	custom	Prot		Perm			
Protected Phases	8	58			5		67					
Permitted Phases						567			67			
Actuated Green, G (s)	93.0	126.0			27.0	96.0	63.0		63.0			
Effective Green, g (s)	93.0	126.0			27.0	96.0	63.0		63.0			
Actuated g/C Ratio	0.46	0.63			0.14	0.48	0.32		0.32			
Clearance Time (s)	6.0				6.0							
Lane Grp Cap (vph)	1581	3172			734	752	1071		493			
v/s Ratio Prot	c0.30	0.32			c0.19		0.19					
v/s Ratio Perm						c0.47			c0.31			
v/c Ratio	0.65	0.51			1.38	0.99	0.61		0.99			
Uniform Delay, d1	41.1	20.3			86.5	51.3	58.1		68.1			
Progression Factor	0.24	0.21			1.00	1.00	1.00		1.00			
Incremental Delay, d2	0.2	0.1			181.3	29.6	2.6		37.5			
Delay (s)	10.3	4.2			267.8	80.9	60.7		105.6			
Level of Service	В	А			F	F	E		F			
Approach Delay (s)		6.6			186.4			81.9			0.0	
Approach LOS		A			F			F			A	
Intersection Summary												
HCM 2000 Control Delay			79.7	Н	CM 2000	Level of	Service		Е			
HCM 2000 Volume to Capa	city ratio		0.96									
Actuated Cycle Length (s)			200.0	S	um of los	st time (s)			30.0			
Intersection Capacity Utiliza	tion		157.9%	IC	CU Level	of Service	)		Н			
Analysis Period (min)			15									

## Timings 603: I-95 NB Ramps & Griffin Road

	≯	-	+	•	1	1						
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR	Ø1	Ø2	Ø3	Ø4	Ø6	Ø7
Lane Configurations	ኘኘ	<b>^</b>	11111	1	ሻሻ	1						
Traffic Volume (vph)	780	1300	1520	755	705	490						
Future Volume (vph)	780	1300	1520	755	705	490						
Turn Type	Prot	NA	NA	custom	Prot	Perm						
Protected Phases	8	58	5		67		1	2	3	4	6	7
Permitted Phases				567		67						
Detector Phase	8	58	5	567	67	67						
Switch Phase												
Minimum Initial (s)	12.0		12.0				2.0	12.0	2.0	4.0	4.0	2.0
Minimum Split (s)	22.0		18.0				7.0	24.0	8.0	10.0	10.0	7.0
Total Split (s)	95.0		40.0				7.0	90.0	16.0	61.0	57.0	8.0
Total Split (%)	47.5%		20.0%				4%	45%	8%	31%	29%	4%
Yellow Time (s)	5.0		5.0				4.0	5.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0		1.0				1.0	1.0	2.0	2.0	2.0	1.0
Lost Time Adjust (s)	0.0		0.0									
Total Lost Time (s)	6.0		6.0									
Lead/Lag	Lag		Lead				Lead	Lag	Lead		Lag	Lead
Lead-Lag Optimize?	Yes		Yes				Yes	Yes	Yes		Yes	Yes
Recall Mode	Max		Max				Max	Мах	Max	Max	Max	Max
Act Effct Green (s)	89.0	129.0	34.0	99.0	59.0	59.0						
Actuated g/C Ratio	0.44	0.64	0.17	0.50	0.30	0.30						
v/c Ratio	0.54	0.42	1.26	0.97	0.74	0.92						
Control Delay	6.0	5.8	185.5	66.4	68.9	70.9						
Queue Delay	25.7	10.6	0.5	36.2	0.0	0.0						
Total Delay	31.8	16.3	186.0	102.6	68.9	70.9						
LOS	С	В	F	F	E	E						
Approach Delay		22.1	158.3									
Approach LOS		С	F									
Intersection Summary												
Cycle Length: 200												
Actuated Cycle Length: 200												
Offset: 7 (4%), Referenced t	o phase 2:	WBTL an	nd 5:, Sta	rt of Greer	ו							
Natural Cycle: 90												
Control Type: Pretimed												
Maximum v/c Ratio: 1.26												
Intersection Signal Delay: 88	3.2			In	tersectior	n LOS: F						
Intersection Capacity Utilizat	tion 160.4%	6		IC	U Level	of Service	Н					
Analysis Period (min) 15												

Splits and Phases: 603: I-95 NB Ramps & Griffin Road

#602#602 Ø2 (R)		#602	Ø3	#602	#602 Ø4
7 <mark>s</mark> 90 s		16 s		26 s	61s
#603	#603	#603	#603 2	Ø8	
40 s	57 s	8 <mark>s</mark> (	95 s		

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	12.0
Minimum Split (s)	18.0
Total Split (s)	26.0
Total Split (%)	13%
Yellow Time (s)	5.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Hecall Mode	Max
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Hatio	
Control Delay	
Queue Delay	
I otal Delay	
LUS Armine ch. Deleu	
Approach Delay	
Approach LOS	
Intersection Summarv	

#### Queues 603: I-95 NB Ramps & Griffin Road

	•	-	-	•	1	1
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	821	1368	1600	795	742	516
v/c Ratio	0.54	0.42	1.26	0.97	0.74	0.92
Control Delay	6.0	5.8	185.5	66.4	68.9	70.9
Queue Delay	25.7	10.6	0.5	36.2	0.0	0.0
Total Delay	31.8	16.3	186.0	102.6	68.9	70.9
Queue Length 50th (ft)	8	537	~648	930	458	514
Queue Length 95th (ft)	m7	m0	#709	#1246	538	#752
Internal Link Dist (ft)		184	813			
Turn Bay Length (ft)						
Base Capacity (vph)	1513	3248	1270	823	1003	562
Starvation Cap Reductn	717	1863	0	92	0	0
Spillback Cap Reductn	0	0	135	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.03	0.99	1.41	1.09	0.74	0.92
Interpretion Summary						

.

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.

	≯	-	$\mathbf{F}$	4	-	•	1	1	1	1	ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻሻ	***			11111	1	ሻሻ		1			
Traffic Volume (vph)	780	1300	0	0	1520	755	705	0	490	0	0	0
Future Volume (vph)	780	1300	0	0	1520	755	705	0	490	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	6.0	6.0		6.0			
Lane Util. Factor	0.97	0.91			0.81	1.00	0.97		1.00			
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)	3400	5036			7471	1568	3400		1568			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	3400	5036			7471	1568	3400		1568			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	821	1368	0	0	1600	795	742	0	516	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	47	0	0	99	0	0	0
Lane Group Flow (vph)	821	1368	0	0	1600	748	742	0	417	0	0	0
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Prot	NA			NA	custom	Prot		Perm			
Protected Phases	8	58			5		67					
Permitted Phases						567			67			
Actuated Green, G (s)	89.0	129.0			34.0	100.0	60.0		60.0			
Effective Green, g (s)	89.0	129.0			34.0	100.0	60.0		60.0			
Actuated g/C Ratio	0.44	0.64			0.17	0.50	0.30		0.30			
Clearance Time (s)	6.0				6.0							
Lane Grp Cap (vph)	1513	3248			1270	784	1020		470			
v/s Ratio Prot	c0.24	0.27			c0.21		0.22					
v/s Ratio Perm						c0.48			0.27			
v/c Ratio	0.54	0.42			1.26	0.95	0.73		0.89			
Uniform Delay, d1	40.6	17.3			83.0	47.8	62.7		66.7			
Progression Factor	0.14	0.33			1.00	1.00	1.00		1.00			
Incremental Delay, d2	0.1	0.0			123.4	22.7	4.5		21.1			
Delay (s)	6.0	5.7			206.4	70.5	67.2		87.9			
Level of Service	А	А			F	E	E		F			
Approach Delay (s)		5.8			161.3			75.7			0.0	
Approach LOS		A			F			E			A	
Intersection Summary												
HCM 2000 Control Delay			84.6	Н	CM 2000	) Level of	Service		F			
HCM 2000 Volume to Capa	city ratio		0.89									
Actuated Cycle Length (s)			200.0	S	um of los	st time (s)			30.0			
Intersection Capacity Utiliza	tion		160.4%	IC	CU Level	of Service	)		Н			
Analysis Period (min)			15									

## Timings 602: I-95 SB Ramps & Griffin Road

	-	$\mathbf{r}$	4	+	1	~						
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR	Ø1	Ø3	Ø4	Ø5	Ø6	Ø7
Lane Configurations	11111	1	ሻሻ	<b>^</b>	ሻሻ	11						
Traffic Volume (vph)	1500	585	650	930	1035	725						
Future Volume (vph)	1500	585	650	930	1035	725						
Turn Type	NA	custom	Prot	NA	Prot	custom						
Protected Phases	39	1349	2	23	14	149	1	3	4	5	6	7
Permitted Phases												
Detector Phase	39	1349	2	23	14	149						
Switch Phase												
Minimum Initial (s)			12.0				2.0	2.0	4.0	12.0	4.0	2.0
Minimum Split (s)			24.0				7.0	8.0	10.0	18.0	10.0	7.0
Total Split (s)			86.0				7.0	15.0	68.0	33.0	60.0	8.0
Total Split (%)			43.0%				4%	8%	34%	17%	30%	4%
Yellow Time (s)			5.0				4.0	4.0	4.0	5.0	4.0	4.0
All-Red Time (s)			1.0				1.0	2.0	2.0	1.0	2.0	1.0
Lost Time Adjust (s)			0.0									
Total Lost Time (s)			6.0									
Lead/Lag			Lag				Lead	Lead		Lead	Lag	Lead
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	Yes
Recall Mode			Max				Max	Max	Max	Max	Max	Max
Act Effct Green (s)	33.0	109.0	80.0	95.0	70.0	94.0						
Actuated g/C Ratio	0.16	0.54	0.40	0.48	0.35	0.47						
v/c Ratio	1.70	0.68	0.50	0.41	0.92	0.59						
Control Delay	363.7	30.6	4.7	1.1	74.4	41.1						
Queue Delay	0.7	0.0	12.6	2.7	0.0	0.0						
Total Delay	364.4	30.6	17.3	3.9	74.4	41.1						
LOS	F	С	В	А	E	D						
Approach Delay	270.7			9.4								
Approach LOS	F			А								
Intersection Summary												
Cycle Length: 200												
Actuated Cycle Length: 200												
Offset: 7 (4%), Referenced to	phase 2	:WBTL ar	nd 5:, Star	t of Greer	۱							
Natural Cycle: 90												
Control Type: Pretimed												
Maximum v/c Ratio: 1.70												
Intersection Signal Delay: 126	.5			In	tersectio	n LOS: F						
Intersection Capacity Utilization	on 157.9	%		IC	U Level	of Service	H					
Analysis Period (min) 15												

Splits and Phases: 602: I-95 SB Ramps & Griffin Road

#602#602		#602	2 Ø3	#602	#602 Ø4
7 <mark>s</mark> 86 s		15 s		24 s	68 s
#603	#603	#603	#60 g	3 Ø8	
33 s	60 s	8 <mark>s</mark>	99 s		

I-95 Interchange Master Plan 2040 No Build
Lane Group	Ø8	Ø9
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Turn Type		
Protected Phases	8	9
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	12.0	12.0
Minimum Split (s)	22.0	18.0
Total Split (s)	99.0	24.0
Total Split (%)	50%	12%
Yellow Time (s)	5.0	5.0
All-Red Time (s)	1.0	1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes
Recall Mode	Max	Max
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

	-	$\mathbf{F}$	1	+	1	~
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	1579	616	684	979	1089	763
v/c Ratio	1.70	0.68	0.50	0.41	0.92	0.59
Control Delay	363.7	30.6	4.7	1.1	74.4	41.1
Queue Delay	0.7	0.0	12.6	2.7	0.0	0.0
Total Delay	364.4	30.6	17.3	3.9	74.4	41.1
Queue Length 50th (ft)	~995	480	11	0	711	415
Queue Length 95th (ft)	#1076	635	m10	m0	809	493
Internal Link Dist (ft)	1272			184		
Turn Bay Length (ft)						
Base Capacity (vph)	928	906	1360	2392	1190	1297
Starvation Cap Reductn	0	0	656	1258	0	0
Spillback Cap Reductn	111	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.93	0.68	0.97	0.86	0.92	0.59
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.

