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I-295 at Collins Road

Interchange Operational Analysis Report

Re-Evaluation

PREPARED BY:
Florida Department of Transportation District Two
1109 S. Marion Avenue
Lake City, FL 32025

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FLORIDA DEPARTMENT OF TRANSPORTATION

Planning and Environmental Management Office

District Two
1109 South Marion Avenue
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February 6, 2020
Financial Project Identification: 439484-1
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Duval County, Florida

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SYSTEMS IMPLEMENTATION OFFICE

QUALITY CONTROL CERTIFICATION FOR INTERCHANGE ACCESS REQUEST SUBMITTAL

Submittal Date: 02/06/2020

FM Number: 439484-1

Project Title: I-295 Interchange at Collins Road

District: Two

Requestor: Michael Brock Phone: 386-961-7707

District IRC: David Tyler Phone: 386/961-7842

Document Type: ☐ MLOU ☐ IJR ☐ IMR ☒ IOAR ☐ OTHER (Specify)

Status of Document (Only complete documents will be submitted for review; however, depending on the complexity of the project, interim reviews may be submitted as agreed upon in the MLOU)

Quality Control (QC) Statement

This document has been prepared following FDOT Procedure Topic No. 525-030-160 (New or Modified Interchanges) and complies with the FHWA two policy requirements. Appropriate District level quality control reviews have been conducted and all comments and issues have been resolved to their satisfaction. A record of all comments and responses provided during QC review is available in the project file or Electronic Review Comments (ERC) system.

Requestor Michael Brock Date: 2/6/2020
[SIGN NAME]

IRC [signature] Date: 2/6/2020
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Interchange Operational Analysis Report (IOAR)

I-295 at Collins Road Interchange Improvements

Re-Evaluation

FPID: 439484-1

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	DocuSigned by: Michael Brock 9BAE9B0CF48E416... Michael Brock, PE FDOT District Two	2/7/2020 | 8:00 AM EST Date
Interchange Review Coordinator	DocuSigned by: 718194A7584B44F... David Tyler, PE, AICP District Two	2/7/2020 | 8:11 AM EST Date
Systems Management Administrator	DocuSigned by: Jenna Bowman 4AD03E6A337F4C1... Jenna Bowman, PE Systems Implementation Office – Central Office	2/24/2020 | 8:02 AM EST Date
State Chief Engineer	DocuSigned by: Will Watts 022E6284290B41A... Will Watts, PE Central Office	2/24/2020 | 8:10 AM EST Date

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Executive Summary

The purpose of this IOAR is to re-evaluate what enhancements can be programmed to improve the ramp intersection operations, adjacent intersection operations and reduce congestion at the Collins Road at I-295 Interchange. The goal of the improvements is to increase the efficiency at the Collins Road study intersections while minimizing right-of-way and bridge impacts.

The primary need for this project is to ease existing and future traffic congestion and delay at the study intersections. In addition, planned developments in the area will also increase traffic in an already congested area furthering the need to these enhancements. If improvements are not made to the study intersections, traffic operations within the study area will continue to deteriorate as traffic and future developments continue to grow.

Two Alternatives were evaluated to address the purpose and need for this project, the Approved Build Alternative and the Proposed Build Alternative. The Proposed Build Alternative implements improvements to the Collins Road from west of the I-295 southbound on and off ramps east to Plantation Bay Drive, along Collins Road.

Based on the evaluations in this report, the recommended alternative for approval in this study is the Proposed Build Alternative.

FHWA POLICY POINTS

FHWA Policy Point 1

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, and ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis should, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (Title 23, Code of Federal Regulations (CFR), paragraphs 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, should 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 should 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 should also include a conceptual plan of the type and location of the signs proposed to support each design

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alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d)).

The operational analysis conducted for the improvements of Collins Road at I-295 Interchange, and surrounding intersections, confirm that the proposed enhancements are not expected to have any significant adverse impacts on safety or operations on I-295 or Collins Road. The Proposed Build Alternative improvements will improve the delay at the study Interchange, while also improving the delay at the surrounding intersections reducing crashes resulting from heavy congestion. In addition, the queuing on the I-295 Off ramps will not back up into the I-295 Collector Distributor system mainline through lanes, thus improving safety when compared to the Approved Build Alternative.

The Proposed Build Alternative will not involve any new mainline access points or changes in traffic movements when compared to the Approved Build Alternative.

FHWA Policy Point 2

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, such as managed lanes (e.g., transit or high occupancy vehicle and high occupancy toll 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)). In rare instances where all basic movements are not provided by the proposed design, the report should include a full-interchange option with a comparison of the operational and safety analyses to the partial-interchange option. The report should also include the mitigation proposed to compensate for the missing movements, including wayfinding signage, impacts on local intersections, mitigation of driver expectation leading to wrong-way movements on ramps, etc. The report should describe whether future provision of a full interchange is precluded by the proposed design.

The proposed enhancements to the Collins Road at I-295 Interchange and study intersections will provide full access and cater to all traffic movements from Collins Road to and from I-295.

The basis for traffic development and project information used in this Interchange Operational Analysis Report (IOAR) are Traffic Turning Movement counts (TMC) performed on March 14, 2017, 2016 Florida Traffic Information (FTI) DVD, 2014 I-295 (SR 9A) Western Beltway Express Lanes Feasibility Study – I-295/Collins Road Interchange Traffic Exercise, The Northeast Regional Planning Model-Activity Based (NERPM AB1 v2_422) and the ITE Trip Generation Manual, 9th edition. The analysis years for this study include the Opening Year 2020 and the Design Year 2030. The operational analysis for the study was performed using Synchro Version 10.

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Appendix A Traffic Development Report
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Appendix D Safety Analysis

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1.0 Introduction

1.1 Background

The Florida Department of Transportation (FDOT) District Two is requesting approval for the Re-evaluation to the approved I-295 at Collins Road interchange IOAR, located within the City of Jacksonville, Florida.

The existing roadway network consists of I-295, which is a six lane Interstate Roadway section, classified as an urban principal arterial interstate with a posted speed limit of 65 mph and Collins Road, a four lane arterial that connects to the I-295 Collector-Distributor (C-D) roadway near the interchange of Collins Road and I-295. Collins Road is a major corridor with many residential and commercial properties adjacent to it.

This Re-evaluation focuses on the approved "Jug Handle" intersection, located just west of the Collins Road at Plantation Bay Drive intersection from the Approved Build Alternative and the intersection of Collins Road and Plantation Bay Drive. The Approved Build Alternative includes intersection improvements at the Collins Road and I-295 Off Ramp, as well as Collins Road and I-295 northbound off ramp and for the eastbound Collins Road left turning traffic that wants to access I-295.

The Proposed Build Alternative will modify the approved "Jug Handle" concept and replace it with a median U-turn. This improvement will increase the storage capacity for the westbound traffic on Collins road between I-295 and Plantation Bay Drive and improve the delay for the southbound I-295 off-ramp to eastbound Collins Road.

1.2 Purpose and Need

The purpose of this project is to enhance the traffic operations and safety at the interchange of I-295 and Collins Road, as well as the surrounding intersections. Improvements are aimed at increasing the overall operations of the Collins Road intersections with minimizing impacts to the corridor's right-of-way.

The need for this project is to ease existing and future congestion and delay within the corridor. Furthermore, anticipated planned developments in the area will increase traffic and congestion furthering the need for these improvements. If no improvements are made to the interchange and surrounding intersections, traffic operations will continue to deteriorate, and congestion will grow as traffic and future developments continue to grow.

1.3 Project Location

This project is located in Duval County, Florida at the I-295 Collector-Distributor System and Collins Road interchange, approximate MP 12.4, section number 72001000 (I-295). The interchange is located approximately 3.3 miles south of the I-295 and SR 134 (103rd St) interchange and approximately 0.8 miles north of the I-295 Collector-Distributor System and SR 21 (Blanding Blvd) interchange. The project location is shown in ***Figure 1-1***. The area of influence for the project includes the following interchanges:

- STUDY INTERCHANGE: I-295 AT COLLINS ROAD

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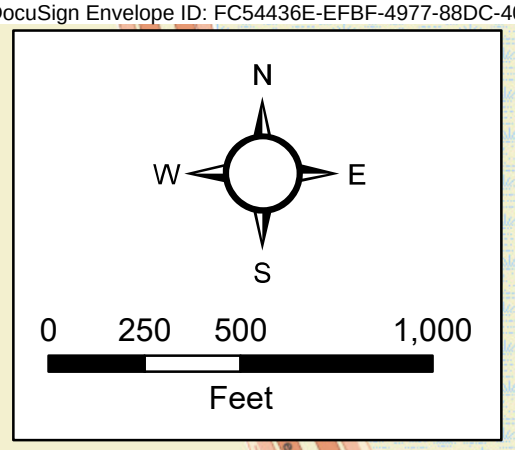

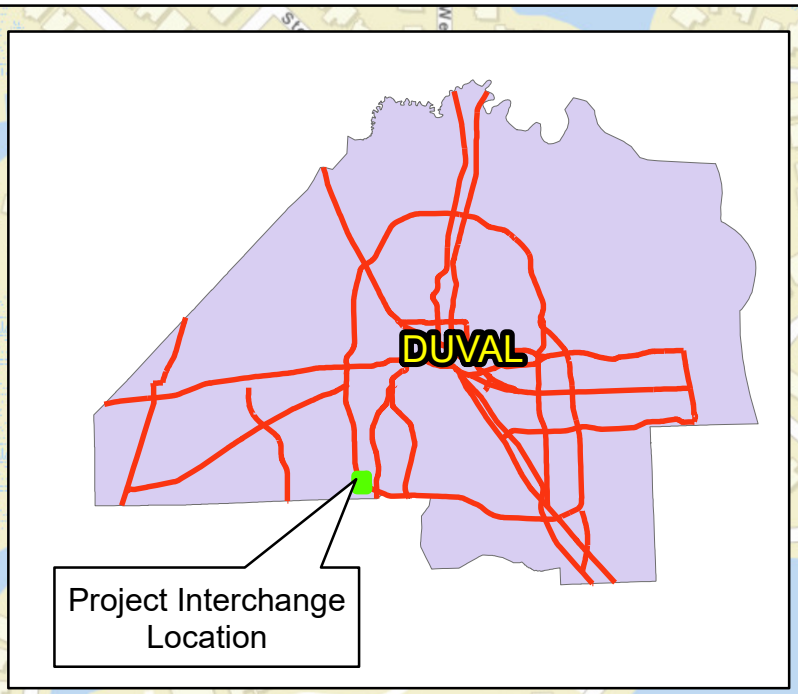

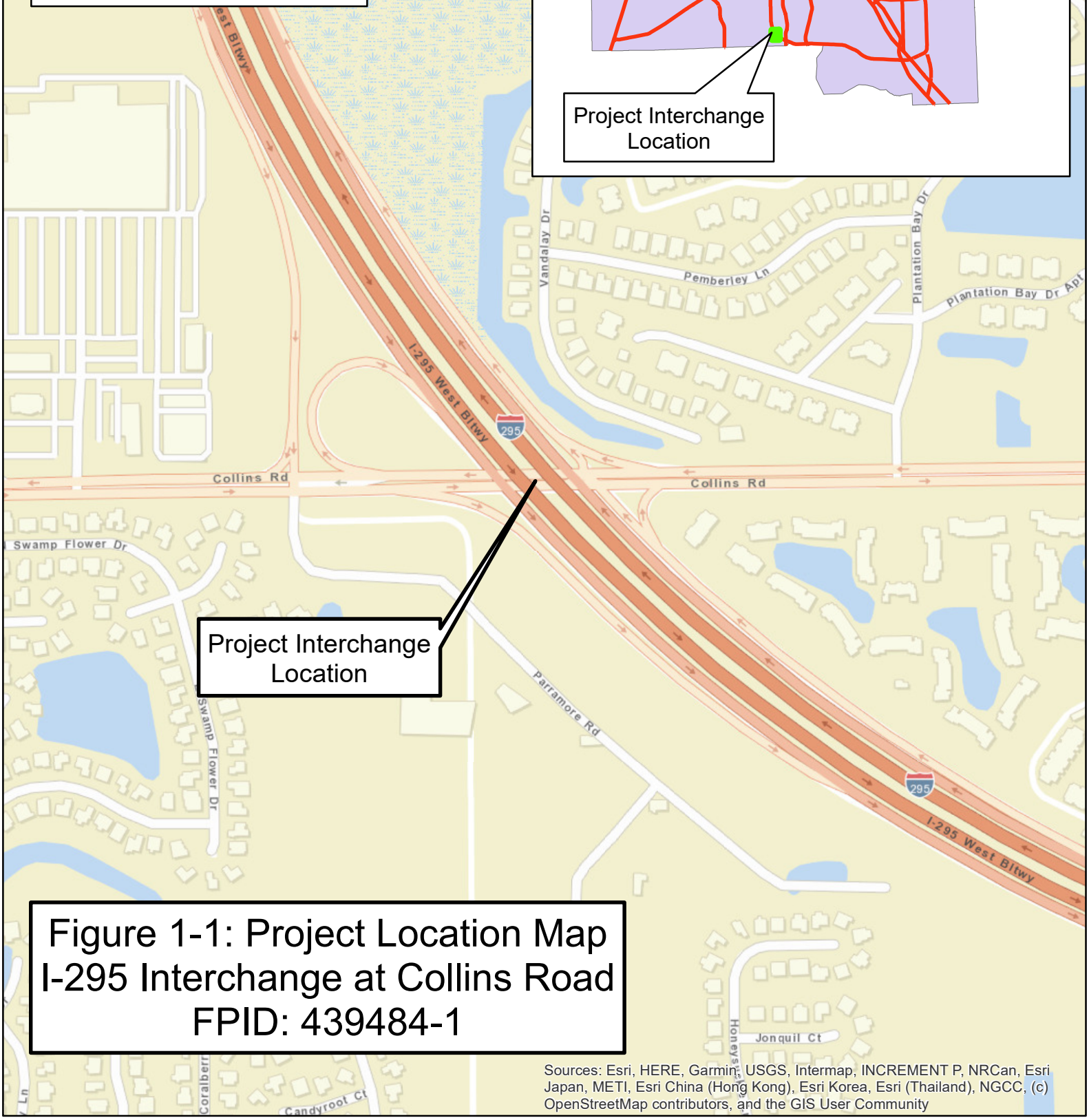

Figure 1-1: Project Location Map
I-295 Interchange at Collins Road
FPID: 439484-1

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

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1.4 Planned Development

Consideration was given to known planned developments that are located within the area of influence. The trip generation and distribution of the traffic generated by these developments is discussed in Section 2 of this IOAR. The following planned developments are expected to be open prior to Opening Year 2020.