	≯	-	$\rightarrow$	¥	+	•	1	<b>†</b>	1	•	Ŧ	-
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		11111	1	ሻሻ	<b>^</b>					ሻሻ		77
Traffic Volume (vph)	0	1500	585	650	930	0	0	0	0	1035	0	725
Future Volume (vph)	0	1500	585	650	930	0	0	0	0	1035	0	725
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	5.0	6.0	6.0					5.0		5.0
Lane Util. Factor		*0.61	1.00	0.97	0.91					0.97		0.88
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)		5626	1568	3400	5036					3400		2760
Flt Permitted		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (perm)		5626	1568	3400	5036					3400		2760
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95
Adj. Flow (vph)	0	1579	616	684	979	0	0	0	0	1089	0	763
RTOR Reduction (vph)	0	0	62	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1579	554	684	979	0	0	0	0	1089	0	763
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type		NA	custom	Prot	NA					Prot		custom
Protected Phases		39	1349	2	23					14		149
Permitted Phases												
Actuated Green, G (s)		33.0	109.0	80.0	95.0					70.0		94.0
Effective Green, g (s)		33.0	91.0	80.0	95.0					64.0		82.0
Actuated g/C Ratio		0.16	0.46	0.40	0.48					0.32		0.41
Clearance Time (s)				6.0								
Lane Grp Cap (vph)		928	713	1360	2392					1088		1131
v/s Ratio Prot		c0.28	0.35	c0.20	0.19					c0.32		0.28
v/s Ratio Perm												
v/c Ratio		1.70	0.78	0.50	0.41					1.00		0.67
Uniform Delay, d1		83.5	45.9	45.1	34.2					68.0		48.1
Progression Factor		1.00	1.00	0.10	0.03					1.00		1.00
Incremental Delay, d2		320.3	8.1	0.1	0.0					27.5		3.2
Delay (s)		403.8	54.1	4.7	1.1					95.5		51.3
Level of Service		F	D	А	А					F		D
Approach Delay (s)		305.7			2.6			0.0			77.3	
Approach LOS		F			А			А			E	
Intersection Summary												
HCM 2000 Control Delay			143.3	Н	CM 2000	Level of S	Service		F			
HCM 2000 Volume to Capacit	ty ratio		0.94									
Actuated Cycle Length (s)			200.0	S	um of lost	t time (s)			30.0			
Intersection Capacity Utilization	on		157.9%	IC	CU Level o	of Service			Н			
Analysis Period (min)			15									

### Timings 602: I-95 SB Ramps & Griffin Road

	-	$\mathbf{r}$	4	+	1	~						
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR	Ø1	Ø3	Ø4	Ø5	Ø6	Ø7
Lane Configurations	11111	1	ሻሻ	<b>^</b>	ካካ	11						
Traffic Volume (vph)	1605	645	795	1430	475	905						
Future Volume (vph)	1605	645	795	1430	475	905						
Turn Type	NA	custom	Prot	NA	Prot	custom						
Protected Phases	39	1349	2	23	14	149	1	3	4	5	6	7
Permitted Phases												
Detector Phase	39	1349	2	23	14	149						
Switch Phase												
Minimum Initial (s)			12.0				2.0	2.0	4.0	12.0	4.0	2.0
Minimum Split (s)			24.0				7.0	8.0	10.0	18.0	10.0	7.0
Total Split (s)			90.0				7.0	16.0	61.0	40.0	57.0	8.0
Total Split (%)			45.0%				4%	8%	31%	20%	29%	4%
Yellow Time (s)			5.0				4.0	4.0	4.0	5.0	4.0	4.0
All-Red Time (s)			1.0				1.0	2.0	2.0	1.0	2.0	1.0
Lost Time Adjust (s)			0.0									
Total Lost Time (s)			6.0									
Lead/Lag			Lag				Lead	Lead		Lead	Lag	Lead
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	Yes
Recall Mode			Max				Max	Max	Max	Max	Max	Max
Act Effct Green (s)	36.0	105.0	84.0	100.0	63.0	89.0						
Actuated g/C Ratio	0.18	0.52	0.42	0.50	0.32	0.44						
v/c Ratio	1.26	0.79	0.59	0.60	0.47	0.78						
Control Delay	183.4	41.9	5.6	4.8	56.8	52.4						
Queue Delay	0.5	0.0	51.3	39.5	0.0	0.0						
Total Delay	183.8	41.9	56.9	44.4	56.8	52.4						
LOS	F	D	E	D	E	D						
Approach Delay	143.1			48.8								
Approach LOS	F			D								
Intersection Summary												
Cycle Length: 200												
Actuated Cycle Length: 200												
Offset: 7 (4%), Referenced to	phase 2	:WBTL ar	nd 5:, Star	t of Greer	า							
Natural Cycle: 90			,									
Control Type: Pretimed												
Maximum v/c Ratio: 1.26												
Intersection Signal Delay: 86.	3			In	tersectio	n LOS: F						
Intersection Capacity Utilization	on 160.4	%		IC	U Level	of Service	H					
Analysis Period (min) 15												

Splits and Phases: 602: I-95 SB Ramps & Griffin Road

#602#602		#602	Ø3	#602	#602 Ø4
7 <mark>s</mark> 90 s		16 s		26 s	61s
#603	#603	#603	#603 2	Ø8	
40 s	57 s	8 s	95 s		

Lane Group	Ø8	Ø9
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Turn Type		
Protected Phases	8	9
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	12.0	12.0
Minimum Split (s)	22.0	18.0
Total Split (s)	95.0	26.0
Total Split (%)	48%	13%
Yellow Time (s)	5.0	5.0
All-Red Time (s)	1.0	1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes
Recall Mode	Max	Max
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

	<b>→</b>	$\mathbf{r}$	4	-	1	1
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	1689	679	837	1505	500	953
v/c Ratio	1.26	0.79	0.59	0.60	0.47	0.78
Control Delay	183.4	41.9	5.6	4.8	56.8	52.4
Queue Delay	0.5	0.0	51.3	39.5	0.0	0.0
Total Delay	183.8	41.9	56.9	44.4	56.8	52.4
Queue Length 50th (ft)	~683	651	11	523	275	603
Queue Length 95th (ft)	#743	847	m17	m0	335	703
Internal Link Dist (ft)	1272			184		
Turn Bay Length (ft)						
Base Capacity (vph)	1344	859	1428	2518	1071	1228
Starvation Cap Reductn	0	0	672	1122	0	0
Spillback Cap Reductn	148	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.41	0.79	1.11	1.08	0.47	0.78
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.

	≯	→	$\rightarrow$	1	+	•	1	1	1	1	Ŧ	-
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		11111	1	ሻሻ	<b>*††</b>					ሻሻ		11
Traffic Volume (vph)	0	1605	645	795	1430	0	0	0	0	475	0	905
Future Volume (vph)	0	1605	645	795	1430	0	0	0	0	475	0	905
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	5.0	6.0	6.0					5.0		5.0
Lane Util. Factor		0.81	1.00	0.97	0.91					0.97		0.88
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)		7471	1568	3400	5036					3400		2760
Flt Permitted		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (perm)		7471	1568	3400	5036					3400		2760
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1689	679	837	1505	0	0	0	0	500	0	953
RTOR Reduction (vph)	0	0	44	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1689	635	837	1505	0	0	0	0	500	0	953
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type		NA	custom	Prot	NA					Prot		custom
Protected Phases		39	1349	2	23					14		149
Permitted Phases												
Actuated Green, G (s)		36.0	105.0	84.0	100.0					63.0		89.0
Effective Green, g (s)		36.0	87.0	84.0	100.0					57.0		77.0
Actuated g/C Ratio		0.18	0.44	0.42	0.50					0.28		0.38
Clearance Time (s)				6.0								
Lane Grp Cap (vph)		1344	682	1428	2518					969		1062
v/s Ratio Prot		c0.23	c0.41	0.25	c0.30					0.15		0.35
v/s Ratio Perm												
v/c Ratio		1.26	0.93	0.59	0.60					0.52		0.90
Uniform Delay, d1		82.0	53.7	44.6	35.7					59.9		57.8
Progression Factor		1.00	1.00	0.12	0.13					1.00		1.00
Incremental Delay, d2		121.7	21.3	0.2	0.1					2.0		11.8
Delay (s)		203.7	75.0	5.6	4.8					61.9		69.6
Level of Service		F	E	А	А					E		E
Approach Delay (s)		166.8			5.1			0.0			66.9	
Approach LOS		F			А			A			E	
Intersection Summary												
HCM 2000 Control Delay			81.8	Н	CM 2000	Level of S	Service		F			
HCM 2000 Volume to Capaci	ity ratio		0.89									
Actuated Cycle Length (s)			200.0	S	um of los	t time (s)			30.0			
Intersection Capacity Utilizati	on		160.4%	IC	CU Level	of Service			Н			
Analysis Period (min)			15									

# **Build Conditions**

#### Timings 603: I-95 NB Ramps & Griffin Road

	٠	-	-	•	1	1						
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR	Ø1	Ø2	Ø3	Ø4	Ø6	Ø7
Lane Configurations	ሻሻ	<b>^</b>	11111	1	ሻሻ	11						
Traffic Volume (vph)	575	950	475	320	550	445						
Future Volume (vph)	575	950	475	320	550	445						
Turn Type	Prot	NA	NA	custom	Prot	Perm						
Protected Phases	8	58	5		67		1	2	3	4	6	7
Permitted Phases				567		67						
Detector Phase	8	58	5	567	67	67						
Switch Phase												
Minimum Initial (s)	12.0		12.0				2.0	12.0	2.0	4.0	4.0	2.0
Minimum Split (s)	22.0		18.0				7.0	24.0	8.0	10.0	10.0	7.0
Total Split (s)	99.0		33.0				7.0	86.0	15.0	68.0	60.0	8.0
Total Split (%)	49.5%		16.5%				4%	43%	8%	34%	30%	4%
Yellow Time (s)	5.0		5.0				4.0	5.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0		1.0				1.0	1.0	2.0	2.0	2.0	1.0
Lost Time Adjust (s)	0.0		0.0									
Total Lost Time (s)	6.0		6.0									
Lead/Lag	Lag		Lead				Lead	Lag	Lead		Lag	Lead
Lead-Lag Optimize?	Yes		Yes				Yes	Yes	Yes		Yes	Yes
Recall Mode	Max		Max				Max	Мах	Max	Max	Max	Max
Act Effct Green (s)	93.0	126.0	27.0	95.0	62.0	62.0						
Actuated g/C Ratio	0.46	0.63	0.14	0.48	0.31	0.31						
v/c Ratio	0.38	0.32	0.68	0.40	0.55	0.55						
Control Delay	3.4	1.4	87.7	14.3	59.8	60.2						
Queue Delay	3.6	1.7	0.0	0.0	0.0	0.0						
Total Delay	7.0	3.1	87.7	14.3	59.8	60.2						
LOS	А	A	F	В	E	E						
Approach Delay		4.6	58.2									
Approach LOS		A	E									
Intersection Summary												
Cycle Length: 200												
Actuated Cycle Length: 200	0											
Offset: 7 (4%), Referenced	to phase 2:	WBTL ar	nd 5:, Sta	rt of Greer	า							
Natural Cycle: 70												
Control Type: Pretimed												
Maximum v/c Ratio: 1.18												
Intersection Signal Delay: 3	34.1			In	itersection	n LOS: C						
Intersection Capacity Utilization	ation 98.1%			IC	CU Level	of Service	F					
Analysis Period (min) 15												

.

Splits and Phases: 603: I-95 NB Ramps & Griffin Road

#602#602		#602	2 Ø3	#602 Ø9	#602 Ø4
7 <mark>s</mark> 86 s		15 s		24 s	68 s
#603	#603	#603	#60: g	3 Ø8	
33 s	60 s	8 s	99 s		

I-95 at Griffin Rd - Option #5b-1  $\,$  09/04/2014 2020 Build-Option #5b-1 - add 2nd NBR - AM pk hr RS&H

Lane Group	Ø9	
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Turn Type		
Protected Phases	9	
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	12.0	
Minimum Split (s)	18.0	
Total Split (s)	24.0	
Total Split (%)	12%	
Yellow Time (s)	5.0	
All-Red Time (s)	1.0	
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	
Lead-Lag Optimize?	Yes	
Recall Mode	Max	
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

RS&H

#### Queues 603: I-95 NB Ramps & Griffin Road

	≯	-	-	•	1	1
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	605	1000	500	337	579	468
v/c Ratio	0.38	0.32	0.68	0.40	0.55	0.55
Control Delay	3.4	1.4	87.7	14.3	59.8	60.2
Queue Delay	3.6	1.7	0.0	0.0	0.0	0.0
Total Delay	7.0	3.1	87.7	14.3	59.8	60.2
Queue Length 50th (ft)	8	0	216	110	329	293
Queue Length 95th (ft)	m8	m0	260	195	395	363
Internal Link Dist (ft)		184	813			
Turn Bay Length (ft)				400		250
Base Capacity (vph)	1581	3172	734	849	1054	855
Starvation Cap Reductn	862	1929	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	0.84	0.80	0.68	0.40	0.55	0.55
Intersection Summary						

# HCM Signalized Intersection Capacity Analysis 603: I-95 NB Ramps & Griffin Road

12/07/201	6
-----------	---

	٦	-	$\mathbf{\hat{v}}$	4	+	•	1	1	۲	1	Ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ካካ	<b>^</b>			11111	1	ሻሻ		11			
Traffic Volume (vph)	575	950	0	0	475	320	550	0	445	0	0	0
Future Volume (vph)	575	950	0	0	475	320	550	0	445	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	6.0	6.0		6.0			
Lane Util. Factor	0.97	0.91			*0.59	1.00	0.97		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)	3400	5036			5442	1568	3400		2760			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	3400	5036			5442	1568	3400		2760			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	605	1000	0	0	500	337	579	0	468	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	103	0	0	0	0	0	0
Lane Group Flow (vph)	605	1000	0	0	500	234	579	0	468	0	0	0
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Prot	NA			NA	custom	Prot		Perm			
Protected Phases	8	58			5		67					
Permitted Phases						567			67			
Actuated Green, G (s)	93.0	126.0			27.0	96.0	63.0		63.0			
Effective Green, g (s)	93.0	126.0			27.0	96.0	63.0		63.0			
Actuated g/C Ratio	0.46	0.63			0.14	0.48	0.32		0.32			
Clearance Time (s)	6.0				6.0							
Lane Grp Cap (vph)	1581	3172			734	752	1071		869			
v/s Ratio Prot	c0.18	0.20			c0.09		c0.17					
v/s Ratio Perm						0.15			0.17			
v/c Ratio	0.38	0.32			0.68	0.31	0.54		0.54			
Uniform Delay, d1	34.8	17.1			82.4	31.8	56.6		56.5			
Progression Factor	0.09	0.08			1.00	1.00	1.00		1.00			
Incremental Delay, d2	0.2	0.1			5.1	1.1	2.0		2.4			
Delay (s)	3.4	1.4			87.5	32.9	58.5		58.9			
Level of Service	А	А			F	С	E		E			
Approach Delay (s)		2.2			65.5			58.7			0.0	
Approach LOS		A			E			E			A	
Intersection Summary												
HCM 2000 Control Delay			34.3	Н	CM 2000	) Level of	Service		С			
HCM 2000 Volume to Capac	city ratio		0.52									
Actuated Cycle Length (s)			200.0	S	um of los	st time (s)			30.0			
Intersection Capacity Utilizat	ion		98.1%	IC	CU Level	of Service	)		F			
Analysis Period (min)			15									

### Timings 603: I-95 NB Ramps & Griffin Road

1	2/	0	7/:	2(	01	6
---	----	---	-----	----	----	---

	•	-	-	•	1	1						
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR	Ø1	Ø2	Ø3	Ø4	Ø6	Ø7
Lane Configurations	ሻሻ	<b>^</b>	11111	1	ካካ	11						
Traffic Volume (vph)	550	820	1050	435	610	320						
Future Volume (vph)	550	820	1050	435	610	320						
Turn Type	Prot	NA	NA	custom	Prot	Perm						
Protected Phases	8	58	5		67		1	2	3	4	6	7
Permitted Phases				567		67						
Detector Phase	8	58	5	567	67	67						
Switch Phase												
Minimum Initial (s)	12.0		12.0				2.0	12.0	2.0	4.0	4.0	2.0
Minimum Split (s)	22.0		18.0				7.0	24.0	8.0	10.0	10.0	7.0
Total Split (s)	95.0		40.0				7.0	90.0	16.0	61.0	57.0	8.0
Total Split (%)	47.5%		20.0%				4%	45%	8%	31%	29%	4%
Yellow Time (s)	5.0		5.0				4.0	5.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0		1.0				1.0	1.0	2.0	2.0	2.0	1.0
Lost Time Adjust (s)	0.0		0.0									
Total Lost Time (s)	6.0		6.0									
Lead/Lag	Lag		Lead				Lead	Lag	Lead		Lag	Lead
Lead-Lag Optimize?	Yes		Yes				Yes	Yes	Yes		Yes	Yes
Recall Mode	Max		Max				Max	Max	Max	Max	Max	Max
Act Effct Green (s)	89.0	129.0	34.0	99.0	59.0	59.0						
Actuated g/C Ratio	0.44	0.64	0.17	0.50	0.30	0.30						
v/c Ratio	0.38	0.27	0.87	0.52	0.64	0.41						
Control Delay	4.3	1.9	89.2	20.5	64.8	58.5						
Queue Delay	2.1	1.1	2.1	0.5	0.0	0.0						
Total Delay	6.4	3.0	91.3	21.0	64.8	58.5						
LOS	А	А	F	С	E	E						
Approach Delay		4.4	70.7									
Approach LOS		A	E									
Intersection Summary												
Cycle Length: 200												
Actuated Cycle Length: 20	0											
Offset: 7 (4%), Referenced	to phase 2:	WBTL ar	nd 5:, Sta	rt of Greer	า							
Natural Cycle: 70												
Control Type: Pretimed												
Maximum v/c Ratio: 0.87												
Intersection Signal Delay: 4	44.7			In	tersection	n LOS: D						
Intersection Capacity Utilization	ation 117.5%	/o		IC	U Level	of Service	Н					
Analysis Period (min) 15												

.

Splits and Phases: 603: I-95 NB Ramps & Griffin Road

#602#602		#602	Ø3	#602	#602 Ø4
7 <mark>s</mark> 90 s		16 s		26 s	61s
#603	#603	#603	#603	Ø8	
40 s	57 s	8 s -	95 s		

I-95 at Griffin Rd - Option #5b-1  $\,$  09/04/2014 2020 Build-Option #5b-1 add 2nd NBR - PM pk hr RS&H

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	12.0
Minimum Split (s)	18.0
Total Split (s)	26.0
Total Split (%)	13%
Yellow Time (s)	5.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	Max
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

12/07/2016

#### Queues 603: I-95 NB Ramps & Griffin Road

	∕	-	+	•	1	1
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	579	863	1105	458	642	337
v/c Ratio	0.38	0.27	0.87	0.52	0.64	0.41
Control Delay	4.3	1.9	89.2	20.5	64.8	58.5
Queue Delay	2.1	1.1	2.1	0.5	0.0	0.0
Total Delay	6.4	3.0	91.3	21.0	64.8	58.5
Queue Length 50th (ft)	6	0	356	230	382	204
Queue Length 95th (ft)	7	0	393	338	455	263
Internal Link Dist (ft)		184	813			
Turn Bay Length (ft)				400		250
Base Capacity (vph)	1513	3248	1270	876	1003	814
Starvation Cap Reductn	759	2052	0	137	0	0
Spillback Cap Reductn	0	0	74	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.72	0.92	0.62	0.64	0.41
Intersection Summary						

# HCM Signalized Intersection Capacity Analysis 603: I-95 NB Ramps & Griffin Road

12/07/201	6
-----------	---

	٦	-	$\mathbf{\hat{v}}$	4	+	•	1	1	۲	1	ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ካካ	<b>^</b>			11111	1	ሻሻ		11			
Traffic Volume (vph)	550	820	0	0	1050	435	610	0	320	0	0	0
Future Volume (vph)	550	820	0	0	1050	435	610	0	320	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	6.0	6.0		6.0			
Lane Util. Factor	0.97	0.91			0.81	1.00	0.97		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)	3400	5036			7471	1568	3400		2760			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	3400	5036			7471	1568	3400		2760			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	579	863	0	0	1105	458	642	0	337	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	100	0	0	0	0	0	0
Lane Group Flow (vph)	579	863	0	0	1105	359	642	0	337	0	0	0
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Prot	NA			NA	custom	Prot		Perm			
Protected Phases	8	58			5		67					
Permitted Phases						567			67			
Actuated Green, G (s)	89.0	129.0			34.0	100.0	60.0		60.0			
Effective Green, g (s)	89.0	129.0			34.0	100.0	60.0		60.0			
Actuated g/C Ratio	0.44	0.64			0.17	0.50	0.30		0.30			
Clearance Time (s)	6.0				6.0							
Lane Grp Cap (vph)	1513	3248			1270	784	1020		828			
v/s Ratio Prot	c0.17	0.17			c0.15		c0.19					
v/s Ratio Perm						0.23			0.12			
v/c Ratio	0.38	0.27			0.87	0.46	0.63		0.41			
Uniform Delay, d1	37.1	15.2			80.8	32.4	60.4		55.8			
Progression Factor	0.10	0.12			1.00	1.00	1.00		1.00			
Incremental Delay, d2	0.5	0.1			8.3	1.9	2.9		1.5			
Delay (s)	4.3	1.9			89.2	34.3	63.4		57.3			
Level of Service	А	А			F	С	E		E			
Approach Delay (s)		2.9			73.1			61.3			0.0	
Approach LOS		A			E			E			A	
Intersection Summary												
HCM 2000 Control Delay			44.8	Н	CM 2000	) Level of	Service		D			
HCM 2000 Volume to Capac	ity ratio		0.60									
Actuated Cycle Length (s)			200.0	S	um of los	st time (s)			30.0			
Intersection Capacity Utilizat	ion		117.5%	IC	CU Level	of Service	)		Н			
Analysis Period (min)			15									

### Timings 602: I-95 SB Ramps & Griffin Road

	→	$\rightarrow$	1	+	1	~						
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR	Ø1	Ø3	Ø4	Ø5	Ø6	Ø7
Lane Configurations	11111	1	ካካ	***	ካካ	11						
Traffic Volume (vph)	1040	560	270	750	480	465						
Future Volume (vph)	1040	560	270	750	480	465						
Turn Type	NA	custom	Prot	NA	Prot	custom						
Protected Phases	39	1349	2	23	14	149	1	3	4	5	6	7
Permitted Phases												
Detector Phase	39	1349	2	23	14	149						
Switch Phase												
Minimum Initial (s)			12.0				2.0	2.0	4.0	12.0	4.0	2.0
Minimum Split (s)			24.0				7.0	8.0	10.0	18.0	10.0	7.0
Total Split (s)			86.0				7.0	15.0	68.0	33.0	60.0	8.0
Total Split (%)			43.0%				4%	8%	34%	17%	30%	4%
Yellow Time (s)			5.0				4.0	4.0	4.0	5.0	4.0	4.0
All-Red Time (s)			1.0				1.0	2.0	2.0	1.0	2.0	1.0
Lost Time Adjust (s)			0.0									
Total Lost Time (s)			6.0									
Lead/Lag			Lag				Lead	Lead		Lead	Lag	Lead
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	Yes
Recall Mode			Max				Max	Max	Max	Max	Max	Max
Act Effct Green (s)	33.0	109.0	80.0	95.0	70.0	94.0						
Actuated g/C Ratio	0.16	0.54	0.40	0.48	0.35	0.47						
v/c Ratio	1.18	0.56	0.21	0.33	0.42	0.38						
Control Delay	159.8	8.7	4.2	0.9	51.0	35.2						
Queue Delay	0.2	0.0	0.9	0.5	0.0	0.0						
Total Delay	159.9	8.7	5.2	1.4	51.0	35.2						
LOS	F	А	А	А	D	D						
Approach Delay	107.0			2.4								
Approach LOS	F			А								
Intersection Summary												
Cycle Length: 200												
Actuated Cycle Length: 200												
Offset: 7 (4%), Referenced to	phase 2	:WBTL ar	nd 5:, Star	t of Greer	า							
Natural Cycle: 70												
Control Type: Pretimed												
Maximum v/c Ratio: 1.18												
Intersection Signal Delay: 60.	2			In	tersectio	n LOS: E						
Intersection Capacity Utilization	on 98.1%	0		IC	U Level	of Service	F					
Analysis Period (min) 15												

Splits and Phases: 602: I-95 SB Ramps & Griffin Road

#602#602 Ø2 (R)		#602	Ø3	#602	#602
7 <mark>s</mark> 86 s		15 s		24 s	68 s
#603	#603	#603	#60 2	3 Ø8	
33 s	60 s	8 s	99 s		

I-95 at Griffin Rd - Option #5b-1  $\,$  09/04/2014 2020 Build-Option #5b-1 - add 2nd NBR - AM pk hr RS&H

Synchro 9 Report Page 1

12/19/2016

Lane Group	Ø8	Ø9	 	
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Turn Type				
Protected Phases	8	9		
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	12.0	12.0		
Minimum Split (s)	22.0	18.0		
Total Split (s)	99.0	24.0		
Total Split (%)	50%	12%		
Yellow Time (s)	5.0	5.0		
All-Red Time (s)	1.0	1.0		
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag	Lag	Lag		
Lead-Lag Optimize?	Yes	Yes		
Recall Mode	Мах	Max		
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				
Intersection Summarv				

#### Queues 602: I-95 SB Ramps & Griffin Road

	-	$\mathbf{r}$	1	-	1	-
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	1095	589	284	789	505	489
v/c Ratio	1.18	0.56	0.21	0.33	0.42	0.38
Control Delay	159.8	8.7	4.2	0.9	51.0	35.2
Queue Delay	0.2	0.0	0.9	0.5	0.0	0.0
Total Delay	159.9	8.7	5.2	1.4	51.0	35.2
Queue Length 50th (ft)	~563	115	6	0	263	234
Queue Length 95th (ft)	#650	224	8	0	320	289
Internal Link Dist (ft)	1272			184		
Turn Bay Length (ft)						
Base Capacity (vph)	928	1053	1360	2392	1190	1297
Starvation Cap Reductn	0	0	811	1074	0	0
Spillback Cap Reductn	28	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.22	0.56	0.52	0.60	0.42	0.38

#### 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.

# HCM Signalized Intersection Capacity Analysis 602: I-95 SB Ramps & Griffin Road

	≯	-	$\mathbf{r}$	4	•	*	٩.	Ť	1	1	ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		11111	1	ሻሻ	<b>^</b>					ሻሻ		11
Traffic Volume (vph)	0	1040	560	270	750	0	0	0	0	480	0	465
Future Volume (vph)	0	1040	560	270	750	0	0	0	0	480	0	465
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	5.0	6.0	6.0					5.0		5.0
Lane Util. Factor		*0.61	1.00	0.97	0.91					0.97		0.88
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)		5626	1568	3400	5036					3400		2760
Flt Permitted		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (perm)		5626	1568	3400	5036					3400		2760
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95
Adj. Flow (vph)	0	1095	589	284	789	0	0	0	0	505	0	489
RTOR Reduction (vph)	0	0	238	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1095	351	284	789	0	0	0	0	505	0	489
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type		NA	custom	Prot	NA					Prot		custom
Protected Phases		39	1349	2	23					14		149
Permitted Phases												
Actuated Green, G (s)		33.0	109.0	80.0	95.0					70.0		94.0
Effective Green, g (s)		33.0	91.0	80.0	95.0					64.0		82.0
Actuated g/C Ratio		0.16	0.46	0.40	0.48					0.32		0.41
Clearance Time (s)				6.0								
Lane Grp Cap (vph)		928	713	1360	2392					1088		1131
v/s Ratio Prot		c0.19	c0.22	0.08	c0.16					0.15		0.18
v/s Ratio Perm												
v/c Ratio		1.18	0.49	0.21	0.33					0.46		0.43
Uniform Delay, d1		83.5	38.3	39.3	32.7					54.3		42.3
Progression Factor		1.00	1.00	0.10	0.02					1.00		1.00
Incremental Delay, d2		92.2	2.4	0.3	0.3					1.4		1.2
Delay (s)		175.7	40.7	4.2	0.9					55.7		43.5
Level of Service		F	D	А	А					Е		D
Approach Delay (s)		128.5			1.7			0.0			49.7	
Approach LOS		F			А			А			D	
Intersection Summary												
HCM 2000 Control Delay			71.3	Н	CM 2000	Level of S	Service		Е			
HCM 2000 Volume to Capacit	y ratio		0.58									
Actuated Cycle Length (s)			200.0	S	um of lost	t time (s)			30.0			
Intersection Capacity Utilization	n		98.1%	IC	CU Level of	of Service			F			
Analysis Period (min)			15									