COSTCO: The planned Costco is currently under construction and is located in the southwest quadrant of the I-295 at Collins Road interchange. The planned development will be 152,626 square feet.

1.5 Applicant Information

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2.0 Methodology

2.1 Overview

This section documents the traffic used in the preparation of this Re-evaluation. The existing and future traffic is based on a Traffic Development report conducted for the approved IOAR, which can be found in **Appendix A**.

This Re-evaluation effort compares the Approved Build Alternative and the Proposed Build Alternative for the AM and PM Design Year 2030.

2.2 Analysis Years

The following study years are established for this IOAR:

- Design Year: 2030

2.3 Area of Influence

The subject interchange is located in Duval County's urbanized area, near the southern border with Clay County. The subject interchange is approximately 3.3 miles south of the I-295 at SR 134 (103rd Street) interchange and 0.8 miles north of the I-295 at SR 21 (Blanding Blvd) interchange. The following major interchange has been analyzed.

- I-295 at Collins Road is approximately located at milepost 12.4 (Section No. 72001000). I-295 is an Urban Principal Arterial Interstate located within the urbanized section of Duval County.

The Major study corridor is Collins Road:

- Collins Road is a 4-lane divided Urban Major Collector within the study area and has a speed limit of 40 miles per hour.

The area of influence includes the adjacent signalized intersections along Collins Road, including the ramps at I-295. The intersections analyzed within the area of influence are listed below. The area of influence is shown in **Figure 2-1.**

- Collins Road at I-295 ramps
- Collins Road at Plantation Bay Drive

2.4 Data Collection and Sources

A traffic forecast was performed for the study area. The traffic data used for this report was developed based on traffic counts performed during the peak AM and PM periods on March 14, 2017. The design traffic forecasts are consistent with FDOT's Project Traffic Forecasting Handbook methodologies and guidelines. The Northeast Regional Planning Model-Activity Based (NERPM AB1 v2_422), 2014 I-295 (SR 9A) Western Beltway Express Lanes Feasibility Study, and the ITE Trip Generation manual, 9th edition were used to develop a compound annual growth rate.

The NERPM AB1 v2_422 model is based on the Florida Standard Urban Transportation modeling Structure (FSUTMS) and is recognized by both FDOT District TWO, as well as the North Florida Transportation Planning Organization (North Florida TPO) as an acceptable travel demand forecasting tool which has been used to develop traffic for several FDOT projects.

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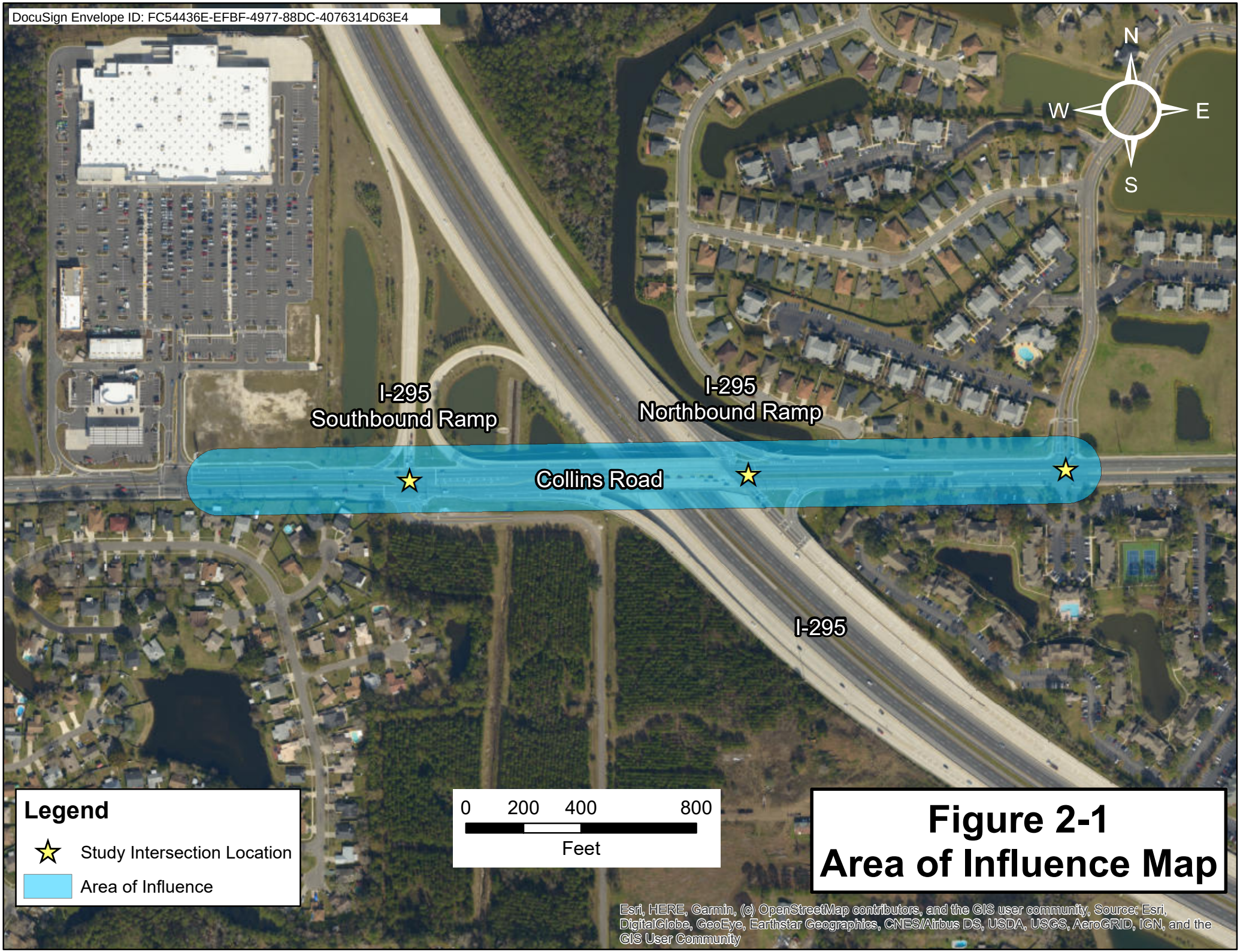

Figure 2-1
Area of Influence Map

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2.5 Travel Demand

A traffic forecast was performed for the study area and intersections. The Northeast Regional Planning Model-Activity Based (NERPM AB1 v2_422), 2014 I-295 (SR 9A) Western Beltway Express Lanes Feasibility Study, and the 2016 Florida Traffic Information (FTI) DVD were used to develop the future traffic. Additionally, the ITE Trip Generation Manual was used to account for the planned COSTCO opening in the southwest quadrant of the I-295 at Collins Road interchange. The trip generation turning movement volumes for the planned development were then added to the volumes developed above.

2.6 Traffic Operational Analysis

Traffic operational analyses have been conducted for the design year of 2030 for the Approved Build Alternative and the Proposed Build Alternatives.

Intersection analysis has been conducted for the I-295 at Collins Road and surrounding intersection using Synchro Version 10.

2.7 Future Traffic Forecast

2017 traffic volumes were collected at the five study intersections along Collins Road. The 2017 peak hour TMCs were checked for reasonableness and balanced along Collins Road. A compound annual growth rate (CAGR) of 2.0% was then developed for the study area by comparing the growth rates from the NERPM model, I-295 Western Beltway Express Lanes Feasibility Study – I-295/Collins Road Interchange Traffic Exercise, and the 2016 FTI DVD historical AADTs. The developed 2.0% CAGR was then applied to the 2017 TMCs to determine Opening Year 2020 and Design Year 2030 TMCs.

Trip generation for the planned Costco development was performed with the ITE Trip Generation Manual, 9th Edition, since it is not included in the most recent NERPM AB model. The planned Costco will be located at the Southwest Quadrant of the I-295 at Collins Road interchange (I-295 SB Southbound Ramps/Parramore Road). The Costco is a retail development planned for a size of 152,626 square feet. The site is expected to generate 75 AM trips and 638 PM trips. The traffic generated from the Costco development was then distributed throughout the study area and added to the future TMCs.

3.0 Approved Build Alternative

The portion of the Approved Build Alternative that we will be analyzed for this e-evaluation is from the I-295 southbound off ramp/Parramore Road at Collins Road to east of the I-295 at Collins Road interchange at Collins Road at Plantation Bay Drive. The only deviation from the Approved Build Alternative is a signal that was recently added for Collins Road at Plantation Bay Drive intersection by the local municipality. Everything West of the I-295 at Collins Road interchange has remained unchanged from the Approved Build Alternative. The Approved Build Alternative includes the following improvements:

- I-295 NB On/Off Ramp at Collins Road
    - Westbound
        - Remove right turn lane and include it as a weaving zone
    - Eastbound

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- Remove NB left turn from the signal and create a new signal approximately 700 feet East of existing signal into a "Jug-Handle" for the eastbound to northbound movement onto I-295

- Collins Road at Plantation Bay Drive
  - Recently constructed signalized intersection at Collins Road and Plantation Bay Drive

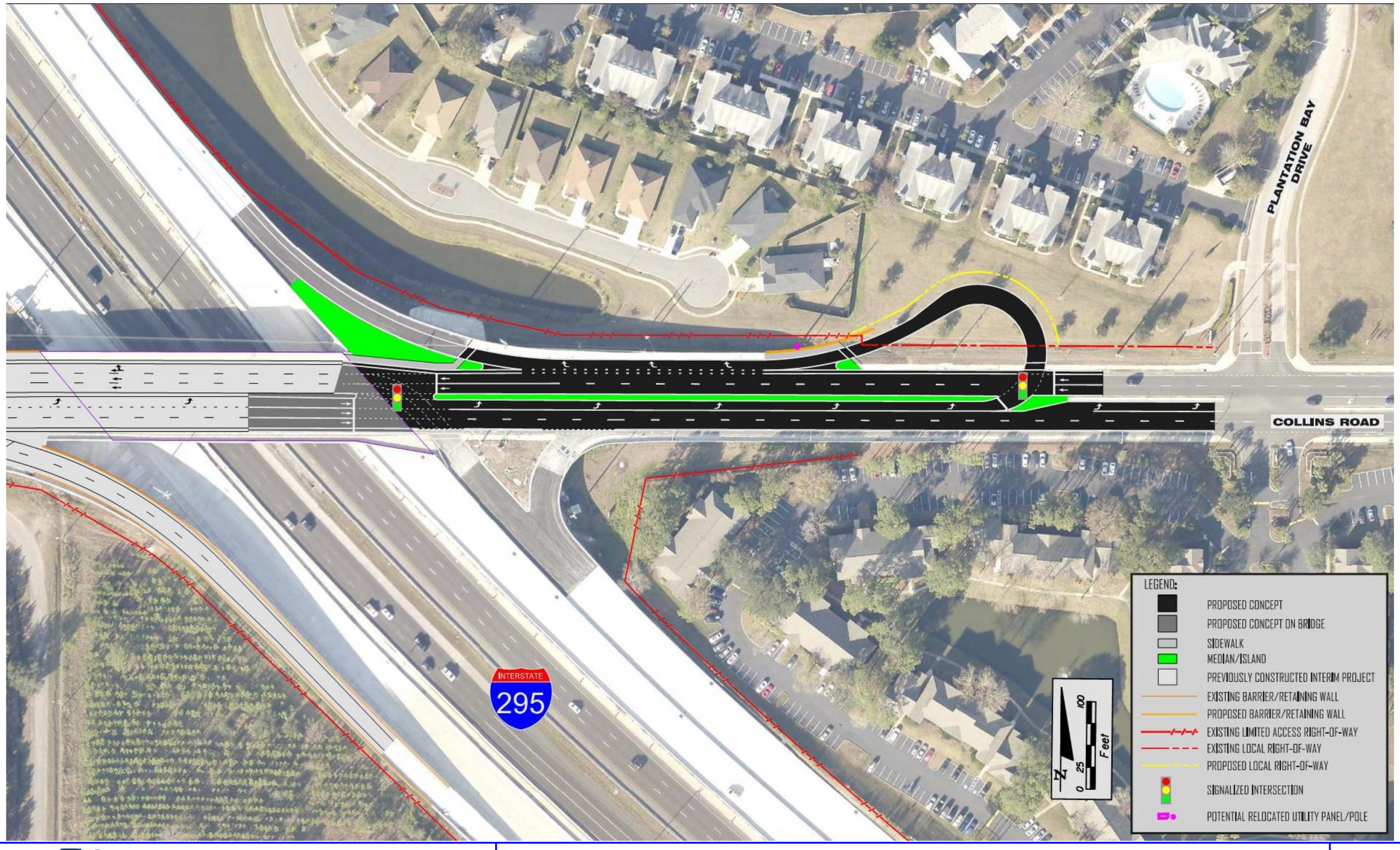
The Approved Build Alternative concept is shown in **Figure 3-1.**

The results for the intersection analysis for the Design Year 2030 of the Approved Build Alternative are shown in **Table 3-1**. The Synchro analysis reports are provided in **Appendix B.**

Table 3-1
Design Year 2030 Approved Build Alternative Intersection Analysis Results

Intersection	AM Peak Hour		PM Peak Hour	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Collins Road at I-295 SB Off-Ramp/Paramore Road	29.0	C	36.4	D
Collins Road at I-295 NB On-Ramp	66.3	E	12.0	B
Collins Road at I-295 NB Off-Ramp	15.2	B	25.6	C
Collins Road at Plantation Bay Drive	16.8	B	26.4	C
Total Delay (veh/sec)	127.3		100.4	

The Design Year 2030 of the Approved Build Alternative shows that all affected intersections will operate at a LOS 'D' or better, with the exception of the Collins Road at I-295 northbound on-ramp, which operates at a LOS 'E'. **Table 3-2** shows the LOS and delay, in seconds, of all the Design Year 2030 movements.