### Timings 602: I-95 SB Ramps & Griffin Road

	→	$\rightarrow$	-	-	1	-						
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR	Ø1	Ø3	Ø4	Ø5	Ø6	Ø7
Lane Configurations	ttttt	1	ካካ	<b>*††</b>	ካካ	11						
Traffic Volume (vph)	1015	555	515	1145	355	775						
Future Volume (vph)	1015	555	515	1145	355	775						
Turn Type	NA	custom	Prot	NA	Prot	custom						
Protected Phases	39	1349	2	23	14	149	1	3	4	5	6	7
Permitted Phases												
Detector Phase	39	1349	2	23	14	149						
Switch Phase												
Minimum Initial (s)			12.0				2.0	2.0	4.0	12.0	4.0	2.0
Minimum Split (s)			24.0				7.0	8.0	10.0	18.0	10.0	7.0
Total Split (s)			90.0				7.0	16.0	61.0	40.0	57.0	8.0
Total Split (%)			45.0%				4%	8%	31%	20%	29%	4%
Yellow Time (s)			5.0				4.0	4.0	4.0	5.0	4.0	4.0
All-Red Time (s)			1.0				1.0	2.0	2.0	1.0	2.0	1.0
Lost Time Adjust (s)			0.0									
Total Lost Time (s)			6.0									
Lead/Lag			Lag				Lead	Lead		Lead	Lag	Lead
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	Yes
Recall Mode			Max				Max	Max	Max	Max	Max	Max
Act Effct Green (s)	36.0	105.0	84.0	100.0	63.0	89.0						
Actuated g/C Ratio	0.18	0.52	0.42	0.50	0.32	0.44						
v/c Ratio	0.79	0.64	0.38	0.48	0.35	0.66						
Control Delay	83.5	24.4	3.4	2.5	53.9	47.0						
Queue Delay	0.4	0.0	2.5	1.5	0.0	0.0						
Total Delay	83.9	24.4	5.9	4.0	53.9	47.0						
LOS	F	С	А	А	D	D						
Approach Delay	62.9			4.6								
Approach LOS	E			А								
Intersection Summary												
Cycle Length: 200												
Actuated Cycle Length: 200												
Offset: 7 (4%), Referenced to p	bhase 2	:WBTL ar	nd 5:, Star	t of Greer	า							
Natural Cycle: 70												
Control Type: Pretimed												
Maximum v/c Ratio: 0.87												
Intersection Signal Delay: 37.1				In	itersectio	n LOS: D						
Intersection Capacity Utilization	n 117.5	%		IC	CU Level	of Service	H					
Analysis Period (min) 15												

Splits and Phases: 602: I-95 SB Ramps & Griffin Road

#602#602		#602	Ø3	#602	#602 Ø4
7 <mark>s</mark> 90 s		16 s		26 s	61s
#603	#603	#603	#603 2	Ø8	
40 s	57 s	8 s	95 s		

I-95 at Griffin Rd - Option #5b-1  $\,$  09/04/2014 2020 Build-Option #5b-1 add 2nd NBR - PM pk hr RS&H

12/19/2016

Lane Group	Ø8	Ø9	 
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Turn Type			
Protected Phases	8	9	
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	12.0	12.0	
Minimum Split (s)	22.0	18.0	
Total Split (s)	95.0	26.0	
Total Split (%)	48%	13%	
Yellow Time (s)	5.0	5.0	
All-Red Time (s)	1.0	1.0	
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	
Recall Mode	Мах	Max	
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			
Intersection Summary			

#### Queues 602: I-95 SB Ramps & Griffin Road

		$\mathbf{x}$	-	+	×	1
		•	•			
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	1068	584	542	1205	374	816
v/c Ratio	0.79	0.64	0.38	0.48	0.35	0.66
Control Delay	83.5	24.4	3.4	2.5	53.9	47.0
Queue Delay	0.4	0.0	2.5	1.5	0.0	0.0
Total Delay	83.9	24.4	5.9	4.0	53.9	47.0
Queue Length 50th (ft)	337	363	8	0	196	480
Queue Length 95th (ft)	374	504	m9	0	248	566
Internal Link Dist (ft)	1272			184		
Turn Bay Length (ft)						
Base Capacity (vph)	1344	919	1428	2518	1071	1228
Starvation Cap Reductn	0	0	735	1057	0	0
Spillback Cap Reductn	49	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.64	0.78	0.82	0.35	0.66
Intersection Summary						

# HCM Signalized Intersection Capacity Analysis 602: I-95 SB Ramps & Griffin Road

	≯	-	$\mathbf{r}$	4	•	*	1	Ť	۲	1	ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		11111	1	ኘኘ	<b>^</b>					ሻሻ		77
Traffic Volume (vph)	0	1015	555	515	1145	0	0	0	0	355	0	775
Future Volume (vph)	0	1015	555	515	1145	0	0	0	0	355	0	775
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	5.0	6.0	6.0					5.0		5.0
Lane Util. Factor		0.81	1.00	0.97	0.91					0.97		0.88
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)		7471	1568	3400	5036					3400		2760
Flt Permitted		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (perm)		7471	1568	3400	5036					3400		2760
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1068	584	542	1205	0	0	0	0	374	0	816
RTOR Reduction (vph)	0	0	114	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1068	470	542	1205	0	0	0	0	374	0	816
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type		NA	custom	Prot	NA					Prot		custom
Protected Phases		39	1349	2	23					14		149
Permitted Phases												
Actuated Green, G (s)		36.0	105.0	84.0	100.0					63.0		89.0
Effective Green, g (s)		36.0	87.0	84.0	100.0					57.0		77.0
Actuated g/C Ratio		0.18	0.44	0.42	0.50					0.28		0.38
Clearance Time (s)				6.0								
Lane Grp Cap (vph)		1344	682	1428	2518					969		1062
v/s Ratio Prot		c0.14	0.30	0.16	c0.24					0.11		c0.30
v/s Ratio Perm												
v/c Ratio		0.79	0.69	0.38	0.48					0.39		0.77
Uniform Delay, d1		78.5	45.6	40.0	32.9					57.4		53.7
Progression Factor		1.00	1.00	0.07	0.06					1.00		1.00
Incremental Delay, d2		4.9	5.6	0.5	0.4					1.2		5.3
Delay (s)		83.4	51.2	3.3	2.5					58.6		59.1
Level of Service		F	D	А	А					E		E
Approach Delay (s)		72.0			2.8			0.0			58.9	
Approach LOS		E			А			А			E	
Intersection Summary												
HCM 2000 Control Delay			42.3	Н	CM 2000	Level of S	Service		D			
HCM 2000 Volume to Capacit	y ratio		0.67									
Actuated Cycle Length (s)			200.0	S	um of los	t time (s)			30.0			
Intersection Capacity Utilization	on		117.5%	IC	CU Level	of Service			Н			
Analysis Period (min)			15									

### Timings 603: I-95 NB Ramps & Griffin Road

1	2/	0	7	/2	0	1	6
---	----	---	---	----	---	---	---

	٦	-	-	•	1	1						
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR	Ø1	Ø2	Ø3	Ø4	Ø6	Ø7
Lane Configurations	ሻሻ	<b>^</b>	11111	1	ሻሻ	11						
Traffic Volume (vph)	980	1550	965	745	620	555						
Future Volume (vph)	980	1550	965	745	620	555						
Turn Type	Prot	NA	NA	custom	Prot	Perm						
Protected Phases	8	58	5		67		1	2	3	4	6	7
Permitted Phases				567		67						
Detector Phase	8	58	5	567	67	67						
Switch Phase												
Minimum Initial (s)	12.0		12.0				2.0	12.0	2.0	4.0	4.0	2.0
Minimum Split (s)	22.0		18.0				7.0	24.0	8.0	10.0	10.0	7.0
Total Split (s)	99.0		33.0				7.0	86.0	15.0	68.0	60.0	8.0
Total Split (%)	49.5%		16.5%				4%	43%	8%	34%	30%	4%
Yellow Time (s)	5.0		5.0				4.0	5.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0		1.0				1.0	1.0	2.0	2.0	2.0	1.0
Lost Time Adjust (s)	0.0		0.0									
Total Lost Time (s)	6.0		6.0									
Lead/Lag	Lag		Lead				Lead	Lag	Lead		Lag	Lead
Lead-Lag Optimize?	Yes		Yes				Yes	Yes	Yes		Yes	Yes
Recall Mode	Max		Max				Max	Мах	Max	Max	Max	Max
Act Effct Green (s)	93.0	126.0	27.0	95.0	62.0	62.0						
Actuated g/C Ratio	0.46	0.63	0.14	0.48	0.31	0.31						
v/c Ratio	0.65	0.51	1.38	1.00	0.62	0.68						
Control Delay	10.3	4.3	238.5	76.6	62.0	65.2						
Queue Delay	50.9	48.9	0.3	35.5	0.0	0.0						
Total Delay	61.3	53.2	238.8	112.1	62.0	65.2						
LOS	E	D	F	F	Е	E						
Approach Delay		56.3	183.6									
Approach LOS		E	F									
Intersection Summary												
Cycle Length: 200												
Actuated Cycle Length: 20	0											
Offset: 7 (4%), Referenced	to phase 2:	WBTL ar	nd 5:, Sta	rt of Greer	า							
Natural Cycle: 90			,									
Control Type: Pretimed												
Maximum v/c Ratio: 1.70												
Intersection Signal Delay: 9	98.1			In	tersectior	1 LOS: F						
Intersection Capacity Utiliz	ation 143.0%	6		IC	U Level o	of Service	Н					
Analysis Period (min) 15												
Online and Diseases (000)				J								

.

Splits and Phases: 603: I-95 NB Ramps & Griffin Road

#602#602		#602	Ø3	#602	#602 Ø4
7 <mark>s</mark> 86 s		15 s		24 s	68 s
#603	#603	#603	#600 g	3 Ø8	
33 s	60 s	8 s	99 s		

I-95 at Griffin Rd - Option #5b-1  $\,$  09/04/2014 2040 Build-Option #5b-1 - add 2nd NBR - AM pk hr RS&H

#### Queues 603: I-95 NB Ramps & Griffin Road

٦	-	+	*	1	1
EBL	EBT	WBT	WBR	NBL	NBR
1032	1632	1016	784	653	584
0.65	0.51	1.38	1.00	0.62	0.68
10.3	4.3	238.5	76.6	62.0	65.2
50.9	48.9	0.3	35.5	0.0	0.0
61.3	53.2	238.8	112.1	62.0	65.2
465	491	~598	959	381	385
m154	m0	#689	#1269	453	468
	184	813			
			400		250
1581	3172	734	787	1054	855
791	1832	0	78	0	0
0	0	37	0	0	0
0	0	0	0	0	0
1.31	1.22	1.46	1.11	0.62	0.68
	EBL 1032 0.65 10.3 50.9 61.3 465 m154 1581 791 0 0 0 1.31	▶  ►    EBL  EBT    1032  1632    0.65  0.51    10.3  4.3    50.9  48.9    61.3  53.2    465  491    m154  m0    184  1    1581  3172    791  1832    0  0    0  0    1.31  1.22	EBL  EBT  WBT    1032  1632  1016    0.65  0.51  1.38    10.3  4.3  238.5    50.9  48.9  0.3    61.3  53.2  238.8    465  491  ~598    m154  m0  #689    1581  3172  734    791  1832  0    0  0  37    0  0  0    1.31  1.22  1.46	EBL  EBT  WBT  WBR    1032  1632  1016  784    0.65  0.51  1.38  1.00    10.3  4.3  238.5  76.6    50.9  48.9  0.3  35.5    61.3  53.2  238.8  112.1    465  491  ~598  959    m154  m0  #689  #1269    184  813	EBL  EBT  WBT  WBR  NBL    1032  1632  1016  784  653    0.65  0.51  1.38  1.00  0.62    10.3  4.3  238.5  76.6  62.0    50.9  48.9  0.3  35.5  0.0    61.3  53.2  238.8  112.1  62.0    465  491  ~598  959  381    m154  m0  #689  #1269  453    184  813

#### 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.

Page 3

# HCM Signalized Intersection Capacity Analysis 603: I-95 NB Ramps & Griffin Road

12/07/2010	6
------------	---

	٦	-	$\rightarrow$	4	+	•	1	Ť	۲	1	ŧ	-
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ካካ	<b>^</b>			11111	1	ሻሻ		11			
Traffic Volume (vph)	980	1550	0	0	965	745	620	0	555	0	0	0
Future Volume (vph)	980	1550	0	0	965	745	620	0	555	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	6.0	6.0		6.0			
Lane Util. Factor	0.97	0.91			*0.59	1.00	0.97		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)	3400	5036			5442	1568	3400		2760			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	3400	5036			5442	1568	3400		2760			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	1032	1632	0	0	1016	784	653	0	584	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	43	0	0	0	0	0	0
Lane Group Flow (vph)	1032	1632	0	0	1016	741	653	0	584	0	0	0
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Prot	NA			NA	custom	Prot		Perm			
Protected Phases	8	58			5		67					
Permitted Phases						567			67			
Actuated Green, G (s)	93.0	126.0			27.0	96.0	63.0		63.0			
Effective Green, g (s)	93.0	126.0			27.0	96.0	63.0		63.0			
Actuated g/C Ratio	0.46	0.63			0.14	0.48	0.32		0.32			
Clearance Time (s)	6.0				6.0							
Lane Grp Cap (vph)	1581	3172			734	752	1071		869			
v/s Ratio Prot	c0.30	0.32			c0.19		0.19					
v/s Ratio Perm						c0.47			0.21			
v/c Ratio	0.65	0.51			1.38	0.99	0.61		0.67			
Uniform Delay, d1	41.1	20.3			86.5	51.3	58.1		59.5			
Progression Factor	0.24	0.21			1.00	1.00	1.00		1.00			
Incremental Delay, d2	0.2	0.1			181.3	29.6	2.6		4.1			
Delay (s)	10.3	4.2			267.8	80.9	60.7		63.7			
Level of Service	В	A			F	F	E		E			
Approach Delay (s)		6.6			186.4			62.1			0.0	
Approach LOS		A			F			E			A	
Intersection Summary												
HCM 2000 Control Delay			75.4	Н	CM 2000	) Level of	Service		Е			
HCM 2000 Volume to Capac	ity ratio		0.96									
Actuated Cycle Length (s)			200.0	S	um of los	st time (s)			30.0			
Intersection Capacity Utilizat	ion		143.0%	IC	CU Level	of Service	)		Н			
Analysis Period (min)			15									

### Timings 603: I-95 NB Ramps & Griffin Road

12/07/	2016
--------	------

	•	-	-	•	1	1						
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR	Ø1	Ø2	Ø3	Ø4	Ø6	Ø7
Lane Configurations	ሻሻ	<b>^</b>	11111	1	ሻሻ	11						
Traffic Volume (vph)	780	1300	1520	755	705	490						
Future Volume (vph)	780	1300	1520	755	705	490						
Turn Type	Prot	NA	NA	custom	Prot	Perm						
Protected Phases	8	58	5		67		1	2	3	4	6	7
Permitted Phases				567		67						
Detector Phase	8	58	5	567	67	67						
Switch Phase												
Minimum Initial (s)	12.0		12.0				2.0	12.0	2.0	4.0	4.0	2.0
Minimum Split (s)	22.0		18.0				7.0	24.0	8.0	10.0	10.0	7.0
Total Split (s)	95.0		40.0				7.0	90.0	16.0	61.0	57.0	8.0
Total Split (%)	47.5%		20.0%				4%	45%	8%	31%	29%	4%
Yellow Time (s)	5.0		5.0				4.0	5.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0		1.0				1.0	1.0	2.0	2.0	2.0	1.0
Lost Time Adjust (s)	0.0		0.0									
Total Lost Time (s)	6.0		6.0									
Lead/Lag	Lag		Lead				Lead	Lag	Lead		Lag	Lead
Lead-Lag Optimize?	Yes		Yes				Yes	Yes	Yes		Yes	Yes
Recall Mode	Max		Max				Max	Max	Max	Max	Max	Max
Act Effct Green (s)	89.0	129.0	34.0	99.0	59.0	59.0						
Actuated g/C Ratio	0.44	0.64	0.17	0.50	0.30	0.30						
v/c Ratio	0.54	0.42	1.26	0.97	0.74	0.63						
Control Delay	6.0	5.8	185.5	66.4	68.9	65.3						
Queue Delay	25.7	10.6	0.5	36.2	0.0	0.0						
Total Delay	31.8	16.3	186.0	102.6	68.9	65.3						
LOS	С	В	F	F	Е	E						
Approach Delay		22.1	158.3									
Approach LOS		С	F									
Intersection Summary												
Cycle Length: 200												
Actuated Cycle Length: 200	)											
Offset: 7 (4%), Referenced	to phase 2:	WBTL ar	nd 5:, Sta	rt of Greer	า							
Natural Cycle: 90	·											
Control Type: Pretimed												
Maximum v/c Ratio: 1.26												
Intersection Signal Delay: 8	37.7			In	tersectior	n LOS: F						
Intersection Capacity Utiliza	ation 150.1%	6		IC	CU Level o	of Service	Н					
Analysis Period (min) 15												
Online and Diseases (000)												

.

Splits and Phases: 603: I-95 NB Ramps & Griffin Road

#602#602		#602		#602	#602
Ø2 (R)		-	ø3	Ø9	<b>↓</b> <sub>Ø4</sub>
7 <mark>s</mark> 90 s		16 s		26 s	61s
#603	#603	#603	#603	1	
Ø5 (R)	<b>1</b> Ø6	$\mathbf{A}$	<b>ے</b>	Ø8	
40 s	57 s	8 <mark>s</mark>	95 s		

I-95 at Griffin Rd - Option #5b-1  $\,$  09/04/2014 2040 Build-Option #5 add 2nd NBR - PM pk hr RS&H

Synchro 9 Report Page 1

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	12.0
Minimum Split (s)	18.0
Total Split (s)	26.0
Total Split (%)	13%
Yellow Time (s)	5.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	Max
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summarv	

#### Queues 603: I-95 NB Ramps & Griffin Road

	≯	→	+	•	1	1
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	821	1368	1600	795	742	516
v/c Ratio	0.54	0.42	1.26	0.97	0.74	0.63
Control Delay	6.0	5.8	185.5	66.4	68.9	65.3
Queue Delay	25.7	10.6	0.5	36.2	0.0	0.0
Total Delay	31.8	16.3	186.0	102.6	68.9	65.3
Queue Length 50th (ft)	8	537	~648	930	458	338
Queue Length 95th (ft)	m7	m0	#709	#1246	538	415
Internal Link Dist (ft)		184	813			
Turn Bay Length (ft)				400		250
Base Capacity (vph)	1513	3248	1270	823	1003	814
Starvation Cap Reductn	717	1863	0	92	0	0
Spillback Cap Reductn	0	0	135	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.03	0.99	1.41	1.09	0.74	0.63

#### 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.

# HCM Signalized Intersection Capacity Analysis 603: I-95 NB Ramps & Griffin Road

12/07/201	6
-----------	---

	٦	-	$\mathbf{\hat{v}}$	4	+	•	1	Ť	۲	1	Ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ካካ	<b>^</b>			11111	*	ሻሻ		77			
Traffic Volume (vph)	780	1300	0	0	1520	755	705	0	490	0	0	0
Future Volume (vph)	780	1300	0	0	1520	755	705	0	490	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	6.0	6.0		6.0			
Lane Util. Factor	0.97	0.91			0.81	1.00	0.97		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)	3400	5036			7471	1568	3400		2760			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	3400	5036			7471	1568	3400		2760			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	821	1368	0	0	1600	795	742	0	516	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	47	0	0	0	0	0	0
Lane Group Flow (vph)	821	1368	0	0	1600	748	742	0	516	0	0	0
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Prot	NA			NA	custom	Prot		Perm			
Protected Phases	8	58			5		67					
Permitted Phases						567			67			
Actuated Green, G (s)	89.0	129.0			34.0	100.0	60.0		60.0			
Effective Green, g (s)	89.0	129.0			34.0	100.0	60.0		60.0			
Actuated g/C Ratio	0.44	0.64			0.17	0.50	0.30		0.30			
Clearance Time (s)	6.0				6.0							
Lane Grp Cap (vph)	1513	3248			1270	784	1020		828			
v/s Ratio Prot	c0.24	0.27			c0.21		0.22					
v/s Ratio Perm						c0.48			0.19			
v/c Ratio	0.54	0.42			1.26	0.95	0.73		0.62			
Uniform Delay, d1	40.6	17.3			83.0	47.8	62.7		60.3			
Progression Factor	0.14	0.33			1.00	1.00	1.00		1.00			
Incremental Delay, d2	0.1	0.0			123.4	22.7	4.5		3.5			
Delay (s)	6.0	5.7			206.4	70.5	67.2		63.8			
Level of Service	A	A			F	E	E		E			
Approach Delay (s)		5.8			161.3			65.8			0.0	
Approach LOS		A			F			E			A	
Intersection Summary												
HCM 2000 Control Delay			82.5	Н	ICM 2000	) Level of	Service		F			
HCM 2000 Volume to Capac	ity ratio		0.89									
Actuated Cycle Length (s)			200.0	S	um of los	st time (s)			30.0			
Intersection Capacity Utilizat	ion		150.1%	IC	CU Level	of Service	)		Н			
Analysis Period (min)			15									

### Timings 602: I-95 SB Ramps & Griffin Road

	-	$\mathbf{r}$	4	+	1	~						
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR	Ø1	Ø3	Ø4	Ø5	Ø6	Ø7
Lane Configurations	11111	1	ካካ	***	ሻሻ	11						
Traffic Volume (vph)	1500	585	650	930	1035	725						
Future Volume (vph)	1500	585	650	930	1035	725						
Turn Type	NA	custom	Prot	NA	Prot	custom						
Protected Phases	39	1349	2	23	14	149	1	3	4	5	6	7
Permitted Phases												
Detector Phase	39	1349	2	23	14	149						
Switch Phase												
Minimum Initial (s)			12.0				2.0	2.0	4.0	12.0	4.0	2.0
Minimum Split (s)			24.0				7.0	8.0	10.0	18.0	10.0	7.0
Total Split (s)			86.0				7.0	15.0	68.0	33.0	60.0	8.0
Total Split (%)			43.0%				4%	8%	34%	17%	30%	4%
Yellow Time (s)			5.0				4.0	4.0	4.0	5.0	4.0	4.0
All-Red Time (s)			1.0				1.0	2.0	2.0	1.0	2.0	1.0
Lost Time Adjust (s)			0.0									
Total Lost Time (s)			6.0									
Lead/Lag			Lag				Lead	Lead		Lead	Lag	Lead
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	Yes
Recall Mode			Max				Max	Max	Max	Max	Max	Max
Act Effct Green (s)	33.0	109.0	80.0	95.0	70.0	94.0						
Actuated g/C Ratio	0.16	0.54	0.40	0.48	0.35	0.47						
v/c Ratio	1.70	0.68	0.50	0.41	0.92	0.59						
Control Delay	363.7	30.6	4.7	1.1	74.4	41.1						
Queue Delay	0.7	0.0	12.6	2.7	0.0	0.0						
Total Delay	364.4	30.6	17.3	3.9	74.4	41.1						
LOS	F	С	В	А	E	D						
Approach Delay	270.7			9.4								
Approach LOS	F			А								
Intersection Summary												
Cycle Length: 200												
Actuated Cycle Length: 200												
Offset: 7 (4%), Referenced to	phase 2	:WBTL ar	nd 5:, Star	t of Greer	า							
Natural Cycle: 90												
Control Type: Pretimed												
Maximum v/c Ratio: 1.70												
Intersection Signal Delay: 12	6.5			In	tersectio	n LOS: F						
Intersection Capacity Utilizat	ion 143.0	%		IC	U Level	of Service	H					
Analysis Period (min) 15												

Splits and Phases: 602: I-95 SB Ramps & Griffin Road

#602#602 Ø2 (R)		#602	Ø3	#602 Ø9	#602 Ø4
7 <mark>s</mark> 86 s		15 s		24 s	68 s
#603	#603	#603	#60 2	3 Ø8	
33 s	60 s	8 s	99 s		

I-95 at Griffin Rd - Option #5b-1  $\,$  09/04/2014 2040 Build-Option #5b-1 - add 2nd NBR - AM pk hr RS&H

Synchro 9 Report Page 1

12/19/2016

Lane Group	Ø8	Ø9	 
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Turn Type			
Protected Phases	8	9	
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	12.0	12.0	
Minimum Split (s)	22.0	18.0	
Total Split (s)	99.0	24.0	
Total Split (%)	50%	12%	
Yellow Time (s)	5.0	5.0	
All-Red Time (s)	1.0	1.0	
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	
Recall Mode	Max	Max	
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			
Intersection Summarv			

	-	$\mathbf{r}$	-	-	1	-
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	1579	616	684	979	1089	763
v/c Ratio	1.70	0.68	0.50	0.41	0.92	0.59
Control Delay	363.7	30.6	4.7	1.1	74.4	41.1
Queue Delay	0.7	0.0	12.6	2.7	0.0	0.0
Total Delay	364.4	30.6	17.3	3.9	74.4	41.1
Queue Length 50th (ft)	~995	480	11	0	711	415
Queue Length 95th (ft)	#1076	635	m10	m0	809	493
Internal Link Dist (ft)	1272			184		
Turn Bay Length (ft)						
Base Capacity (vph)	928	906	1360	2392	1190	1297
Starvation Cap Reductn	0	0	656	1258	0	0
Spillback Cap Reductn	111	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.93	0.68	0.97	0.86	0.92	0.59

#### 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.

# HCM Signalized Intersection Capacity Analysis 602: I-95 SB Ramps & Griffin Road

	≯	-	$\mathbf{\hat{z}}$	4	+	•	1	Ť	1	1	ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		11111	1	ሻሻ	<b>^</b>					ካካ		77
Traffic Volume (vph)	0	1500	585	650	930	0	0	0	0	1035	0	725
Future Volume (vph)	0	1500	585	650	930	0	0	0	0	1035	0	725
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	5.0	6.0	6.0					5.0		5.0
Lane Util. Factor		*0.61	1.00	0.97	0.91					0.97		0.88
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)		5626	1568	3400	5036					3400		2760
Flt Permitted		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (perm)		5626	1568	3400	5036					3400		2760
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95
Adj. Flow (vph)	0	1579	616	684	979	0	0	0	0	1089	0	763
RTOR Reduction (vph)	0	0	62	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1579	554	684	979	0	0	0	0	1089	0	763
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type		NA	custom	Prot	NA					Prot		custom
Protected Phases		39	1349	2	23					14		149
Permitted Phases												
Actuated Green, G (s)		33.0	109.0	80.0	95.0					70.0		94.0
Effective Green, g (s)		33.0	91.0	80.0	95.0					64.0		82.0
Actuated g/C Ratio		0.16	0.46	0.40	0.48					0.32		0.41
Clearance Time (s)				6.0								
Lane Grp Cap (vph)		928	713	1360	2392					1088		1131
v/s Ratio Prot		c0.28	0.35	c0.20	0.19					c0.32		0.28
v/s Ratio Perm												
v/c Ratio		1.70	0.78	0.50	0.41					1.00		0.67
Uniform Delay, d1		83.5	45.9	45.1	34.2					68.0		48.1
Progression Factor		1.00	1.00	0.10	0.03					1.00		1.00
Incremental Delay, d2		320.3	8.1	0.1	0.0					27.5		3.2
Delay (s)		403.8	54.1	4.7	1.1					95.5		51.3
Level of Service		F	D	А	А					F		D
Approach Delay (s)		305.7			2.6			0.0			77.3	
Approach LOS		F			A			A			E	
Intersection Summary												
HCM 2000 Control Delay			143.3	Н	CM 2000	Level of S	Service		F			
HCM 2000 Volume to Capacity ratio			0.94									
Actuated Cycle Length (s)			200.0	Sum of lost time (s)					30.0			
Intersection Capacity Utilization			143.0%	IC	CU Level	of Service			Н			
Analysis Period (min)			15									
### Timings 602: I-95 SB Ramps & Griffin Road