Approved Build Alternative Concept

Figure 3-1

Table 3-2
Approved Build Alternative Operation and Delay Analysis

Operational Movement	AM Movements		PM Movements	
	LOS	Total Delay (sec)	LOS	Total Delay (sec)
Collins Road at Plantation Bay Drive				
Eastbound Left	B	14.4	D	41.7
Eastbound Through	B	17.0	B	18.8
Westbound Left	B	15.2	A	8.9
Westbound Through	C	22.1	C	34.9
Northbound Through	B	12.9	B	12.3
Southbound Through	B	16.9	B	18.3
Southbound Right	A	5.2	A	8.9
I-295 Southbound Off-Ramp/Parramore Road at Collins Road				
Eastbound Through	C	22.5	C	28.7
Westbound Left	B	11.4	E	57.2
Westbound Through	A	6.7	B	18.3
Northbound Right	A	0.3	C	26.2
Northbound Left	D	47.4	E	66.5
Southbound Through	D	43.7	C	33.0
Southbound Left	E	69.0	D	40.7
Southbound Right	F	103.7	F	101.2
I-295 Northbound Off-Ramp at Collins Road				
Eastbound Through	B	19.0	C	28.9
Westbound Through	A	9.2	C	22.1
Westbound Right	A	2.9	A	3.9
Northbound Left	B	18.8	C	31.7
Northbound Right	A	7.5	A	9.6
Collins Road at turn onto I-295 Northbound				
Eastbound Left	F	87.0	C	27.6
Eastbound Through	A	0.2	A	0.3
Westbound Through	F	113.7	B	17.0

When analyzing the movements that will operate below LOS 'D' in the Approved Build Alternative, a large amount of delay can be seen occurring at the Collins Road eastbound to I-295 northbound turn (the eastbound left) movement, the Collins Road westbound through at I-295 northbound ramps, as well as at the I-295 southbound off-ramp/Parramore Road at Collins Road southbound right and left turning movements. These delays are due to the amount of congestion along Collins Road and are greatly improved upon the existing condition that was shown in the approved IOAR for I-295 at Collins Road.

Table 3-3 summarizes the results of the Design Year 2030 95th percentile queuing analysis for the study intersections in the AM and PM peak hours for the Approved Build Alternative. The analysis shows that the queues on the off ramps will not back up to the I-295 C-D system through lanes in the Design Year 2030. The southbound approach queues will go beyond the available storage, however they will not back up to I-295 C-D system.

Table 3-3 Design Year 2030 Approved Build Alternative 95th Queuing Analysis Results

Intersection	Time Period	Eastbound			Westbound			Northbound			Southbound		
		Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Collins Road at I-295 SB Off-Ramp/Paramore Road	AM Peak		#835		12	86		8		0	#162	16	#190
	PM Peak		438		#149	401		#71		#75	171	55	#322
	Build Storage (ft)				335					250			
Collins Road at I-295 NB On-Ramp	AM Peak	#1462	0			#666							
	PM Peak	#275	0			255							
	Build Storage (ft)	630											
Collins Road at I-295 NB Off-Ramp	AM Peak		#319			75	41	107		28			
	PM Peak		#342			234	50	#448		71			
	Build Storage (ft)						350						
Collins Road at Plantation Bay Drive	AM Peak	58	#296		12	170			48			43	61
	PM Peak	#166	#278		18	#354			34			31	69
	Build Storage (ft)	250			150								

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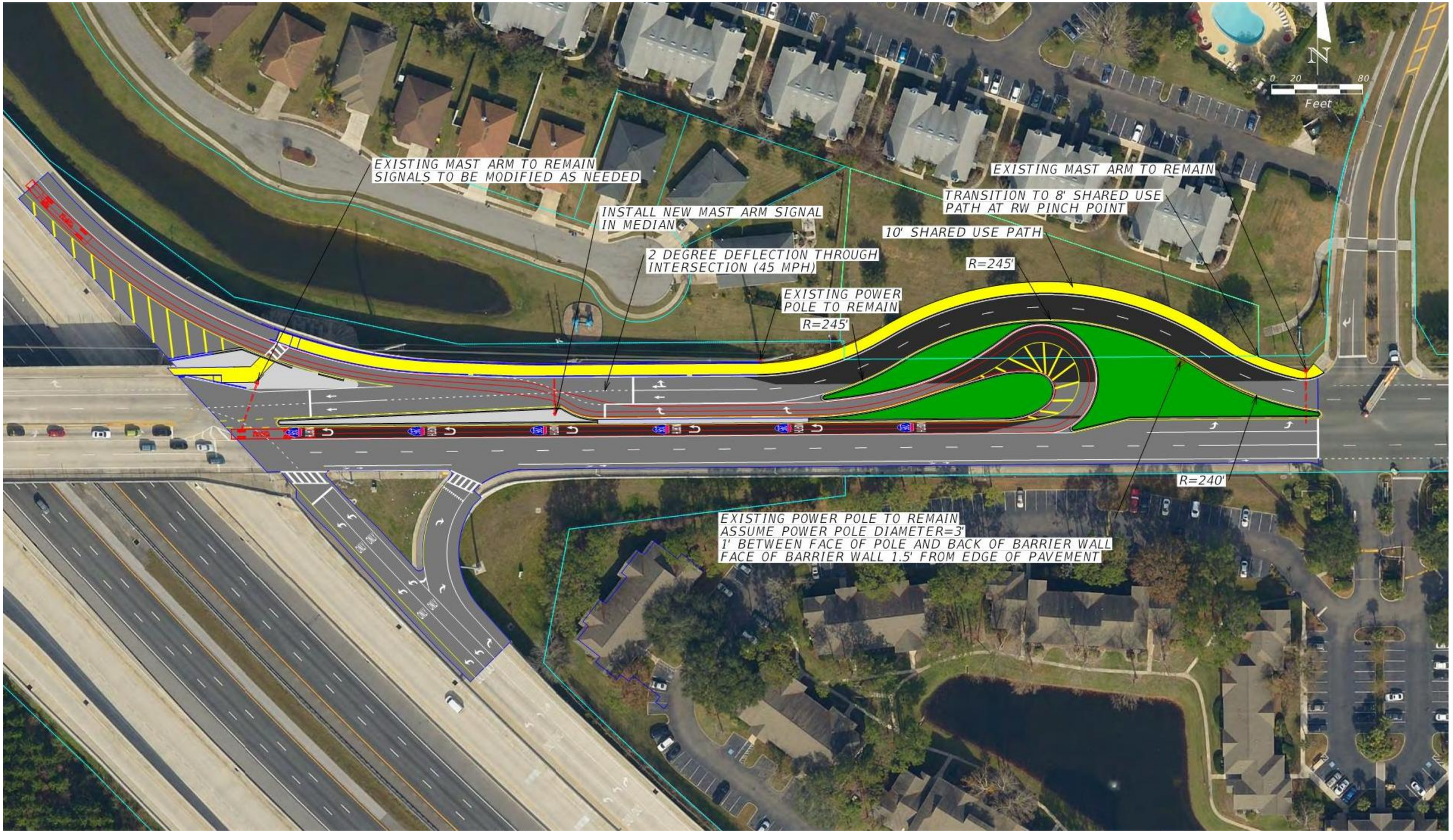
4.0 Proposed Build Alternative

The Proposed Build Alternative modifies the approved 'Jug Handle' concept. The approved Collins Road eastbound to I-295 northbound movement has eastbound traffic travel through the existing intersection near the northbound C-D road, to a new signal, where the movement is made through a 'jug handle' movement merging with the westbound right turn movement to access I-295. The Proposed Build Alternative can be seen in **Figure 4-1**. The Proposed Build Alternative includes the following improvements:

- I-295 NB On/Off Ramp at Collins Road
  - Westbound
    - Curve westbound traffic around proposed median U-turn to create longer storage lane in the westbound direction. The westbound to northbound movement at the signal will have a combined through/right outside lane.
  - Eastbound
    - Remove northbound left turn from the signal and extend eastbound into a new lane that has a free-flowing U-turn approximately 700 feet East of existing signal
    - Construct free flowing U-turn movement for access to I-295 NB
- Collins Road at Plantation Bay Drive
  - Recently constructed signalized intersection at Collins Road and Plantation Bay Drive

The Proposed Build Alternative significantly improves the Collins Road eastbound to I-295 northbound movement. It also improves the westbound storage between Plantation Bay Drive and I-295 northbound on-ramp. The Approved Build, in conjunction with the new signal at Collins Road and Plantation Bay Drive, limits the storage capacity for westbound traffic for the Plantation Bay drive residents to leave the residential area and store near the traffic signal for eastbound left turn and is expected to backup into the adjacent signal possibly impeding traffic operations. The Proposed Build Alternative increases the storage westbound, thus reducing the potential for vehicle queues preventing motorists from Plantation Bay Drive from accessing westbound Collins Road. In addition, the Proposed Build Alternative also improves the operational flow of the eastbound movement at the Collins Road at I-295 northbound on and off ramps during the AM peak. The improved flow reduces the delay shown in the I-295 southbound off-ramp left onto Collins road. The results for the intersection analysis for the Design Year 2030 of the Proposed Build Alternative are shown in **Table 4-1**. The Synchro analysis reports are provided in **Appendix C.**



Proposed Build Alternative Concept

Figure 4-1

Table 4-1
Design Year 2030 Proposed Build Alternative Analysis Results

Intersection	AM Peak Hour		PM Peak Hour	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Collins Road at I-295 SB Off-Ramp/Paramore Road	20.5	C	36.8	D
Collins Road at I-295 NB On-Ramp	31.0	C	13.0	B
Collins Road at I-295 NB Off-Ramp	10.0	B	38.5	D
Collins Road at Plantation Bay Drive	17.4	B	25.0	C
Total Delay (veh/sec)	78.9		113.3	

The Design Year 2030 of the Proposed Build Alternative shows that all affected intersections will operate similar to the Approved Build Alternative at a LOS 'D' or better. **Table 4-2** show the LOS and delay, in seconds, of all the Design Year 2030 movements:

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Table 4-2
Proposed Build Alternative Operation and Delay Analysis

Operational Movement	AM Movements		PM Movements	
	LOS	Total Delay (sec)	LOS	Total Delay (sec)
Collins Road at Plantation Bay Drive				
Eastbound Left	B	11.4	D	35.8
Eastbound Through	B	10.7	B	17.0
Westbound Left	C	20.7	B	15.4
Westbound Through	C	26.3	C	34.9
Northbound Through	C	31.2	B	12.3
Southbound Through	D	37.9	B	18.3
Southbound Right	B	11.5	A	4.2
I-295 Southbound Off-Ramp/Parramore Road at Collins Road				
Eastbound Through	B	18.5	C	28.7
Westbound Left	A	7.8	E	72.8
Westbound Through	A	0.9	B	18.3
Northbound Right	A	0.3	C	26.2
Northbound Left	D	49.6	E	66.5
Southbound Through	D	43.7	C	33.0
Southbound Left	D	52.1	D	40.7
Southbound Right	E	57.4	F	101.2
I-295 Northbound Off-Ramp at Collins Road				
Eastbound Through	A	2.7	C	28.3
Westbound Through	A	2.2	E	72.3
Northbound Left	D	49.4	C	32.5
Northbound Right	C	33.9	B	12.8
Collins Road at turn onto I-295 Northbound				
Westbound Right	D	51.8	D	35.3
Eastbound Through	A	2.4	A	0.5
Westbound Through	E	70.5	C	21.3

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It is important to note that both the Approved Build Alternative and the Proposed Build Alternative will operate similarly to one another, with the Proposed Build Alternative operating significantly better during the AM peak.

When analyzing the turning movements that operate below LOS 'D', we still see a large amount of delay at the Collins Road at the I-295 northbound turn (eastbound left), and the I-295 southbound off-ramp/Parramore Road at Collins Road intersection southbound right movement. While the LOS is still below LOS 'D' for some of these movements, we see the I-295 southbound left onto Collins Road improves from a LOS 'E' to a LOS 'D' due to the improved flow of the eastbound traffic. While this Proposed Build Alternative does not solve all the issues due to the congestion in the area, it does help move traffic off I-295 more efficiently than that of the Approved Build Alternative. It is important to note that both the Approved Build Alternative and the Proposed Build Alternative will operate similarly to one another, with the Proposed Build Alternative operating better in the AM condition, especially the eastbound traffic. The Proposed Build Alternative operates better in the AM peak hour by allowing the eastbound traffic, in particular the eastbound Collins Road to I-295 Northbound, to move more efficiently. In addition, it helps with the westbound traffic at Collins Road and Plantation Bay Drive by giving longer westbound through movement storage.