	-	$\mathbf{i}$	4	←	1	~						
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR	Ø1	Ø3	Ø4	Ø5	Ø6	Ø7
Lane Configurations	11111	1	ካካ	***	ካካ	11						
Traffic Volume (vph)	1605	645	795	1430	475	905						
Future Volume (vph)	1605	645	795	1430	475	905						
Turn Type	NA	custom	Prot	NA	Prot	custom						
Protected Phases	39	1349	2	23	14	149	1	3	4	5	6	7
Permitted Phases												
Detector Phase	39	1349	2	23	14	149						
Switch Phase												
Minimum Initial (s)			12.0				2.0	2.0	4.0	12.0	4.0	2.0
Minimum Split (s)			24.0				7.0	8.0	10.0	18.0	10.0	7.0
Total Split (s)			90.0				7.0	16.0	61.0	40.0	57.0	8.0
Total Split (%)			45.0%				4%	8%	31%	20%	29%	4%
Yellow Time (s)			5.0				4.0	4.0	4.0	5.0	4.0	4.0
All-Red Time (s)			1.0				1.0	2.0	2.0	1.0	2.0	1.0
Lost Time Adjust (s)			0.0									
Total Lost Time (s)			6.0									
Lead/Lag			Lag				Lead	Lead		Lead	Lag	Lead
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	Yes
Recall Mode			Мах				Max	Max	Max	Max	Max	Max
Act Effct Green (s)	36.0	105.0	84.0	100.0	63.0	89.0						
Actuated g/C Ratio	0.18	0.52	0.42	0.50	0.32	0.44						
v/c Ratio	1.26	0.79	0.59	0.60	0.47	0.78						
Control Delay	183.4	41.9	5.6	4.8	56.8	52.4						
Queue Delay	0.5	0.0	51.3	39.5	0.0	0.0						
Total Delay	183.8	41.9	56.9	44.4	56.8	52.4						
LOS	F	D	E	D	E	D						
Approach Delay	143.1			48.8								
Approach LOS	F			D								
Intersection Summary												
Cycle Length: 200												
Actuated Cycle Length: 200												
Offset: 7 (4%), Referenced to	phase 2	WBTL ar	nd 5:, Stai	rt of Greer	า							
Natural Cycle: 90												
Control Type: Pretimed												
Maximum v/c Ratio: 1.26												
Intersection Signal Delay: 86.	3			In	tersectio	on LOS: F						
Intersection Capacity Utilization	on 150.1	%		IC	U Level	of Service	H					
Analysis Period (min) 15												

Splits and Phases: 602: I-95 SB Ramps & Griffin Road

#602#602		#602	<b>Ø</b> 3	#602	#602
7 <mark>s</mark> 90 s		16 s		26 s	61s
#603	#603	#603	#603 2	Ø8	
40 s	57 s	8 <mark>s</mark> 9	95 s		

I-95 at Griffin Rd - Option #5b-1 09/04/2014 2040 Build-Option #5 add 2nd NBR - PM pk hr RS&H

Synchro 9 Report Page 1

#### 12/19/2016

Lane Group	Ø8	Ø9
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Turn Type		
Protected Phases	8	9
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	12.0	12.0
Minimum Split (s)	22.0	18.0
Total Split (s)	95.0	26.0
Total Split (%)	48%	13%
Yellow Time (s)	5.0	5.0
All-Red Time (s)	1.0	1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes
Recall Mode	Max	Max
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

	-	$\mathbf{r}$	1	-	1	1
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	1689	679	837	1505	500	953
v/c Ratio	1.26	0.79	0.59	0.60	0.47	0.78
Control Delay	183.4	41.9	5.6	4.8	56.8	52.4
Queue Delay	0.5	0.0	51.3	39.5	0.0	0.0
Total Delay	183.8	41.9	56.9	44.4	56.8	52.4
Queue Length 50th (ft)	~683	651	11	523	275	603
Queue Length 95th (ft)	#743	847	m17	m0	335	703
Internal Link Dist (ft)	1272			184		
Turn Bay Length (ft)						
Base Capacity (vph)	1344	859	1428	2518	1071	1228
Starvation Cap Reductn	0	0	672	1122	0	0
Spillback Cap Reductn	148	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.41	0.79	1.11	1.08	0.47	0.78

#### 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.

### HCM Signalized Intersection Capacity Analysis 602: I-95 SB Ramps & Griffin Road

	۶	-	$\mathbf{i}$	4	•	*	٩.	Ť	۲	1	ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		11111	1	ሻሻ	<b>^</b>					ሻሻ		77
Traffic Volume (vph)	0	1605	645	795	1430	0	0	0	0	475	0	905
Future Volume (vph)	0	1605	645	795	1430	0	0	0	0	475	0	905
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	5.0	6.0	6.0					5.0		5.0
Lane Util. Factor		0.81	1.00	0.97	0.91					0.97		0.88
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)		7471	1568	3400	5036					3400		2760
Flt Permitted		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (perm)		7471	1568	3400	5036					3400		2760
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1689	679	837	1505	0	0	0	0	500	0	953
RTOR Reduction (vph)	0	0	44	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1689	635	837	1505	0	0	0	0	500	0	953
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type		NA	custom	Prot	NA					Prot		custom
Protected Phases		39	1349	2	23					14		149
Permitted Phases												
Actuated Green, G (s)		36.0	105.0	84.0	100.0					63.0		89.0
Effective Green, g (s)		36.0	87.0	84.0	100.0					57.0		77.0
Actuated g/C Ratio		0.18	0.44	0.42	0.50					0.28		0.38
Clearance Time (s)				6.0								
Lane Grp Cap (vph)		1344	682	1428	2518					969		1062
v/s Ratio Prot		c0.23	c0.41	0.25	c0.30					0.15		0.35
v/s Ratio Perm												
v/c Ratio		1.26	0.93	0.59	0.60					0.52		0.90
Uniform Delay, d1		82.0	53.7	44.6	35.7					59.9		57.8
Progression Factor		1.00	1.00	0.12	0.13					1.00		1.00
Incremental Delay, d2		121.7	21.3	0.2	0.1					2.0		11.8
Delay (s)		203.7	75.0	5.6	4.8					61.9		69.6
Level of Service		F	E	А	А					Е		E
Approach Delay (s)		166.8			5.1			0.0			66.9	
Approach LOS		F			А			А			Е	
Intersection Summary												
HCM 2000 Control Delay			81.8	Н	CM 2000	Level of S	Service		F			
HCM 2000 Volume to Capacit	y ratio		0.89									
Actuated Cycle Length (s)			200.0	S	um of lost	t time (s)			30.0			
Intersection Capacity Utilization	n		150.1%	IC	CU Level of	of Service			Н			
Analysis Period (min)			15									

c Critical Lane Group

## **Appendix D**

## **Excerpt from Interchange Master Plan**

**Existing Weaving Analysis Summary** 

I-95 Segment Description	Analysis Type	DDHV	V/C	Density	LOS
SR 84 SB On-Ramp to Griffin Road SB Off-Ramp	Mainline/Basic	5,080(6,510)	0.43(0.55)	14.8(18.8)	B(C)
Griffin Road SB Off-Ramp	Off-Ramp	5,080(6,510)	0.43(0.55)	15.3(19.7)	B(B)
Griffin Road SB Off-Ramp to I-595 SB On-Ramp	Mainline/Basic	4,650(5,780)	0.39(0.49)	13.6(16.8)	B(B)
I-595 SB On-Ramp	On-Ramp	7,170(8,280)	0.57(0.66)	21.8(26.0)	C(C)
I-595 SB On-Ramp to Griffin Road SB On-Ramp	Mainline/Basic	7,170(8,280)	0.57(0.66)	19.6(23.4)	C(C)
Griffin Road SB On-Ramp to Stirling Road SB Off-Ramp	Weaving	7,840(9,210)	0.58(0.81)	14.7(20.6)	B(C)
Stirling Road SB Off-Ramp to Stirling Rd SB On-Ramp	Mainline/Basic	7,030(8,050)	0.56(0.65)	19.4(22.8)	C(C)
Stirling Rd SB On-Ramp to Sheridan Street SB Off-Ramp	Weaving	7,800(9,020)	0.71(0.95)	15.5(21.4)	B(C)
Sheridan Street SB Off-Ramp to Sheridan Street SB On-Ramp	Mainline/Basic	6,720(7,540)	0.54(0.61)	18.7(21.3)	C(C)
Sheridan Street SB On-Ramp to Hollywood Boulevard SB Off- Ramp	Weaving	7,970(8,680)	1.00(1.00)	17.9(21.7)	B(C)
Hollywood Boulevard SB Off-Ramp to Hollywood Boulevard SB On-Ramp	Mainline/Basic	6,450(7,220)	0.49(0.58)	16.9(20.2)	B(C)

T.L. (1 F.	·		
1  able  0.1 - Exis	ung year 1-9:	<b>5 SB Freeway</b>	Analysis Results

AM (PM)

### Table 6.2 – Existing Year I-95 NB Freeway Analysis Results

I-95 Segment Description	Analysis Type	DDHV	V/C	Density	LOS
Hollywood Boulevard NB Off-Ramp to Hollywood Boulevard NB On-Ramp	Mainline/Basic	7,490(8,180)	0.63(0.69)	22.1(24.5)	C(C)
Hollywood Boulevard NB On-Ramp to Sheridan Street NB Off- Ramp	Weaving	8,910(9,350)	0.91(1.00)	30.6(34.1)	D(D)
Sheridan Street NB Off-Ramp to Sheridan Street NB On-Ramp	Mainline/Basic	8,030(7,910)	0.68(0.64)	24.0(22.3)	C(C)
Sheridan Street NB On-Ramp to Stirling Road NB Off-Ramp	Weaving	9,430(9,080)	0.90(0.87)	33.2(33.4)	D(D)
Stirling Road NB Off-Ramp to Stirling Road NB On-Ramp	Mainline/Basic	8,560(7,980)	0.72(0.65)	26.0(22.8)	C(C)
Stirling Road NB On-Ramp to Griffin Road NB Off-Ramp	Weaving	9,460(9,110)	0.73(0.74)	31.7(32.0)	D(D)
Griffin Road NB Off-Ramp to Griffin Road NB On-Ramp	Mainline/Basic	8,540(8,290)	0.72(0.67)	26.0(23.8)	C(C)
Griffin Road NB On-Ramp to I-595 NB Off-Ramp	Weaving	9,100(9,060)	0.95(0.98)	26.2(26.6)	C(C)
I-595 NB Off-Ramp to SR 84 NB Off-Ramp	Mainline/Basic	6,330(6,260)	0.53(0.51)	18.4(17.6)	C(B)

AM (PM)

# **Appendix E**

Interchange Master Plan

**Future Traffic Volumes** 



Figure 9.1: 2020 Build

February2015



Figure 12.1: 2040 Build

February2015

# **Appendix F**

## **Excerpt from Interchange Master Plan**

## 2040 Weaving Analysis Summary

I-95 Segment Description	Analysis Type	DDHV	V/C	Density	LOS
Hollywood Boulevard NB Off-Ramp to Hollywood Boulevard NB On-Ramp	Mainline/Basic	7,370(8,170)	0.66(0.67)	73.9(83.4)	F(F)
Hollywood Boulevard NB On-Ramp to Sheridan Street NB Off- Ramp	Weaving	9,340(9,810)	1.00(1.00)	50.6(47.2)	E(E)
Sheridan Street NB Off-Ramp to Sheridan Street NB On-Ramp	Mainline/Basic	7,920(7,960)	0.62(0.60)	21.6(20.9)	C(C)
Sheridan Street NB On-Ramp to Stirling Road NB Off-Ramp	Weaving	9,920(9,490)	1.00(0.90)	52.3(45.0)	E(E)
Stirling Road NB Off-Ramp to I-95 Express NB On-Ramp	Mainline/Basic	8,510(8,060)	0.67(0.65)	23.9(23.1)	C(C)
I-95 Express NB On-Ramp	On-Ramp	9,770(9,260)	0.80(0.77)	31.5(30.4)	D(D)
I-95 Express NB On-Ramp to Stirling Road NB On-Ramp	Mainline/Basic	9,770(9,260)	0.80(0.77)	29.9(28.5)	D(D)
Stirling Road NB On-Ramp to Griffin Road NB Off-Ramp	Weaving	11,140(10,840)	0.83(0.91)	32.7(33.6)	D(D)
Griffin Road NB Off-Ramp to I-95 Express NB Off-Ramp	Mainline/Basic	9,970(9,650)	0.84(0.84)	32.5(32.1)	D(D)
I-95 Express NB Off-Ramp	Off-Ramp	9,970(9,650)	0.84(0.84)	32.4(32.1)	D(D)
I-95 Express NB Off-Ramp to Griffin Road NB On-Ramp	Mainline/Basic	8,310(8,000)	0.70(0.70)	25.1(24.8)	C(C)
Griffin Road NB On-Ramp to I-595 NB Off-Ramp	Weaving	10,040(9,530)	1.00(0.91)	38.1(36.5)	E(E)
I-595 NB Off-Ramp to SR 84 NB Off-Ramp	Mainline/Basic	7,450(7,200)	0.65(0.65)	22.9(22.6)	C(C)

### Table 10.2 – No-Build 2040 NB Freeway Segment Analysis Results

AM (PM)

Concept Devel opment Report

# Appendix G

**Conceptual Plan** 



# Appendix H

**Typical Sections** 



DI430D

AT	GRIFFIN	ROAD	(SR)	818)	

### TYPICAL SECTIONS

SHEET NO:	
1	



3/6/2017 9:4/:/

9

BROWARD

pl430p,

TING LINE	
SWALE	
4 <i>DE</i>	
AT GRIFFIN ROAD (SR 818)	)
TYPICAL SECTIONS	SHEET NO.
7 AM C:\a\timsproi\siscd\009-005-b\roadway\TYPSRD0/ Concents.DC	2

# Appendix I

**Environmental Features** 

**Identification Memorandum** 



## Florida Department of Transportation

RICK SCOTT GOVERNOR 3400 West Commercial Blvd. Fort Lauderdale, FL 33309 JIM BOXOLD SECRETARY

## MEMORANDUM

**Date:** December 27, 2016

To: Jamie Polidora, Project Development Engineer

From: Mary Ellen Milford, Environmental Specialist

Subject: ENVIRONMENTAL FEATURES IDENTIFICATION The northbound on and off ramps Griffin Road from I-95 east to the canal and Old Griffin Road Financial Project ID Number: N/A Federal Aid Project No.: N/A County: Broward Description: Concept Development Project

The intent of this project is to address existing and short term operational conditions at the ramp terminal of SR 9 (I-95) and Griffin Road and the intersection of Griffin Road and Old Griffin Road. The proposed improvement is intended to address queues backing up to the I-95 mainline that occur in the AM and PM peak periods on the I-95 northbound off ramp and I-95 southbound off ramp at SR 706.