Table 4-3 summarizes the results of the Design Year 2030 95th percentile queuing analysis for the study intersections in the AM and PM peak hours. This analysis shows that 95th percentile queues in the Proposed Build Alternative. The analysis shows that the queues on the off ramps will not back up to the I-295 C-D system through lanes in the Design Year 2030. The southbound approach queues will go beyond the available storage, however they will not back up to I-295 C-D system. The queue lengths are similar in impact to the Approved Build Alternative.

Table 4-3 Design Year 2030 Proposed Build Alternative 95th Queuing Analysis Results

Intersection	Time Period	Eastbound			Westbound			Northbound			Southbound		
		Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Collins Road at I-295 SB Off-Ramp/Paramore Road	AM Peak		#856		m8	10		8		0	#161	16	#191
	PM Peak		438		#149	401		#71		#75	171	55	#322
	Build Storage (ft)				335					250			
Collins Road at I-295 NB On-Ramp	AM Peak		32			#510	#1167						
	PM Peak		0			#302	#343						
	Build Storage (ft)						1175						
Collins Road at I-295 NB Off-Ramp	AM Peak		30			m4		204		74			
	PM Peak		#342			234		#448		86			
	Build Storage (ft)							350					
Collins Road at Plantation Bay Drive	AM Peak	m56	217		16	253			95			78	132
	PM Peak	#165	#278		27	#354			34			31	41
	Build Storage (ft)	250			150								

5.0 Safety

5.1 Safety Analysis Methodology and Data Collection

A safety analysis was performed on the collected data using methodology outlined in the FDOT Highway Safety Manual. Crash Modification Factors (CMF) from the Federal Highway Administration's online clearinghouse were reviewed, but due to the unique configuration of the Proposed Build Alternative, there were no applicable CMFs in the clearinghouse available for this concept. The previously Approved Build Alternative safety analysis used FDOT specific Crash Reduction Factors (CRF) from the Crash Reduction Analysis System Hub (CRASH) maintained by the FDOT Safety Office.

The following CRFs were previously used to perform a safety analysis of the Approved Build Alternative:

- Add turn lane(s) and pavement resurfacing – 35%
- Modify Intersection at signalized intersection – 6%

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Historical crash data for the project study area was obtained for a five-year crash period, 2012 through 2016, along the Collins Road mainline at I-295 study C-D system interchange ramps and also at the intersections of Plantation Bay Drive, Rampart Road, Parramore Road, and Star Rush Road/Collins Crossing. The data obtained included crash volume, type, location severity and property damage along with driver information and incident descriptions as recorded by emergency responders. Traffic data from Florida traffic online and the previously Approved Build Alternative IOAR was also used in this analysis. A detailed safety analysis for the Proposed Build Alternative can be found in **Appendix D.**

5.2 Summary of Safety Analysis Results

The crash reduction analysis performed for the Proposed Build Alternative yielded an expected Annual Reduction in Crashes of 12.4. There are additional safety benefits expected to be realized with the Proposed Build Alternative which cannot be quantified given the limitations of CRFs and CMFs. Specifically, for the Collins Road at I-295 Northbound Ramps intersections, the Proposed Build Alternative at the Northbound ramps will extend the storage available for the Collins Road Eastbound to I-295 Northbound movement which should reduce rear-end crashes in the queue and some angle crashes at the adjacent intersections. The Proposed Build Alternative will also help to eliminate the weave along Collins Road in the westbound direction which should reduce the number of sideswipe crashes. A detailed safety analysis for the Proposed Build can be found in **Appendix D**.

6.0 Project Funding and Schedule

This project has a production date of 11/08/2019, with a letting date of 04/22/2020. It has federal funding under the Federal Project Number D217-133-B.

7.0 Summary and Recommendation

The purpose of this Re-evaluation is to analyze the operational improvements between the Approved Build Alternative and the Proposed Build Alternative at the I-295 at Collins Road interchange. The Re-evaluation proposes to change the approved “Jug Handle” concept into a median U-turn for the Collins Road eastbound to I-295 northbound movement. While both movements operate similarly, the Proposed Build Alternative significantly improves the AM peak operations on the Collins Road eastbound movement to I-295 northbound (The median U-turn). While there is a decrease in operations during the PM peak, it is outweighed when compared to the AM peak improvement, which improves the failing Collins Road at I-295 northbound On-Ramp intersection from a LOS ‘E’ to a LOS ‘C’. Due to the nature and location of the “Jug Handle”, there is limited storage for the Collins Road westbound movement. The Proposed Build Alternative improves upon this by allowing a free flow U-turn movement, instead of a signalized left turn for the Collins Road eastbound to I-295 northbound movement, giving additional storage space for the Collins Road westbound movement. A table showing the comparison between the Approved Build Alternative and Proposed Build Alternative is shown in **Table 7-1.**

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Table 7-1
Design Year 2030 Approved Build Alternative vs. Proposed Build Alternative Intersection Comparison

Intersection	2030 Approved Build Alternative				2030 Proposed Build Alternative			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Collins Road at I-295 SB Off-Ramp/Paramore Road	29.0	C	36.4	D	20.5	C	36.8	D
Collins Road at I-295 NB On-Ramp	66.3	E	12.0	B	31.0	C	13.0	B
Collins Road at I-295 NB Off-Ramp	15.2	B	25.6	C	10.0	B	38.5	D
Collins Road at Plantation Bay Drive	16.8	B	26.4	C	17.4	B	25.0	C

Since the operation and delay of the Proposed Build Alternative are better than the Approved Build Alternative, as well as the increased storage for the eastbound Collins to Northbound I-295, The Proposed Build Alternative is the preferred alternative for construction.

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APPENDIX A

Traffic Development Report

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I-295 at Collins Road – Traffic Development

Objective

The objective of this document was to develop a methodology for existing and future traffic development, and perform the traffic forecasting for the I-295 at Collins Road Interchange Operational Analysis Report (IOAR).

Peak hour turning movement volumes were developed for the Existing Year 2017, Opening Year 2020 and Design Year 2030. Future traffic development must also incorporate the planned COSTCO opening in the southwest quadrant of the I-295 at Collins Road interchange. The planned development will be 152,626 square feet, and accounted for using trip generation performed with the ITE Trip Generation Manual, 9th Edition.

Data Source

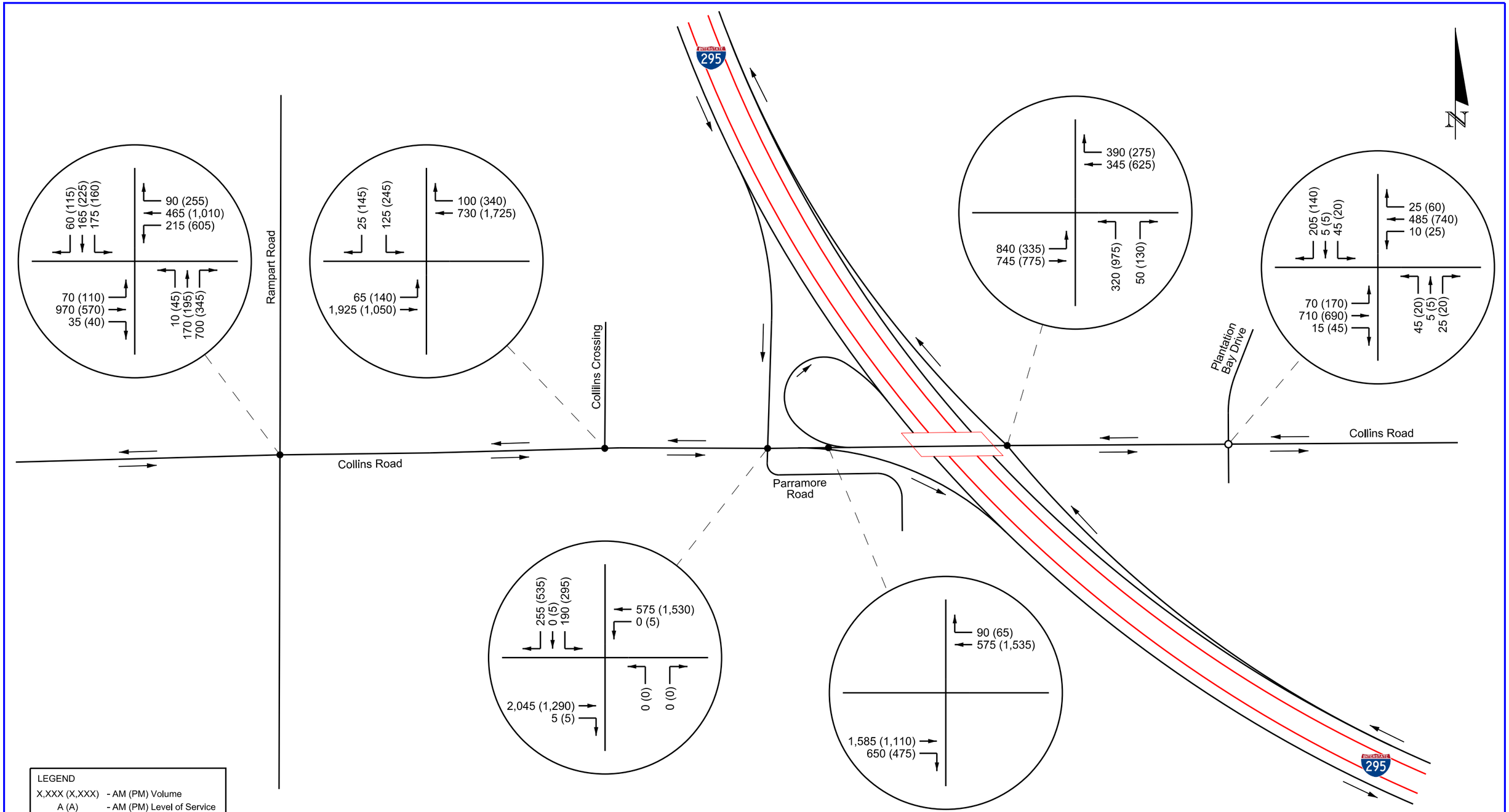
- 2016 Florida Traffic Information (FTI) DVD
- Three hour Traffic Turning Movement Counts (TMC) performed on March 14, 2017 from 6:00 AM to 9:00 AM and 4:00 PM to 7:00 PM
- 2014 I-295 (SR 9A) Western Beltway Express Lanes Feasibility Study – I-295/Collins Road Interchange Traffic Exercise submitted May 2015
- Northeast Regional Planning Model-Activity Based (NERPM AB1 v2_422)
- ITE Trip Generation Manual, 9th Edition

Information and Assumptions

- Reviewed NERPM model to confirm the project area geometry.
- A COSTCO (Discount Club) has an AM peak hour trip generation rate of 0.49 per 1,000 square feet and a PM peak hour trip generation rate of 4.18 per 1,000 square feet. Using this information, 75 AM trips and 638 PM trips are expected to be generated due to the planned COSTCO.

Process

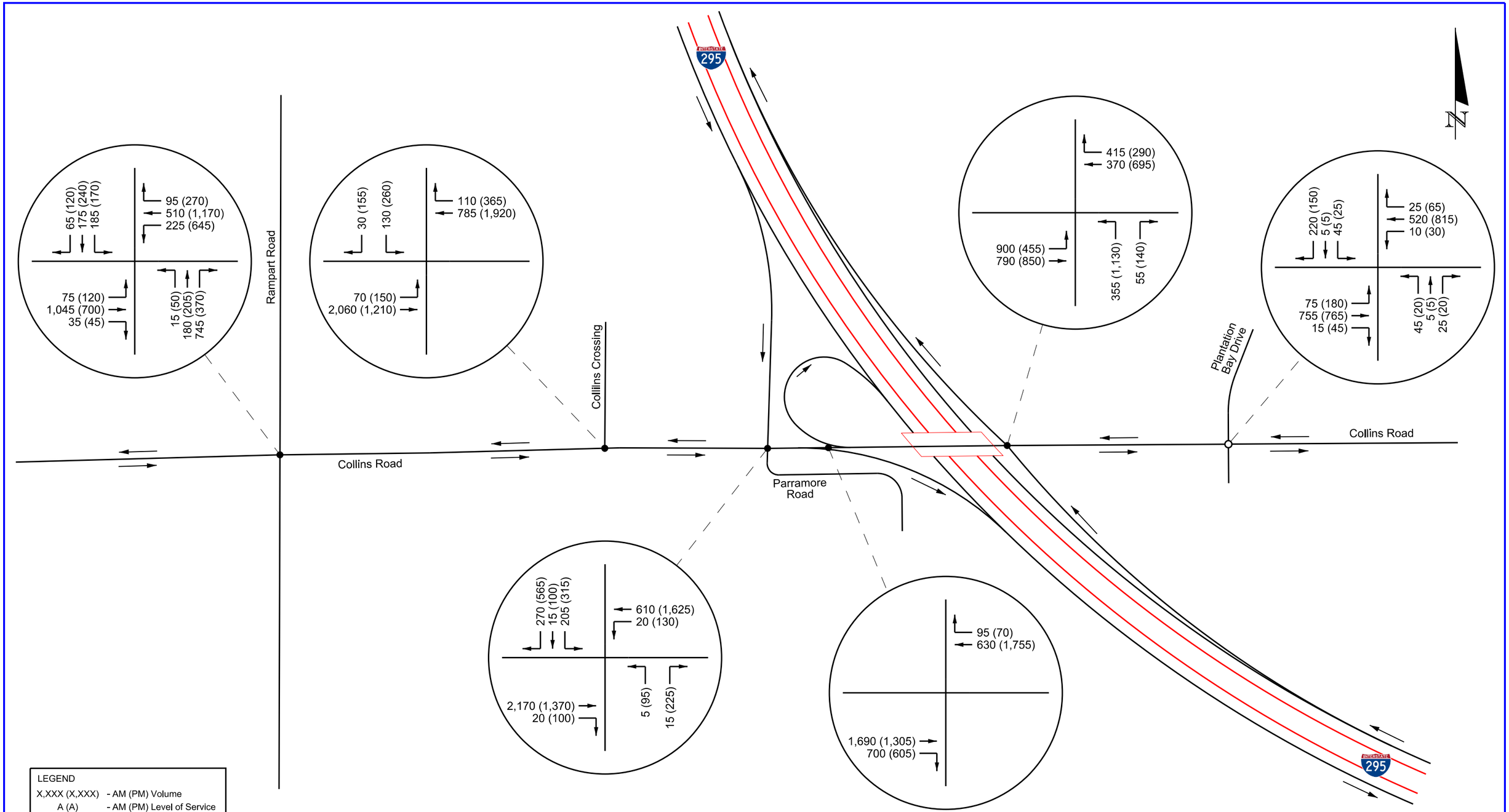
- 2017 traffic volumes were collected at the following five intersections along Collins Road: Rampart Road, Collins Crossing (Walmart), I-295 Southbound Ramps/Parramore Road, I-295 Northbound Ramps and Plantation Bay Drive.
- The 2017 peak hour TMCs were checked for reasonableness and balanced along Collins Road.
    - Two intersections had peak hours that varied from the common peak hour of the other intersections along Collins Road. The common peak hour for the AM was 7:15 AM to 8:00 AM and the PM was 4:00 PM to 5:00 PM. The AM peak hour had to be adjusted for Collins Road at I-295 Southbound Ramps/Parramore Road, and the PM peak hour had to be adjusted for Collins Road at Plantation Bay Drive.
- A compound annual growth rate (CAGR) of 2.0% was then developed for the study area by comparing the growth rates from the NERPM model, I-295 Express Lanes Traffic Exercise and 2016 FTI DVD historical AADTs.
- The 2.0% CAGR was then applied to the 2017 TMCs to determine Opening Year 2020 and Design Year 2030 TMCs.
- The generated traffic from the COSTCO development was then distributed throughout the study area and added to the future TMCs.
- Final 2020 and 2030 TMCs were balanced and checked for reasonableness. Figures with the Existing Year 2017, Opening Year 2020 and Design Year 2040 TMCs are provided.