An environmental features evaluation was conducted for the above-referenced project. The purpose of this evaluation is to identify environmental features of potential concern within the proposed project area. The project was evaluated using the following resources:

- Efficient Transportation Decision Making (ETDM) GIS Environmental Screening Tool (EST)
- Aerial Photographs and Street Maps

Please note that the database/GIS information within the EST is only applicable to date, due to continual updates of these databases. From this evaluation, the following environmental features were identified that should be considered during preparation of the future project plans.

#### **NEPA Compliance Checklist Items**

#### Air Quality and Noise

The project is located within the Southeast Florida Air shed for all of the National Ambient Air Quality Standards under the criteria provided in the Clean Air Act.

#### Wetlands

According to EDTM and based on a review of the National Wetlands Inventory Wetlands Mapper, the project is near several National Wetlands Inventory Areas. There is an estuarine & marine wetland just east of the I-95 exit ramp. There is also an estuarine & marine deepwater canal east of I-95 that intersects SR-818/Griffin Road and runs parallel to Old Griffin Road. According to EDTM, the shores of the canal along Old Griffin Road are classified as environmentally sensitive shoreline (9B Vegetated Low Banks). There is a freshwater emergent wetland located south of SR-818/Griffin Road, and west of I-95. There are also several freshwater ponds located near the proposed project corridor. The locations of each of the identified wetlands are shown on the map below.



#### Water Quality

According to EDTM, the entire area of the I-95 and Griffin Road project corridor is a Mitigation Bank Service Area for Everglades, Loxahatchee, and Wetlands Bank Pembroke Pines.

#### **Floodplain Encroachment**

Areas of the I-95 and Griffin Road project corridor are located within the 100-year floodplain (Zone AE and Zone AH).

#### Endangered or Threatened Species, Wildlife, and Critical Habitats

The proposed project is listed as part of the U.S. Fish and Wildlife Service's (USFWS) Broward Consultation Species, which identifies federally-listed species known to be present in Broward County. The project corridor is within a Snail Kite (*Rostrhamus sociabilis*) Consultation Area. The canal adjacent to the prosed project is a Florida Fish and Wildlife Commission (FWC) Manatee Protection Zone requiring slow boat speed all year. EDTM also identified the proposed project area as a rare and imperiled fish area for the Mangrove Rivulus (*Kryptolebias marmoratus*).

#### **Coastal Barrier Resources**

The project is not located within a Coastal Barrier Resource Area (CBRA).

#### **Community Services**

There are several community services located within the project vicinity:

- Florida Mens Medical Clinic, LLC 1815 Griffin Road, Suite 206
- Cerebral Palsy Adult Home Inc 1405 NW 10 St
- Aviation Greenspace (Neighborhood Park/Walking Path) 100 Terminal Dr Fort Lauderdale, FL 333315
- Tigertail Park (Neighborhood Park/Mixed Use Recreation) 850 Gulfstream Way Dania, FL 33004
- IGFA Fishing Hall of Fame & Museum 300 Gulf Stream Way Dania Beach, FL 33004

#### Section 106 of the National Historic Preservation Act

According to a review of the ETDM EST, several Cultural Resource Surveys have been conducted within the project area:

- Historic Resources Reconnaissance Survey and Archaeological Desktop Analysis I-95 Managed Lanes Pilot Project: 95 Express From: I-395 (Miami-Dade County) To: I-595 (Broward County) ETDM No.: 3174 (May 7, 2007)
- An Archaeological Survey of Southeast Broward County, Florida: Phase 3 (1995)
- An Archaeological and Historical Assessment for the Existing NW 1<sup>st</sup> Street Cellular Tower, Broward County, Florida (2004)
- Cultural Resource Assessment Survey SR 9/I-95 PD&E Study from Stirling Road to north of Oakland Park Blvd FM 42980412201/ ETDM 13168, Broward County, Florida (2012)
- Cultural Resources Reconnaissance Study South Florida East Coast Corridor Transit Analysis Miami-Dade, Broward and Palm Beach Counties (2006)
- City of Dania Historical Survey (1993)

The ETDM EST identified two historic sites near the proposed project corridor which are shown on the map below:

- Site Name: Old Griffin (Site ID: BD02905). Prehistoric midden, not evaluated by SHPO.
- Site Name: Ocean Waterway Mobile Home Park (Site ID: BD00148) 1500 W Griffin Rd. Not evaluated by SHPO. Ineligible for National Register of Historic Places (NRHP).



#### **State Historic Highway**

SR-818/Griffin Road is not listed as a State Historic Highway, as designated by Florida state law.

#### Section 4(f) of the Department of Transportation Act

According to ETDM there are two public parks located close to the proposed project corridor:

- Aviation Greenspace (Neighborhood Park/Walking Path) 100 Terminal Dr Fort Lauderdale, FL 333315
- Tigertail Park (Neighborhood Park/Mixed Use Recreation) 850 Gulfstream Way Dania, FL 33004

#### Contamination

Based on a review of EDTM and the FDEP Contamination Locator Map, the following contaminated sites were located in the vicinity of the proposed project corridor:

• Lapointe LTD (Facility ID: 9813202) 1880 Griffin Rd Dania Beach 33004

- Redwing Carriers Spill (Facility ID: 9402003) I-95 & Griffin Rd Dania Beach 33004
- Texaco Station (Facility ID: 8502017) 1895 Griffin Rd Dania Beach 33004
- Monte Polluck Aircraft Spill-Milts Marina (Facility ID: 9802840) 1541 Griffin Rd Dania Beach 33004
- Sheraton (Facility ID: 9700959) 1825 Griffin Rd Dania Beach 33004
- Design Center of the Americas (Facility ID: 9100136) 1855 Griffin Rd Dania Beach 33004
- Palmdale Oil Co (Facility ID: 9809061) Griffin Rd @ I-95 (NB Ramp) Dania Beach 33315
- Humane Society of Broward County Inc (Facility #: 8731740) 2070 Griffin Rd Fort Lauderdale 33312
- Studiale Property (Facility ID: 9200241) 1901 Griffin Rd Fort Lauderdale 33315

Please coordinate with the District Contamination Impact Coordinator (DCIC), Maria Salgado ext. 4286, to identify any testing needs.

If you have any comments or questions concerning any issues discussed in this memorandum, please feel free to contact Mary Ellen Milford (mary.milford@dot.state.fl.us) to discuss further. Thank you for your coordination on this project.

# Appendix J

## Long Range Estimate (LRE)

Date: 3/15/2017 4:53:42 PM

### **FDOT Long Range Estimating System - Production R3: Project Details by Sequence Report**

Project: I95816-1-52-01			Letting D	ate: 01/2099
Description: SR81	6/I-95 Griffin Rd intersection impr	ovements		
District: 04 Contract Class: 9	County: 86 BROWARD Lump Sum Project: N	Market Area: 12 Design/Build: Y	Units: English Project Length: 0.100	MI
Project Manager:				
Version 3 Project ( Description: Optior	Grand Total n 5B - I-95 NB Ramp with 3C Vers	sion 1-P_Updated		\$447,854.70
Sequence: 1 WUR	- Widen/Resurface, Undivided, R	ural	Net Length:	0.091 MI 478 LF

Description: Right Turn Lanes: Milling, resurfacing and widening to two right turn lanes

#### EARTHWORK COMPONENT

User Input Data	
Description	Value
Standard Clearing and Grubbing Limits L/R	0.00 / 20.00
Incidental Clearing and Grubbing Area	0.00
Alignment Number	1
Distance	0.500
Top of Structural Course For Begin Section	102.00
Top of Structural Course For End Section	102.00
Horizontal Elevation For Begin Section	100.00
Horizontal Elevation For End Section	100.00
Existing Front Slope L/R	6 to 1 / 6 to 1
Existing Outside Shoulder Cross Slope L/R	6.00 % / 6.00 %
Front Slope L/R	6 to 1 / 6 to 1
Outside Shoulder Cross Slope L/R	6.00 % / 6.00 %
Roadway Cross Slope L/R	2.00 % / 2.00 %

#### Pay Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
110-1-1	CLEARING & GRUBBING	0.22 AC	\$41,264.72	\$9,078.24
120-2-2	BORROW EXCAVATION, TRUCK MEASURE	743.11 CY	\$37.83	\$28,111.85

#### **Earthwork Component Total**

#### \$37,190.09

#### **ROADWAY COMPONENT**

User Input Data	
Description	Value
Number of Lanes	2
Existing Roadway Pavement Width L/R	0.00 / 12.00
Structural Spread Rate	165
Friction Course Spread Rate	80

Widened Outside Pavement Width L/R	0.00 / 15.00
Widened Structural Spread Rate	330
Widened Friction Course Spread Rate	80

Pay Items				
Pay item	Description	Quantity Unit	Unit Price E	Extended Amount
160-4	TYPE B STABILIZATION	796.40 SY	\$5.32	\$4,236.85
285-709	OPTIONAL BASE, BASE GROUP 09	813.92 SY	\$22.22	\$18,085.30
327-70-11	MILLING EXIST ASPH PAVT,2 1/4" AVG DEPTH	637.12 SY	\$3.47	\$2,210.81
334-1-53	SUPERPAVE ASPH CONC, TRAF C, PG76-22	52.56 TN	\$115.00	\$6,044.40
334-1-53	SUPERPAVE ASPH CONC, TRAF C, PG76-22	131.41 TN	\$115.00	\$15,112.15
337-7-22	ASPH CONC FC,INC BIT,FC- 5,PG76-22,PMA	25.48 TN	\$151.72	\$3,865.83
337-7-22	ASPH CONC FC,INC BIT,FC- 5,PG76-22,PMA	31.86 TN	\$151.72	\$4,833.80
X-Items				
Pay item	Description	Quantity Unit	Unit Price E	Extended Amount
334-1-53	SUPERPAVE ASPH CONC, TRAF C, PG76-22	9.20 TN	\$115.00	\$1,058.00
	Comment: 5% Contingency			
337-7-22	ASPH CONC FC,INC BIT,FC- 5,PG76-22,PMA	2.90 TN	\$151.72	\$439.99
	Comment: 5% Contingency			
711-11-123	THERMOPLASTIC, STD, WHITE, SOLID, 12"	48.00 LF	\$2.07	\$99.36
711-11-125	THERMOPLASTIC, STD, WHITE, SOLID, 24"	74.00 LF	\$3.50	\$259.00
711-11-170	THERMOPLASTIC, STD, WHITE, ARROW	4.00 EA	\$62.93	\$251.72
Pavement Marki	ng Subcomponent			
Description		Value	9	
Include Thermo/T	ape/Other	١	(	
Pavement Type		Asphal	t	
Solid Stripe No. o	f Paint Applications		1	
Solid Stripe No. o	f Stripes	2	2	
Skip Stripe No. of	f Stripes		1	
Pay Items				
Pay item	Description	Quantity Unit	Unit Price E	Extended Amount
706-3	RETRO-REFLECTIVE PAVEMENT MARKERS	12.00 EA	\$4.88	\$58.56
711-15-101	THERMOPLASTIC, STD-OP, WHITE, SOLID, 6"	0.18 GM	\$4,628.97	\$833.21
711-16-201	THERMOPLASTIC, STD- OTH,YELLOW, SOLID, 6"	0.18 GM	\$3,900.85	\$702.15
	Roadway Component Total			\$58,091.13

#### SHOULDER COMPONENT

User Input Data	
Description	Value
Existing Total Outside Shoulder Width L/R	0.00 / 0.00
New Total Outside Shoulder Width L/R	0.00 / 0.00
Total Outside Shoulder Perf. Turf Width L/R	0.00 / 0.00
Existing Paved Outside Shoulder Width L/R	0.00 / 0.00
New Paved Outside Shoulder Width L/R	0.00 / 0.00
Structural Spread Rate	110
Friction Course Spread Rate	80
Total Width (T) / 8" Overlap (O)	Т
Rumble Strips No. of Sides	0

#### X-Items

Pay item	Description	Quantity Unit	Unit Price Exte	ended Amount
520-1-10	CONCRETE CURB & GUTTER, TYPE F	531.00 LF	\$25.82	\$13,710.42
522-1	CONCRETE SIDEWALK AND DRIVEWAYS, 4"	47.00 SY	\$41.25	\$1,938.75

#### **Erosion Control**

Pay Items				
Pay item	Description	Quantity Unit	Unit Price Ext	ended Amount
104-10-3	SEDIMENT BARRIER	600.00 LF	\$1.75	\$1,050.00
104-15	SOIL TRACKING PREVENTION DEVICE	1.00 EA	\$2,050.23	\$2,050.23
104-18	INLET PROTECTION SYSTEM	4.00 EA	\$96.05	\$384.20
107-1	LITTER REMOVAL	0.22 AC	\$50.51	\$11.11
107-2	MOWING	0.22 AC	\$75.46	\$16.60
	Shoulder Component Total			\$19,161.31

#### DRAINAGE COMPONENT

Pay Items				
Pay item	Description	Quantity Unit	Unit Price Ext	ended Amount
400-2-2	CONC CLASS II, ENDWALLS	1.63 CY	\$2,160.00	\$3,520.80
430-174-124	PIPE CULV, OPT MATL, ROUND,24"SD	16.00 LF	\$172.63	\$2,762.08
430-175-136	PIPE CULV, OPT MATL, ROUND, 36"S/CD	8.00 LF	\$116.66	\$933.28
430-984-129	MITERED END SECT, OPTIONAL RD, 24" SD	1.00 EA	\$1,419.05	\$1,419.05
570-1-1	PERFORMANCE TURF	36.56 SY	\$4.44	\$162.33
X-Items				

Pay item	Description	Quantity Unit	Unit Price Ext	tended Amount
425-1-351	INLETS, CURB, TYPE P-5, <10'	2.00 EA	\$4,946.91	\$9,893.82
425-1-361	INLETS, CURB, TYPE P-6, <10'	2.00 EA	\$5,486.22	\$10,972.44
430-173-118	PIPE CULV OPT MATL, ROUND, 18", GD	176.00 LF	\$115.00	\$20,240.00