LEGEND

X,XXX (X,XXX)	- AM (PM) Volume
A (A)	- AM (PM) Level of Service
●	- Signalized Intersection
○	- Unsignalized Intersection

FDOT *I-295 at Collins Road* *Interchange Operational Analysis Report*	*Existing Year 2017* *Peak Hours Volumes*	*Figure* *1*



LEGEND

X,XXX (X,XXX)	- AM (PM) Volume
A (A)	- AM (PM) Level of Service
●	- Signalized Intersection
○	- Unsignalized Intersection

FDOT *I-295 at Collins Road* *Interchange Operational Analysis Report*	*Opening Year 2020* *Peak Hours Volumes*	*Figure* *2*

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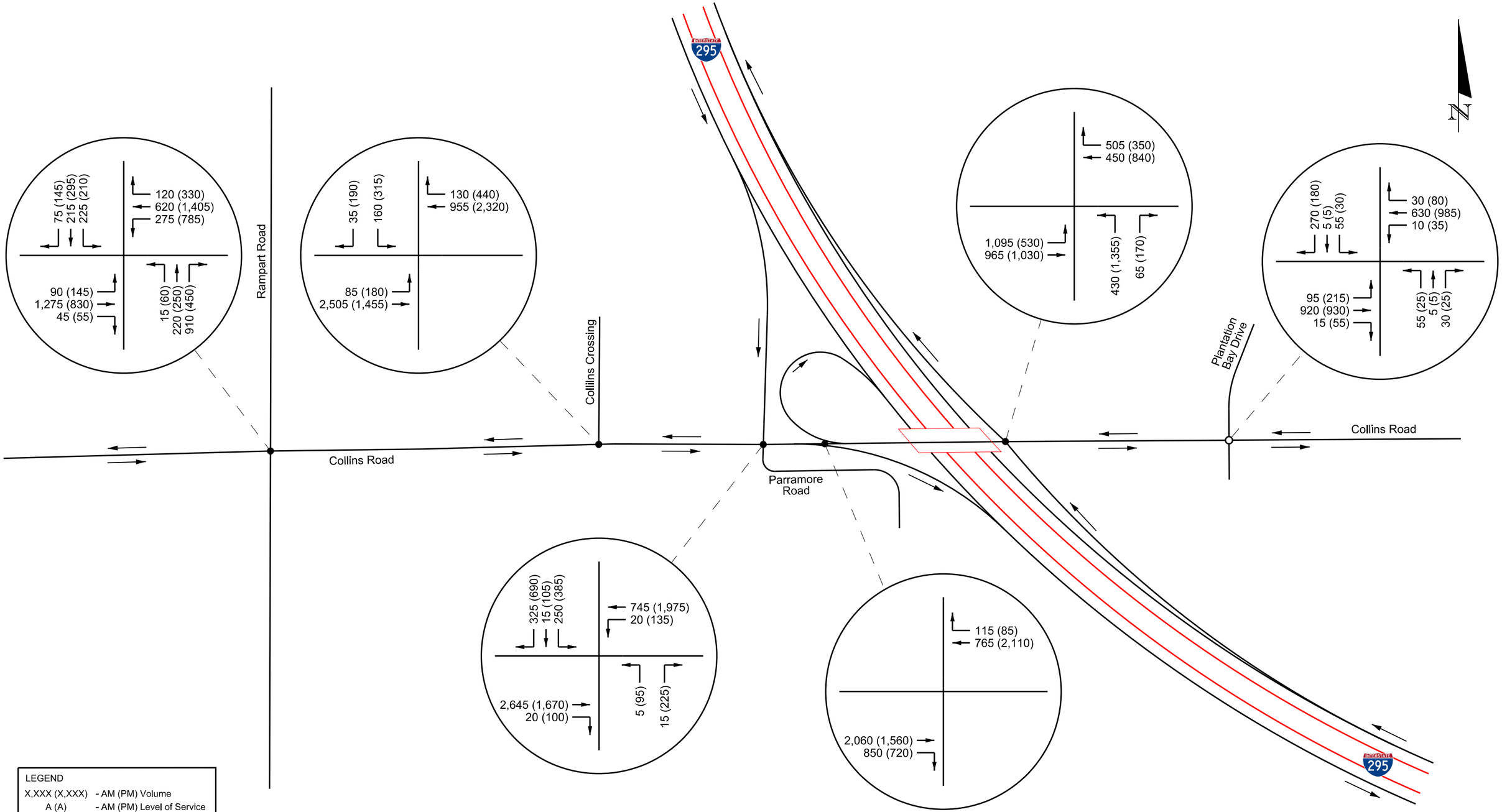

LEGEND

X,XXX (X,XXX)	- AM (PM) Volume
A (A)	- AM (PM) Level of Service
●	- Signalized Intersection
○	- Unsignalized Intersection

FDOT *I-295 at Collins Road* *Interchange Operational Analysis Report*	*Design Year 2030* *Peak Hours Volumes*	*Figure* *3*

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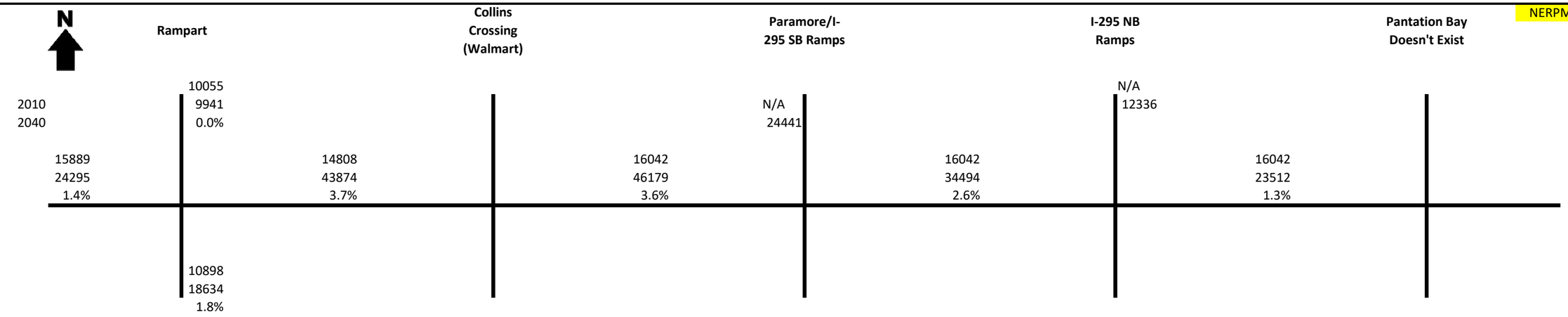
NERPM Model



I-295 EL Feasability Study

Growth Rate with COSTCO and Paramore Road Extension

Collins Road	2.2%
Rampart Road	3.9%
Plantation Bay Road	1.7%

FTI DVD

Collins Rd

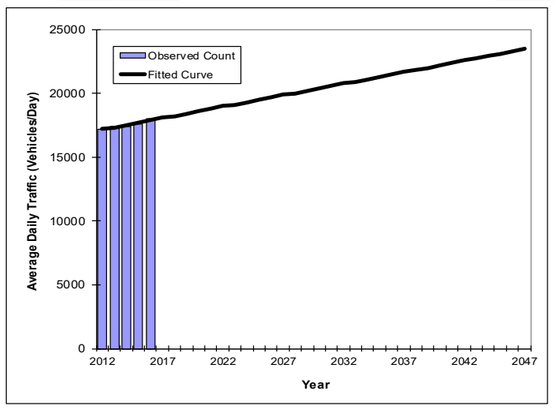
2012	17200
2013	17400
2014	17400
2015	17600
2016	18000

Traffic Trends - V2.0

COVE ROAD -- From here to there

PIN#	973215-1
Location	1

County:	Martin (89)
Station #:	0142
Highway:	COVE ROAD



** Annual Trend Increase:	180
Trend R-squared:	88.04%
Trend Annual Historic Growth Rate:	1.02%
Trend Growth Rate (2016 to Design Year):	#DIV/0!
Printed:	20-Jun-17
Straight Line Growth Option	

	Traffic (ADT/AADT)	
Year	Count*	Trend**
2012	17200	17200
2013	17400	17300
2014	17400	17500
2015	17600	17700
2016	18000	17900
2012 Opening Year Trend		
2012	N/A	17200
2016 Mid-Year Trend		
2016	N/A	17900
2016 Design Year Trend		
2016	N/A	17900
TRANPLAN Forecasts/Trends		

*Axle-Adjusted

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APPENDIX B

Approved Build Alternative

Synchro Reports

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Design Year 2030

AM Traffic

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Lanes, Volumes, Timings
6: Parramore Rd/I-295 SB Off & Collins Road

01/17/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	2645	20	20	745	0	5	0	15	250	15	325
Future Volume (vph)	0	2645	20	20	745	0	5	0	15	250	15	325
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	335		0	0		250	0		0
Storage Lanes	0		0	1		0	2		1	2		3
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	0.97	1.00	0.88	0.97	0.95	0.76
Frt		0.999							0.850			0.850
Flt Protected				0.950			0.950			0.950		
Satd. Flow (prot)	0	5080	0	1770	5085	0	3433	0	2787	3433	3539	3610
Flt Permitted				0.058			0.667			0.950		
Satd. Flow (perm)	0	5080	0	108	5085	0	2410	0	2787	3433	3539	3610
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)		2							156			
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		540			281			493			453	
Travel Time (s)		9.2			4.8			8.4			7.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2875	22	22	810	0	5	0	16	272	16	353
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2897	0	22	810	0	5	0	16	272	16	353
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Number of Detectors		2		1	2		1		1	1	2	1
Detector Template		Thru		Left	Thru		Left		Right	Left	Thru	Right
Leading Detector (ft)		100		20	100		20		20	20	100	20
Trailing Detector (ft)		0		0	0		0		0	0	0	0
Detector 1 Position(ft)		0		0	0		0		0	0	0	0
Detector 1 Size(ft)		6		20	6		20		20	20	6	20
Detector 1 Type		Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0		0.0	0.0		0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)		0.0		0.0	0.0		0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)		0.0		0.0	0.0		0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type		NA		pm+pt	NA		Perm		Perm	Split	NA	Perm
Protected Phases		4		3	8					6	6	
Permitted Phases				8			2		2			6
Detector Phase		4		3	8		2		2	6	6	6

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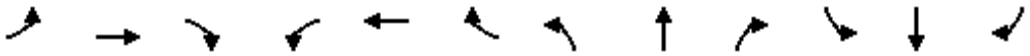
Lanes, Volumes, Timings
6: Parramore Rd/I-295 SB Off & Collins Road

01/17/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)		20.0		4.0	20.0		6.0		6.0	6.0	6.0	6.0
Minimum Split (s)		48.0		11.0	27.0		12.0		12.0	13.0	13.0	13.0
Total Split (s)		66.0		11.0	77.0		12.0		12.0	16.0	16.0	16.0
Total Split (%)		62.9%		10.5%	73.3%		11.4%		11.4%	15.2%	15.2%	15.2%
Maximum Green (s)		60.0		5.0	71.0		6.0		6.0	10.0	10.0	10.0
Yellow Time (s)		4.0		4.0	4.0		4.0		4.0	4.0	4.0	4.0
All-Red Time (s)		2.0		2.0	2.0		2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0		0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0		6.0	6.0		6.0		6.0	6.0	6.0	6.0
Lead/Lag		Lead		Lag								
Lead-Lag Optimize?		Yes		Yes								
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0	3.0	3.0	3.0
Recall Mode		C-Max		None	C-Max		Max		Max	None	None	None
Walk Time (s)		7.0			7.0		7.0		7.0	7.0	7.0	7.0
Flash Dont Walk (s)		11.0			11.0		11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0			0		0		0	0	0	0
Act Effct Green (s)		66.6		71.0	71.0		6.0		6.0	10.0	10.0	10.0
Actuated g/C Ratio		0.63		0.68	0.68		0.06		0.06	0.10	0.10	0.10
v/c Ratio		0.90		0.14	0.24		0.04		0.05	0.83	0.05	1.03
Control Delay		22.5		11.4	6.7		47.4		0.3	69.0	43.7	103.7
Queue Delay		0.0		0.0	0.0		0.0		0.0	0.0	0.0	0.0
Total Delay		22.5		11.4	6.7		47.4		0.3	69.0	43.7	103.7
LOS		C		B	A		D		A	E	D	F
Approach Delay		22.5			6.9			11.5			87.4	
Approach LOS		C			A			B			F	
Queue Length 50th (ft)		479		4	68		1		0	94	5	~111
Queue Length 95th (ft)		#835		12	86		8		0	#162	16	#190
Internal Link Dist (ft)		460			201			413			373	
Turn Bay Length (ft)				335					250			
Base Capacity (vph)		3222		152	3438		137		306	326	337	343
Starvation Cap Reductn		0		0	0		0		0	0	0	0
Spillback Cap Reductn		0		0	0		0		0	0	0	0
Storage Cap Reductn		0		0	0		0		0	0	0	0
Reduced v/c Ratio		0.90		0.14	0.24		0.04		0.05	0.83	0.05	1.03

Intersection Summary			
Area Type:	Other		
Cycle Length: 105			
Actuated Cycle Length: 105			
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Green			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.03			
Intersection Signal Delay: 29.0		Intersection LOS: C	
Intersection Capacity Utilization 78.7%		ICU Level of Service D	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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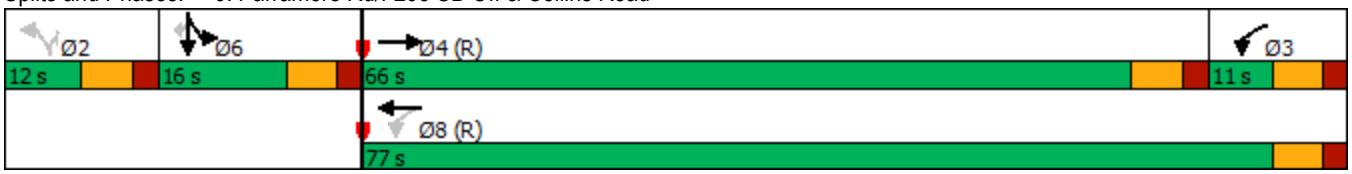
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Parramore Rd/I-295 SB Off & Collins Road



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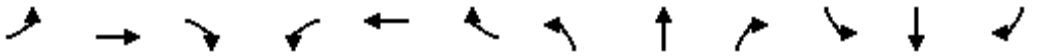
Lanes, Volumes, Timings
9: Collins Road & Plantation Bay Dr

01/17/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	920	15	10	630	30	55	5	30	55	5	270
Future Volume (vph)	95	920	15	10	630	30	55	5	30	55	5	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	215		0	150		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.993			0.955				0.850
Flt Protected	0.950			0.950				0.970			0.956	
Satd. Flow (prot)	1770	3532	0	1770	3514	0	0	1726	0	0	1781	1583
Flt Permitted	0.379			0.328				0.795			0.702	
Satd. Flow (perm)	706	3532	0	611	3514	0	0	1414	0	0	1308	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			8			33				164
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		330			999			225			555	
Travel Time (s)		5.6			17.0			5.1			12.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	103	1000	16	11	685	33	60	5	33	60	5	293
Shared Lane Traffic (%)												
Lane Group Flow (vph)	103	1016	0	11	718	0	0	98	0	0	65	293
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	pm+ov
Protected Phases	7	4		3	8			2			6	7
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		3	8		2	2		6	6	7

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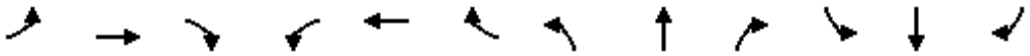
Lanes, Volumes, Timings
9: Collins Road & Plantation Bay Dr

01/17/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	11.0	24.0		11.0	24.0		24.0	24.0		24.0	24.0	11.0
Total Split (s)	12.0	25.0		11.0	24.0		24.0	24.0		24.0	24.0	12.0
Total Split (%)	20.0%	41.7%		18.3%	40.0%		40.0%	40.0%		40.0%	40.0%	20.0%
Maximum Green (s)	6.0	19.0		5.0	18.0		18.0	18.0		18.0	18.0	6.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	6.0
Lead/Lag	Lag	Lag		Lead	Lead							Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		Max	Max		Max	Max	None
Walk Time (s)		7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		11.0			11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effct Green (s)	27.8	27.8		18.0	18.0			18.0			18.0	30.0
Actuated g/C Ratio	0.46	0.46		0.30	0.30			0.30			0.30	0.50
v/c Ratio	0.24	0.62		0.04	0.68			0.22			0.17	0.34
Control Delay	14.4	16.4		15.2	22.1			12.9			16.9	5.2
Queue Delay	0.0	0.6		0.0	0.0			0.0			0.0	0.0
Total Delay	14.4	17.0		15.2	22.1			12.9			16.9	5.2
LOS	B	B		B	C			B			B	A
Approach Delay		16.7			22.0			12.9			7.3	
Approach LOS		B			C			B			A	
Queue Length 50th (ft)	18	124		3	117			17			17	23
Queue Length 95th (ft)	58	#296		12	170			48			43	61
Internal Link Dist (ft)		250			919			145			475	
Turn Bay Length (ft)	215			150								
Base Capacity (vph)	433	1638		279	1059			447			392	873
Starvation Cap Reductn	0	268		0	0			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.24	0.74		0.04	0.68			0.22			0.17	0.34

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 16.8		Intersection LOS: B	
Intersection Capacity Utilization 56.9%		ICU Level of Service B	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

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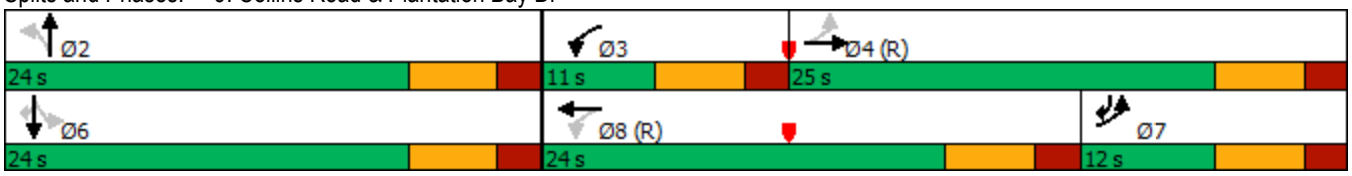
Splits and Phases: 9: Collins Road & Plantation Bay Dr



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Lanes, Volumes, Timings
12: I-295 NB Off & Collins Road

01/17/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	0	2060	0	0	450	505	0	0	0	430	0	65
Future Volume (vph)	0	2060	0	0	450	505	0	0	0	430	0	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		350	0		0	0		0
Storage Lanes	0		0	0		1	0		0	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt						0.850						0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	5085	0	0	3539	1583	0	0	0	3433	0	1583
Flt Permitted										0.950		
Satd. Flow (perm)	0	5085	0	0	3539	1583	0	0	0	3433	0	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						549						55
Link Speed (mph)		40			40			40			30	
Link Distance (ft)		698			668			146			758	
Travel Time (s)		11.9			11.4			2.5			17.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2239	0	0	489	549	0	0	0	467	0	71
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2239	0	0	489	549	0	0	0	467	0	71
Enter Blocked Intersection	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			4			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Number of Detectors		2			2	1				1		1
Detector Template		Thru			Thru	Right				Left		Right
Leading Detector (ft)		100			100	20				20		20
Trailing Detector (ft)		0			0	0				0		0
Detector 1 Position(ft)		0			0	0				0		0
Detector 1 Size(ft)		6			6	20				20		20
Detector 1 Type		Cl+Ex			Cl+Ex	Cl+Ex				Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0	0.0				0.0		0.0
Detector 1 Queue (s)		0.0			0.0	0.0				0.0		0.0
Detector 1 Delay (s)		0.0			0.0	0.0				0.0		0.0
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA			NA	Perm				Perm		Perm
Protected Phases		4			8							
Permitted Phases						8				2		2
Detector Phase		4			8	8				2		2

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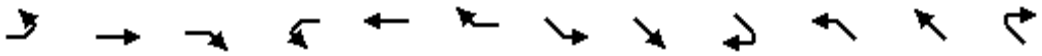
Lanes, Volumes, Timings
12: I-295 NB Off & Collins Road

01/17/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Switch Phase												
Minimum Initial (s)		5.0			5.0	5.0				5.0		5.0
Minimum Split (s)		24.0			24.0	24.0				24.0		24.0
Total Split (s)		36.0			36.0	36.0				24.0		24.0
Total Split (%)		60.0%			60.0%	60.0%				40.0%		40.0%
Maximum Green (s)		30.0			30.0	30.0				18.0		18.0
Yellow Time (s)		4.0			4.0	4.0				4.0		4.0
All-Red Time (s)		2.0			2.0	2.0				2.0		2.0
Lost Time Adjust (s)		0.0			0.0	0.0				0.0		0.0
Total Lost Time (s)		6.0			6.0	6.0				6.0		6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0			3.0	3.0				3.0		3.0
Recall Mode		C-Max			C-Max	C-Max				Max		Max
Walk Time (s)		7.0			7.0	7.0				7.0		7.0
Flash Dont Walk (s)		11.0			11.0	11.0				11.0		11.0
Pedestrian Calls (#/hr)		0			0	0				0		0
Act Effct Green (s)		30.0			30.0	30.0				18.0		18.0
Actuated g/C Ratio		0.50			0.50	0.50				0.30		0.30
v/c Ratio		0.88			0.28	0.52				0.45		0.14
Control Delay		19.0			9.2	2.9				18.8		7.5
Queue Delay		0.0			0.0	0.0				0.0		0.0
Total Delay		19.0			9.2	2.9				18.8		7.5
LOS		B			A	A				B		A
Approach Delay		19.0			5.9						17.3	
Approach LOS		B			A						B	
Queue Length 50th (ft)		244			50	0				69		4
Queue Length 95th (ft)		#319			75	41				107		28
Internal Link Dist (ft)		618			588			66			678	
Turn Bay Length (ft)						350						
Base Capacity (vph)		2542			1769	1066				1029		513
Starvation Cap Reductn		0			0	0				0		0
Spillback Cap Reductn		0			0	0				0		0
Storage Cap Reductn		0			0	0				0		0
Reduced v/c Ratio		0.88			0.28	0.52				0.45		0.14

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 15.2		Intersection LOS: B	
Intersection Capacity Utilization 60.4%		ICU Level of Service B	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

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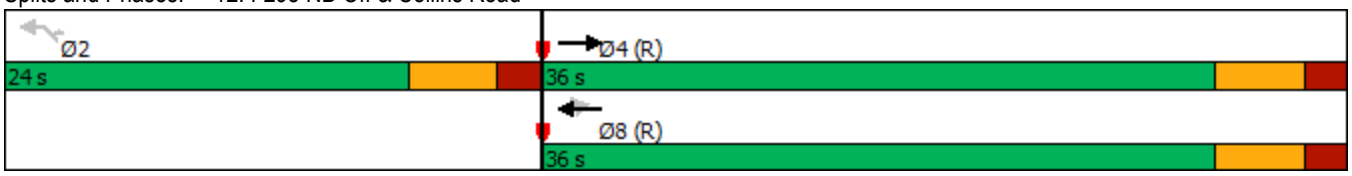
Splits and Phases: 12: I-295 NB Off & Collins Road



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Lane Group	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Volume (vph)	0	1095	0	0	505	0
Future Volume (vph)	0	1095	0	0	505	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865				
Flt Protected						
Satd. Flow (prot)	0	1611	0	0	1863	0
Flt Permitted						
Satd. Flow (perm)	0	1611	0	0	1863	0
Link Speed (mph)	30			30	40	
Link Distance (ft)	847			674	146	
Travel Time (s)	19.3			15.3	2.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1190	0	0	549	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1190	0	0	549	0
Enter Blocked Intersection	Yes	Yes	Yes	Yes	Yes	Yes
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Sign Control	Free			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 101.0%		ICU Level of Service G	
Analysis Period (min) 15			

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Lanes, Volumes, Timings
15: I-295 SB On & Collins Road

01/17/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	0	2060	850	0	765	115	0	0	0	0	0	0
Future Volume (vph)	0	2060	850	0	765	115	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	25		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994	0.850		0.980							
Flt Protected												
Satd. Flow (prot)	0	3370	1441	0	4984	0	0	0	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	3370	1441	0	4984	0	0	0	0	0	0	0
Link Speed (mph)		40			40			30			40	
Link Distance (ft)		281			698			728			1032	
Travel Time (s)		4.8			11.9			16.5			17.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2239	924	0	832	125	0	0	0	0	0	0
Shared Lane Traffic (%)			10%									
Lane Group Flow (vph)	0	2331	832	0	957	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 69.3%		ICU Level of Service C	
Analysis Period (min) 15			