#### Drainage Component Total

\$49,903.80

#### SIGNING COMPONENT

Pay Items				
Pay item	Description	Quantity Unit	Unit Price E	Extended Amount
700-1-11	SINGLE POST SIGN, F&I GM, <12 SF	5.00 AS	\$336.28	\$1,681.40
700-1-60	SINGLE POST SIGN, REMOVE	5.00 AS	\$22.18	\$110.90
700-2-13	MULTI- POST SIGN, F&I GM, 21-30 SF	2.00 AS	\$3,162.66	\$6,325.32
700-2-60	MULTI- POST SIGN, REMOVE	1.00 AS	\$465.42	\$465.42
	Signing Component Total			\$8,583.04

#### SIGNALIZATIONS COMPONENT

Signalization 1	
Description	Value
Туре	2 Lane Mast Arm
Multiplier	1
Description	2 Right Turn Lanes Mast Arm

#### Pay Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
630-2-11	CONDUIT, F& I, OPEN TRENCH	200.00 LF	\$8.05	\$1,610.00
630-2-12	CONDUIT, F& I, DIRECTIONAL BORE	50.00 LF	\$17.74	\$887.00
632-7-1	SIGNAL CABLE- NEW OR RECO, FUR & INSTALL	1.00 PI	\$4,725.36	\$4,725.36
635-2-11	PULL & SPLICE BOX, F&I, 13" x 24"	3.00 EA	\$578.89	\$1,736.67
639-1-112	ELECTRICAL POWER SRV,F&I,OH,M,PUR BY CON	1.00 AS	\$8,840.54	\$8,840.54
639-2-1	ELECTRICAL SERVICE WIRE, F&I	15.00 LF	\$4.24	\$63.60
650-1-14	TRAFFIC SIGNAL,F&I ALUMINUM, 3 S 1 W	2.00 AS	\$965.56	\$1,931.12
653-1-11	PEDESTRIAN SIGNAL, F&I LED COUNT, 1 WAY	2.00 AS	\$731.09	\$1,462.18
660-1-102	LOOP DETECTOR INDUCTIVE, F&I, TYPE 2	2.00 EA	\$184.94	\$369.88
660-2-106	LOOP ASSEMBLY, F&I, TYPE F	2.00 AS	\$1,009.61	\$2,019.22
665-1-11	PEDESTRIAN DETECTOR, F&I, STANDARD	2.00 EA	\$219.74	\$439.48
670-5-111	TRAF CNTL ASSEM, F&I, NEMA, 1 PREEMPT	1.00 AS	\$29,924.04	\$29,924.04
700-3-101	SIGN PANEL, F&I GM, UP TO 12 SF	2.00 EA	\$305.17	\$610.34
X-Items				
Pay item	Description	Quantity Unit	Unit Price	Extended Amount

i ay item	Description	Quantity Offic		leu Amount
649-21-15	STEEL MAST ARM ASSEMBLY, F&I, 70'	1.00 EA	\$39,000.00	\$39,000.00

Sequence: 2 RSU - Resurfacing, Undivided	Net Length:	0.105 MI 556 LF

Description: Milling Two Left turn lanes and raised median island reconstruction

#### **ROADWAY COMPONENT**

Value
2
12.00 / 12.00
165
80

#### Pay Items

-				
Pay item	Description	Quantity Unit	Unit Price Ex	tended Amount
327-70-11	MILLING EXIST ASPH PAVT,2 1/4" AVG DEPTH	1,482.62 SY	\$3.47	\$5,144.69
334-1-53	SUPERPAVE ASPH CONC, TRAF C, PG76-22	122.32 TN	\$115.00	\$14,066.80
337-7-22	ASPH CONC FC,INC BIT,FC- 5.PG76-22.PMA	59.30 TN	\$151.72	\$8,997.00

#### X-Items

Pay item	Description	Quantity Unit	Unit Price	tended Amount
334-1-53	SUPERPAVE ASPH CONC, TRAF C, PG76-22	6.10 TN	\$115.00	\$701.50
	Comment: 5% Contingency			
337-7-22	ASPH CONC FC,INC BIT,FC- 5,PG76-22,PMA	3.00 TN	\$151.72	\$455.16
	Comment: 5% Contingency			
711-11-123	THERMOPLASTIC, STD, WHITE, SOLID, 12"	48.00 LF	\$2.07	\$99.36
711-11-125	THERMOPLASTIC, STD, WHITE, SOLID, 24"	74.00 LF	\$3.50	\$259.00
711-11-170	THERMOPLASTIC, STD, WHITE, ARROW	4.00 EA	\$62.93	\$251.72

#### **Pavement Marking Subcomponent**

Description	Value
Include Thermo/Tape/Other	Y
Pavement Type	Asphalt
Solid Stripe No. of Paint Applications	1
Solid Stripe No. of Stripes	2
Skip Stripe No. of Paint Applications	1
Skip Stripe No. of Stripes	1

#### Pay Items

Pay item	Description	Quantity Unit	Unit Price <sup>E</sup>	Extended Amount
706-3	RETRO-REFLECTIVE PAVEMENT MARKERS	14.00 EA	\$4.88	\$68.32
711-15-101	THERMOPLASTIC, STD-OP, WHITE, SOLID, 6"	0.21 GM	\$4,628.97	\$972.08

711-15-201	THERMOPLASTIC, STD- OP,YELLOW, SOLID, 6"	0.21 GM	\$4,308.95	\$904.88
	Roadway Component Total			\$31,920.51
	SHOULDER CO	MPONENT		
User Input Data	3			
Description		Value		
Total Outside SI	noulder Width L/R houlder Perf. Turf Width L/P	12.67 / 0.00		
Paved Outside S	Shoulder Width L/R	10.00 / 0.00		
Structural Sprea	ad Rate	110		
Friction Course	Spread Rate	80		
Total Width (T)	/ 8" Overlap (O)	0		
Rumble Strips N	lo. of Sides	0		
Pay Items				
Pay item	Description	Quantity Unit	Unit Price Ex	tended Amount
327-70-1	MILLING EXIST ASPH PAVT, 1" AVG DEPTH	617.76 SY	\$2.93	\$1,810.04
334-1-13	SUPERPAVE ASPHALTIC CONC, TRAFFIC C	33.98 TN	\$120.19	\$4,084.06
337-7-43	ASPH CONC FC,TRAFFIC C,FC- 12.5,PG 76-22	1.63 TN	\$232.09	\$378.31
570-1-1	PERFORMANCE TURF	164.94 SY	\$4.44	\$732.33
X-Items				
Pay item	Description	Quantity Unit	Unit Price Ex	tended Amount
520-1-10	CONCRETE CURB & GUTTER, TYPE F	784.00 LF	\$25.82	\$20,242.88
	Comment: Raised median island recor	nstruction		
522-1	CONCRETE SIDEWALK AND DRIVEWAYS, 4"	38.00 SY	\$41.25	\$1,567.50
	Comment: Raised median island recor	nstruction		
570-1-2	PERFORMANCE TURF, SOD	108.00 SY	\$3.69	\$398.52
	<b>Comment:</b> Raised median island recor	nstruction		
Erosion Contro Pay Items	51			
Pay item	Description	Quantity Unit	Unit Price Ex	tended Amount
104-18	INLET PROTECTION SYSTEM	1.00 EA	\$96.05	\$96.05
107-1	LITTER REMOVAL	0.25 AC	\$50.51	\$12.63
107-2	MOWING	0.25 AC	\$75.46	\$18.87
	Shoulder Component Total			\$29,341.19
Sequence 2 To	tal			\$61 261 70
Sequence 2 IC				ψ01,201.70

Date: 3/15/2017 4:53:43 PM

### FDOT Long Range Estimating System - Production R3: Project Details by Sequence Report

Project: 195816-7	roject: 195816-1-52-01 Letting Date: 01/2099								
Description: SR	816/I-95 Griffin Rd intersection impro	ovements							
District: 04 Contract Class:	County: 86 BROWARD 9 Lump Sum Project: N	Market Area: 12 Design/Build: Y	Units: English Project Length	<b>:</b> 0.100 MI					
Project Manage	r:								
Version 3 Project Description: Opt	t <b>Grand Total</b> ion 5B - I-95 NB Ramp with 3C Versi	on 1-P_Updated		\$447,854.70					
Project Sequend	ces Subtotal			\$327,810.50					
102-1	Maintenance of Traffic	10.00 %		\$32,781.05					
101-1	Mobilization	8.00 %	1	\$28,847.32					
Project Sequend	ces Total			\$389,438.87					
Project Unknown	S	0.00 %		\$0.00					
Design/Build		10.00 %	1	\$38,943.89					
Non-Bid Compo	nents:								
Pay item	Description	Quantity U	nit Unit Price	Extended Amount					
999-25	NITIAL CONTINGENCY AMOUNT DO NOT BID)	LS	6 \$19,471.94	\$19,471.94					
Project Non-Bid	Subtotal			\$19,471.94					
Version 3 Proje	ct Grand Total			\$447,854.70					

Appendix K

**Benefit Cost Analysis** 

#### NET PRESENT VALUE ANALYSIS

I-95 at Griffin Road NB Off Ramp Improvements - Option #5b-1

NET PRESENT VALUE																
(Benefits)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Discount Rate
\$2,735,448	\$0	\$0	\$0	\$0	\$113,744	\$127,076	\$140,407	\$153,739	\$167,071	\$180,403	\$193,734	\$207,066	\$220,398	\$233,729	\$247,061	4%
						2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	
						\$260,393	\$273,724	\$287,056	\$300,388	\$313,720	\$327,051	\$340,383	\$353,715	\$367,046	\$380,378	
NET PRESENT VALUE																
(Costs)																
\$447,855																
NET PRESENT VALUE	= NPV (Bene	efits) - NPV (	Costs)													
	\$2,287,594			-												

Assume 2020 as Opening Year of project Calculated Present Value of 2040 benefits for 2020 assuming 4% CGR Assume linear increase of delay benefits between 2020 and 2040

#### December 6, 2016

#### **OPERATIONAL BENEFITS for PROPOSED IMPROVEMENT PROJECT (2040)** I-95 Northbound Off-Ramp at Griffin Road - OPTION #5b-1

#### PEAK TRAFFIC VOLUMES

2040 VOLUMES												
Peak Period	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM PEAK	620	0	555	0	0	0	980	1550	0	0	965	745
PM PEAK	705	0	490	0	0	0	780	1300	0	0	1520	755
24 Hour Total	13278		0		47833			45167				

ALTERNATIVES	Peak Ho (V	Daily Delay	
	AM	PM	Cost
No Build	79.70	84.60	\$26,753.50
Build Alternative	75.40	82.50	\$25,711.37

#### DELAY COST

No Build	D1 =	\$26,753.50
Build Alternative	D2 =	\$25,711.37

<b>Project Operational Benefit:</b>		Daily	Yearly
Proposed Improvement Project	D1 - D2 =	\$1,042.13	\$380,378

#### Note:

1. Synchro Output was used for determination of Peak-Hour Delay for the Proposed Improvement Project

2. Daily Delay = [ Peak Hour Delay (AM + PM) x AADT]/Peak Hour Volumes (AM + PM)

3. Daily Delay Cost = Daily Delay (V-H) x 1 x \$16.80/V-H

4. Value of delay is assumed to be \$16.80 per vehicle-hour

5. Build Alternative = Add 2nd NB right-turn lane

#### December 6, 2016

#### **OPERATIONAL BENEFITS for PROPOSED IMPROVEMENT PROJECT (2020)** I-95 Northbound Off-Ramp at Griffin Road - OPTION #5b-1

#### PEAK TRAFFIC VOLUMES

Peak Period	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM PEAK	550	0	445	0	0	0	575	950	0	0	475	320
PM PEAK	610	0	320	0	0	0	550	820	0	0	1050	435
24 Hour Total	10333		0		33667		29167					

ALTERNATIVES	Peak Ho	Daily Delay	
	AM	PM	Cost
No Build	36.00	44.90	\$14,005.95
Build Alternative	34.30	44.80	\$13,694.33

#### DELAY COST

No Build	D1 =	\$14,005.95
Build Alternative	D2 =	\$13,694.33

<b>Project Operational Benefit:</b>		Daily	Yearly
Proposed Improvement Project	D1 - D2 =	\$311.63	\$113,744

Note:

1. Synchro Output was used for determination of Peak-Hour Delay for the Proposed Improvement Project

2. Daily Delay = [ Peak Hour Delay (AM + PM) x AADT]/Peak Hour Volumes (AM + PM)

3. Daily Delay Cost = Daily Delay (V-H) x 1 x \$16.80/V-H

4. Value of delay is assumed to be \$16.80 per vehicle-hour

5. Build Alternative = Add 2nd NB right-turn lane

Appendix L

**Project Scope**
## Project Scope

## <u>Summary</u>

Interchange Improvements. Adding a turn lane at the NB exit ramp at Griffin Road.

## Scope Elements

- ADA
  - Impacted sidewalks will be ADA compliant.
- Drainage
  - Existing drainage system will be evaluated and upgraded if needed. The current system utilizes ditches along the ramps.
- ITS
- Provide fiber Interconnect and CCTV.
- Roadway
  - Mill and resurface through project limits, widening NB exit ramp to accommodate new turn lane.
- Sidewalks
  - Sidewalks are existing in the project limits. It is anticipated sidewalks will be impacted and re-constructed.
- Signalization
  - Re-construction of existing mast arms at ramp terminal.
- Signing and Marking
  - All marking will be updated as needed. Relocation of existing signs are anticipated.
- Structures
  - New signal mast arms are necessary to provide signal control for the recommended signalization of the northbound off ramp. Mast arms will be required to include pedestrian signal heads.
- Turn Lanes
  - $\circ$   $\;$  An additional turn lane will be provided on the NB exit ramp.
- Typical Section
  - NB Exit Ramp Terminal at Griffin Road
    - Existing:
      - Barrier wall, paved, shoulder, two left turn lanes, right turn lane, paved shoulder, grass swale, barrier wall.
    - Proposed:
      - Barrier wall, paved, shoulder, two left turn lanes, two right turn lanes, paved shoulder, grass swale, barrier wall.
- Utilities
  - Utility impacts will be assessed during the design process.