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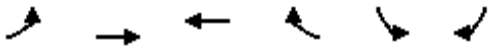

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	1095	1030	955	0	0	0
Future Volume (vph)	1095	1030	955	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt						
Flt Protected	0.950					
Satd. Flow (prot)	1770	3539	3539	0	0	0
Flt Permitted	0.950					
Satd. Flow (perm)	1770	3539	3539	0	0	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						
Link Speed (mph)		40	40		30	
Link Distance (ft)		668	330		847	
Travel Time (s)		11.4	5.6		19.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1190	1120	1038	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1190	1120	1038	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		16	12		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Number of Detectors	1	2	2			
Detector Template	Left	Thru	Thru			
Leading Detector (ft)	20	100	100			
Trailing Detector (ft)	0	0	0			
Detector 1 Position(ft)	0	0	0			
Detector 1 Size(ft)	20	6	6			
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			
Detector 1 Queue (s)	0.0	0.0	0.0			
Detector 1 Delay (s)	0.0	0.0	0.0			
Detector 2 Position(ft)		94	94			
Detector 2 Size(ft)		6	6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Prot	NA	NA			
Protected Phases	7	4	8			
Permitted Phases						
Detector Phase	7	4	8			
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0			
Minimum Split (s)	24.0	24.0	24.0			

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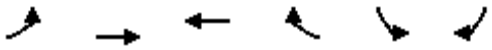

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Total Split (s)	94.0	140.0	46.0			
Total Split (%)	67.1%	100.0%	32.9%			
Maximum Green (s)	88.0	134.0	40.0			
Yellow Time (s)	4.0	4.0	4.0			
All-Red Time (s)	2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0	0.0			
Total Lost Time (s)	6.0	6.0	6.0			
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0			
Recall Mode	None	C-Max	C-Max			
Walk Time (s)	7.0	7.0	7.0			
Flash Dont Walk (s)	11.0	11.0	11.0			
Pedestrian Calls (#/hr)	0	0	0			
Act Effct Green (s)	88.0	140.0	40.0			
Actuated g/C Ratio	0.63	1.00	0.29			
v/c Ratio	1.07	0.32	1.03			
Control Delay	74.2	0.2	84.0			
Queue Delay	12.7	0.0	29.8			
Total Delay	87.0	0.2	113.7			
LOS	F	A	F			
Approach Delay		44.9	113.7			
Approach LOS		D	F			
Queue Length 50th (ft)	~1198	0	~529			
Queue Length 95th (ft)	#1462	0	#666			
Internal Link Dist (ft)		588	250		767	
Turn Bay Length (ft)						
Base Capacity (vph)	1112	3539	1011			
Starvation Cap Reductn	148	0	341			
Spillback Cap Reductn	0	0	0			
Storage Cap Reductn	0	0	0			
Reduced v/c Ratio	1.23	0.32	1.55			

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green			
Natural Cycle: 140			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.07			
Intersection Signal Delay: 66.3		Intersection LOS: E	
Intersection Capacity Utilization 97.1%		ICU Level of Service F	
Analysis Period (min) 15			

~ 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.

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Splits and Phases: 20: Collins Road & I-295 NB On

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Design Year 2030

PM Traffic

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Lanes, Volumes, Timings
6: Parramore Rd/I-295 SB Off & Collins Road

01/17/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1670	100	135	1975	0	95	0	225	385	105	690
Future Volume (vph)	0	1670	100	135	1975	0	95	0	225	385	105	690
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	335		0	0		250	0		0
Storage Lanes	0		0	1		0	2		1	2		3
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	0.97	1.00	0.88	0.97	0.95	0.76
Frt		0.992							0.850			0.850
Flt Protected				0.950			0.950			0.950		
Satd. Flow (prot)	0	5045	0	1770	5085	0	3433	0	2787	3433	3539	3610
Flt Permitted				0.083			0.667			0.950		
Satd. Flow (perm)	0	5045	0	155	5085	0	2410	0	2787	3433	3539	3610
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)		12							179			
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		589			281			493			453	
Travel Time (s)		10.0			4.8			8.4			7.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1815	109	147	2147	0	103	0	245	418	114	750
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1924	0	147	2147	0	103	0	245	418	114	750
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Number of Detectors		2		1	2		1		1	1	2	1
Detector Template		Thru		Left	Thru		Left		Right	Left	Thru	Right
Leading Detector (ft)		100		20	100		20		20	20	100	20
Trailing Detector (ft)		0		0	0		0		0	0	0	0
Detector 1 Position(ft)		0		0	0		0		0	0	0	0
Detector 1 Size(ft)		6		20	6		20		20	20	6	20
Detector 1 Type		Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0		0.0	0.0		0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)		0.0		0.0	0.0		0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)		0.0		0.0	0.0		0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type		NA		pm+pt	NA		Perm		Perm	Split	NA	Perm
Protected Phases		4		3	8					6	6	
Permitted Phases				8			2		2			6
Detector Phase		4		3	8		2		2	6	6	6

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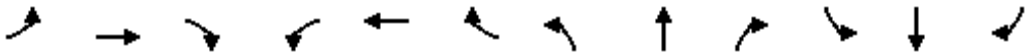
Lanes, Volumes, Timings
6: Parramore Rd/I-295 SB Off & Collins Road

01/17/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)		20.0		4.0	20.0		6.0		6.0	6.0	6.0	6.0
Minimum Split (s)		48.0		11.0	27.0		12.0		12.0	13.0	13.0	13.0
Total Split (s)		48.0		11.0	59.0		12.0		12.0	24.0	24.0	24.0
Total Split (%)		50.5%		11.6%	62.1%		12.6%		12.6%	25.3%	25.3%	25.3%
Maximum Green (s)		42.0		5.0	53.0		6.0		6.0	18.0	18.0	18.0
Yellow Time (s)		4.0		4.0	4.0		4.0		4.0	4.0	4.0	4.0
All-Red Time (s)		2.0		2.0	2.0		2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0		0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0		6.0	6.0		6.0		6.0	6.0	6.0	6.0
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?		Yes		Yes								
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0	3.0	3.0	3.0
Recall Mode		C-Max		None	C-Max		Max		Max	None	None	None
Walk Time (s)		7.0			7.0		7.0		7.0	7.0	7.0	7.0
Flash Dont Walk (s)		11.0			11.0		11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0			0		0		0	0	0	0
Act Effct Green (s)		42.0		53.0	53.0		6.0		6.0	18.0	18.0	18.0
Actuated g/C Ratio		0.44		0.56	0.56		0.06		0.06	0.19	0.19	0.19
v/c Ratio		0.86		0.86	0.76		0.68		0.71	0.64	0.17	1.10
Control Delay		28.7		57.2	18.3		66.5		26.2	40.7	33.0	101.2
Queue Delay		0.0		0.0	0.0		0.0		0.0	0.0	0.0	0.0
Total Delay		28.7		57.2	18.3		66.5		26.2	40.7	33.0	101.2
LOS		C		E	B		E		C	D	C	F
Approach Delay		28.7			20.8			38.1			75.4	
Approach LOS		C			C			D			E	
Queue Length 50th (ft)		369		40	339		31		22	121	30	~226
Queue Length 95th (ft)		438		#149	401		#71		#75	171	55	#322
Internal Link Dist (ft)		509			201			413			373	
Turn Bay Length (ft)				335					250			
Base Capacity (vph)		2237		171	2836		152		343	650	670	684
Starvation Cap Reductn		0		0	0		0		0	0	0	0
Spillback Cap Reductn		0		0	0		0		0	0	0	0
Storage Cap Reductn		0		0	0		0		0	0	0	0
Reduced v/c Ratio		0.86		0.86	0.76		0.68		0.71	0.64	0.17	1.10

Intersection Summary			
Area Type:	Other		
Cycle Length: 95			
Actuated Cycle Length: 95			
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Green			
Natural Cycle: 95			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.10			
Intersection Signal Delay: 36.4		Intersection LOS: D	
Intersection Capacity Utilization 72.0%		ICU Level of Service C	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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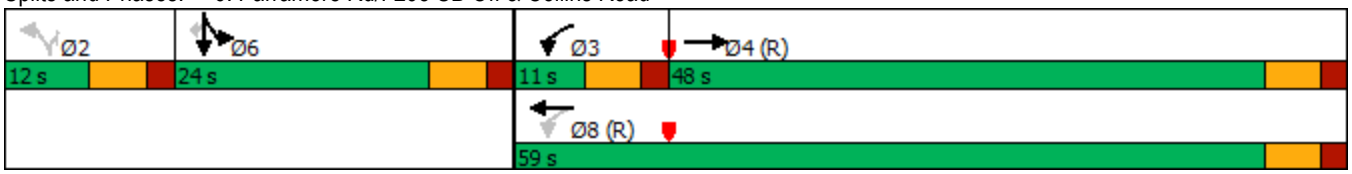
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Parramore Rd/I-295 SB Off & Collins Road



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	215	930	55	35	985	80	25	5	25	30	5	180
Future Volume (vph)	215	930	55	35	985	80	25	5	25	30	5	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	215		0	150		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992			0.989			0.938				0.850
Flt Protected	0.950			0.950				0.978			0.958	
Satd. Flow (prot)	1770	3511	0	1770	3500	0	0	1709	0	0	1785	1583
Flt Permitted	0.148			0.182				0.875			0.771	
Satd. Flow (perm)	276	3511	0	339	3500	0	0	1529	0	0	1436	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			14			27				50
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		330			999			225			555	
Travel Time (s)		5.6			17.0			5.1			12.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	234	1011	60	38	1071	87	27	5	27	33	5	196
Shared Lane Traffic (%)												
Lane Group Flow (vph)	234	1071	0	38	1158	0	0	59	0	0	38	196
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	pm+ov
Protected Phases	7	4		3	8			2			6	7
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		3	8		2	2		6	6	7

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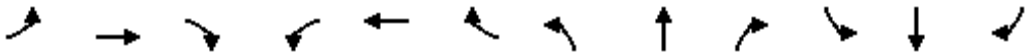
Lanes, Volumes, Timings
9: Collins Road & Plantation Bay Dr

01/17/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	11.0	24.0		11.0	24.0		24.0	24.0		24.0	24.0	11.0
Total Split (s)	12.0	30.0		11.0	29.0		24.0	24.0		24.0	24.0	12.0
Total Split (%)	18.5%	46.2%		16.9%	44.6%		36.9%	36.9%		36.9%	36.9%	18.5%
Maximum Green (s)	6.0	24.0		5.0	23.0		18.0	18.0		18.0	18.0	6.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag							Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		Max	Max		Max	Max	None
Walk Time (s)		7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		11.0			11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effct Green (s)	33.0	30.6		28.0	23.0			18.0			18.0	30.0
Actuated g/C Ratio	0.51	0.47		0.43	0.35			0.28			0.28	0.46
v/c Ratio	0.84	0.65		0.15	0.93			0.13			0.10	0.26
Control Delay	41.7	17.0		8.9	34.9			12.3			18.3	8.9
Queue Delay	0.0	1.8		0.0	0.0			0.0			0.0	0.0
Total Delay	41.7	18.8		8.9	34.9			12.3			18.3	8.9
LOS	D	B		A	C			B			B	A
Approach Delay		22.9			34.1			12.3			10.5	
Approach LOS		C			C			B			B	
Queue Length 50th (ft)	45	133		7	224			9			11	32
Queue Length 95th (ft)	#166	#278		18	#354			34			31	69
Internal Link Dist (ft)		250			919			145			475	
Turn Bay Length (ft)	215			150								
Base Capacity (vph)	278	1658		256	1247			442			397	757
Starvation Cap Reductn	0	401		0	0			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.84	0.85		0.15	0.93			0.13			0.10	0.26

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 65			
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.93			
Intersection Signal Delay: 26.4		Intersection LOS: C	
Intersection Capacity Utilization 66.5%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

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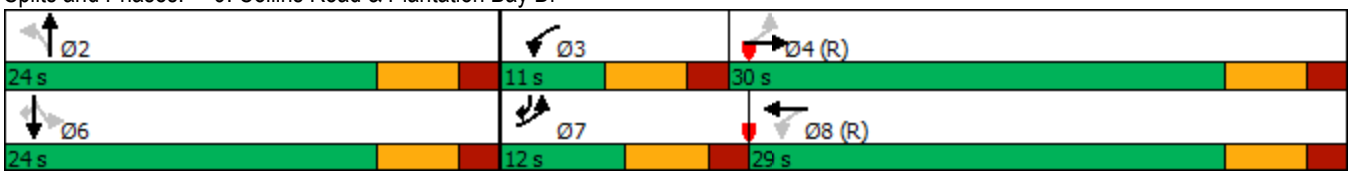
Splits and Phases: 9: Collins Road & Plantation Bay Dr



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Lanes, Volumes, Timings
12: I-295 NB Off & Collins Road

01/17/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	0	1560	0	0	840	350	0	0	0	1355	0	170
Future Volume (vph)	0	1560	0	0	840	350	0	0	0	1355	0	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		350	0		0	0		0
Storage Lanes	0		0	0		1	0		0	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt						0.850						0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	5085	0	0	3539	1583	0	0	0	3433	0	1583
Flt Permitted										0.950		
Satd. Flow (perm)	0	5085	0	0	3539	1583	0	0	0	3433	0	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						380						47
Link Speed (mph)		40			40			40			30	
Link Distance (ft)		698			668			146			758	
Travel Time (s)		11.9			11.4			2.5			17.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1696	0	0	913	380	0	0	0	1473	0	185
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1696	0	0	913	380	0	0	0	1473	0	185
Enter Blocked Intersection	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			4			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Number of Detectors		2			2	1				1		1
Detector Template		Thru			Thru	Right				Left		Right
Leading Detector (ft)		100			100	20				20		20
Trailing Detector (ft)		0			0	0				0		0
Detector 1 Position(ft)		0			0	0				0		0
Detector 1 Size(ft)		6			6	20				20		20
Detector 1 Type		Cl+Ex			Cl+Ex	Cl+Ex				Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0	0.0				0.0		0.0
Detector 1 Queue (s)		0.0			0.0	0.0				0.0		0.0
Detector 1 Delay (s)		0.0			0.0	0.0				0.0		0.0
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA			NA	Perm				Perm		Perm
Protected Phases		4			8							
Permitted Phases						8				2		2
Detector Phase		4			8	8				2		2

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Lanes, Volumes, Timings
12: I-295 NB Off & Collins Road

01/17/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Switch Phase												
Minimum Initial (s)		5.0			5.0	5.0				5.0		5.0
Minimum Split (s)		24.0			24.0	24.0				24.0		24.0
Total Split (s)		32.0			32.0	32.0				38.0		38.0
Total Split (%)		45.7%			45.7%	45.7%				54.3%		54.3%
Maximum Green (s)		26.0			26.0	26.0				32.0		32.0
Yellow Time (s)		4.0			4.0	4.0				4.0		4.0
All-Red Time (s)		2.0			2.0	2.0				2.0		2.0
Lost Time Adjust (s)		0.0			0.0	0.0				0.0		0.0
Total Lost Time (s)		6.0			6.0	6.0				6.0		6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0			3.0	3.0				3.0		3.0
Recall Mode		C-Max			C-Max	C-Max				Max		Max
Walk Time (s)		7.0			7.0	7.0				7.0		7.0
Flash Dont Walk (s)		11.0			11.0	11.0				11.0		11.0
Pedestrian Calls (#/hr)		0			0	0				0		0
Act Effct Green (s)		26.0			26.0	26.0				32.0		32.0
Actuated g/C Ratio		0.37			0.37	0.37				0.46		0.46
v/c Ratio		0.90			0.69	0.46				0.94		0.25
Control Delay		28.9			22.1	3.9				31.7		9.6
Queue Delay		0.0			0.0	0.0				0.0		0.0
Total Delay		28.9			22.1	3.9				31.7		9.6
LOS		C			C	A				C		A
Approach Delay		28.9			16.7						29.3	
Approach LOS		C			B						C	
Queue Length 50th (ft)		246			170	0				295		34
Queue Length 95th (ft)		#342			234	50				#448		71
Internal Link Dist (ft)		618			588			66			678	
Turn Bay Length (ft)						350						
Base Capacity (vph)		1888			1314	826				1569		749
Starvation Cap Reductn		0			0	0				0		0
Spillback Cap Reductn		0			0	0				0		0
Storage Cap Reductn		0			0	0				0		0
Reduced v/c Ratio		0.90			0.69	0.46				0.94		0.25

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.94			
Intersection Signal Delay: 25.6		Intersection LOS: C	
Intersection Capacity Utilization 77.1%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

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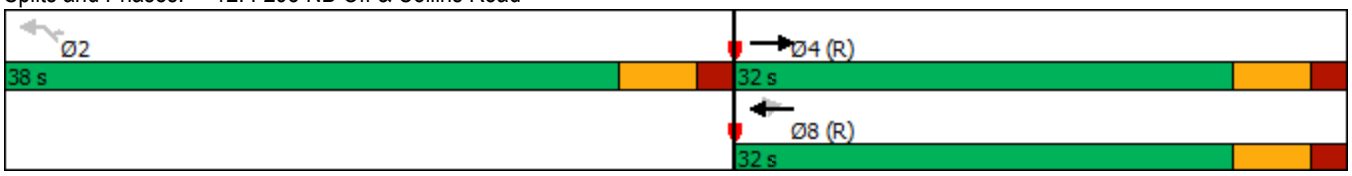
Splits and Phases: 12: I-295 NB Off & Collins Road



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Lane Group	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Volume (vph)	0	530	0	0	350	0
Future Volume (vph)	0	530	0	0	350	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865				
Flt Protected						
Satd. Flow (prot)	0	1611	0	0	1863	0
Flt Permitted						
Satd. Flow (perm)	0	1611	0	0	1863	0
Link Speed (mph)	30			30	40	
Link Distance (ft)	847			674	146	
Travel Time (s)	19.3			15.3	2.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	576	0	0	380	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	576	0	0	380	0
Enter Blocked Intersection	Yes	Yes	Yes	Yes	Yes	Yes
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Sign Control	Free			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 57.9%		ICU Level of Service B	
Analysis Period (min) 15			

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	0	1560	720	0	2110	85	0	0	0	0	0	0
Future Volume (vph)	0	1560	720	0	2110	85	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	25		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993	0.850		0.994							
Flt Protected												
Satd. Flow (prot)	0	3366	1441	0	5055	0	0	0	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	3366	1441	0	5055	0	0	0	0	0	0	0
Link Speed (mph)		40			40			30			40	
Link Distance (ft)		281			698			728			1032	
Travel Time (s)		4.8			11.9			16.5			17.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1696	783	0	2293	92	0	0	0	0	0	0
Shared Lane Traffic (%)			10%									
Lane Group Flow (vph)	0	1774	705	0	2385	0	0	0	0	0	0	0
Enter Blocked Intersection	Yes	Yes	Yes	No	Yes	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 54.1%		ICU Level of Service A	
Analysis Period (min) 15			

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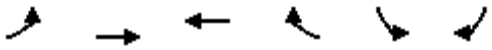

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	530	1200	1190	0	0	0
Future Volume (vph)	530	1200	1190	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt						
Flt Protected	0.950					
Satd. Flow (prot)	1770	3539	3539	0	0	0
Flt Permitted	0.151					
Satd. Flow (perm)	281	3539	3539	0	0	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						
Link Speed (mph)		40	40		30	
Link Distance (ft)		668	330		847	
Travel Time (s)		11.4	5.6		19.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	576	1304	1293	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	576	1304	1293	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		16	12		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Number of Detectors	1	2	2			
Detector Template	Left	Thru	Thru			
Leading Detector (ft)	20	100	100			
Trailing Detector (ft)	0	0	0			
Detector 1 Position(ft)	0	0	0			
Detector 1 Size(ft)	20	6	6			
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			
Detector 1 Queue (s)	0.0	0.0	0.0			
Detector 1 Delay (s)	0.0	0.0	0.0			
Detector 2 Position(ft)		94	94			
Detector 2 Size(ft)		6	6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	D.P+P	NA	NA			
Protected Phases	7	4	8			
Permitted Phases	8					
Detector Phase	7	4	8			
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0			
Minimum Split (s)	24.0	24.0	24.0			

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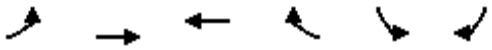
Lanes, Volumes, Timings
20: Collins Road & I-295 NB On

01/17/2020



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Total Split (s)	24.0	55.0	31.0			
Total Split (%)	43.6%	100.0%	56.4%			
Maximum Green (s)	18.0	49.0	25.0			
Yellow Time (s)	4.0	4.0	4.0			
All-Red Time (s)	2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0	0.0			
Total Lost Time (s)	6.0	6.0	6.0			
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0			
Recall Mode	None	C-Max	C-Max			
Walk Time (s)	7.0	7.0	7.0			
Flash Dont Walk (s)	11.0	11.0	11.0			
Pedestrian Calls (#/hr)	0	0	0			
Act Effct Green (s)	43.0	55.0	26.5			
Actuated g/C Ratio	0.78	1.00	0.48			
v/c Ratio	0.87	0.37	0.76			
Control Delay	27.6	0.3	16.0			
Queue Delay	0.0	0.0	0.9			
Total Delay	27.6	0.3	17.0			
LOS	C	A	B			
Approach Delay		8.7	17.0			
Approach LOS		A	B			
Queue Length 50th (ft)	112	0	178			
Queue Length 95th (ft)	#275	0	255			
Internal Link Dist (ft)		588	250		767	
Turn Bay Length (ft)						
Base Capacity (vph)	715	3539	1707			
Starvation Cap Reductn	0	0	181			
Spillback Cap Reductn	0	0	0			
Storage Cap Reductn	0	0	0			
Reduced v/c Ratio	0.81	0.37	0.85			

Intersection Summary

Area Type: Other

Cycle Length: 55

Actuated Cycle Length: 55

Offset: 0 (0%), Referenced to phase 4:EBT and 8:EBWB, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 12.0 — Intersection LOS: B

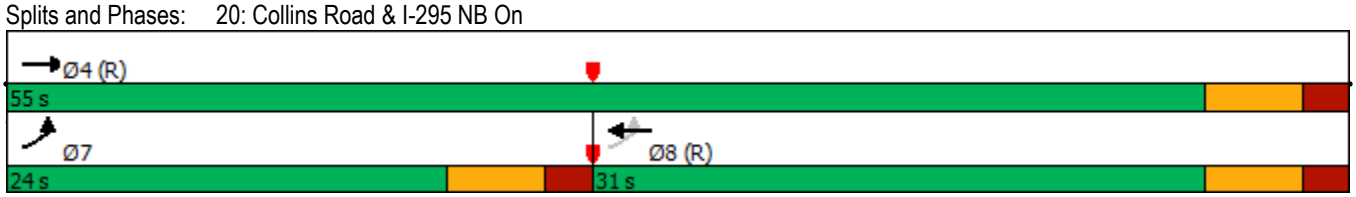
Intersection Capacity Utilization 72.3% — ICU Level of Service C

Analysis Period (min) 15

\# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 20: Collins Road & I-295 NB On



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APPENDIX C

Proposed Build Alternative

Synchro Reports

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Design Year 2030

AM Traffic

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Lanes, Volumes, Timings
6: Parramore Rd/I-295 SB Off & Collins Road

02/05/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	2645	20	20	745	0	5	0	15	250	15	325
Future Volume (vph)	0	2645	20	20	745	0	5	0	15	250	15	325
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	335		0	0		250	0		0
Storage Lanes	0		0	1		0	2		1	2		3
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	0.97	1.00	0.88	0.97	0.95	0.76
Frt		0.999							0.850			0.850
Flt Protected				0.950			0.950			0.950		
Satd. Flow (prot)	0	5080	0	1770	5085	0	3433	0	2787	3433	3539	3610
Flt Permitted				0.055						0.950		
Satd. Flow (perm)	0	5080	0	102	5085	0	3614	0	2787	3433	3539	3610
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)		2							149			
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		516			281			493			453	
Travel Time (s)		8.8			4.8			8.4			7.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2875	22	22	810	0	5	0	16	272	16	353
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2897	0	22	810	0	5	0	16	272	16	353
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	R NA	Right	Left	Left	Right	L NA	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Number of Detectors		2		1	2		1		1	1	2	1
Detector Template		Thru		Left	Thru		Left		Right	Left	Thru	Right
Leading Detector (ft)		100		20	100		20		20	20	100	20
Trailing Detector (ft)		0		0	0		0		0	0	0	0
Detector 1 Position(ft)		0		0	0		0		0	0	0	0
Detector 1 Size(ft)		6		20	6		20		20	20	6	20
Detector 1 Type		Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0		0.0	0.0		0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)		0.0		0.0	0.0		0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)		0.0		0.0	0.0		0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type		NA		pm+pt	NA		Perm		Perm	Split	NA	Perm
Protected Phases		4		3	8					6	6	
Permitted Phases				8			2		2			6
Detector Phase		4		3	8		2		2	6	6	6

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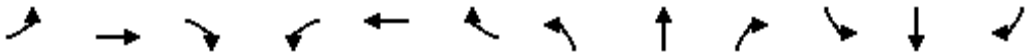
Lanes, Volumes, Timings
6: Parramore Rd/I-295 SB Off & Collins Road

02/05/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)		20.0		4.0	20.0		6.0		6.0	6.0	6.0	6.0
Minimum Split (s)		48.0		11.0	27.0		12.0		12.0	13.0	13.0	13.0
Total Split (s)		70.0		11.0	81.0		12.0		12.0	17.0	17.0	17.0
Total Split (%)		63.6%		10.0%	73.6%		10.9%		10.9%	15.5%	15.5%	15.5%
Maximum Green (s)		64.0		5.0	75.0		6.0		6.0	11.0	11.0	11.0
Yellow Time (s)		4.0		4.0	4.0		4.0		4.0	4.0	4.0	4.0
All-Red Time (s)		2.0		2.0	2.0		2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0		0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0		6.0	6.0		6.0		6.0	6.0	6.0	6.0
Lead/Lag		Lead		Lag								
Lead-Lag Optimize?		Yes		Yes								
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0	3.0	3.0	3.0
Recall Mode		C-Max		None	C-Max		None		None	None	None	None
Walk Time (s)		7.0			7.0		7.0		7.0	7.0	7.0	7.0
Flash Dont Walk (s)		11.0			11.0		11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0			0		0		0	0	0	0
Act Effct Green (s)		74.3		78.7	78.7		6.0		6.0	14.5	14.5	14.5
Actuated g/C Ratio		0.68		0.72	0.72		0.05		0.05	0.13	0.13	0.13
v/c Ratio		0.84		0.15	0.22		0.03		0.05	0.60	0.03	0.74
Control Delay		18.5		7.8	0.9		49.6		0.3	52.1	43.7	57.4
Queue Delay		0.0		0.0	0.0		0.0		0.0	0.0	0.0	0.0
Total Delay		18.5		7.8	0.9		49.6		0.3	52.1	43.7	57.4
LOS		B		A	A		D		A	D	D	E
Approach Delay		18.5			1.1			12.1			54.8	
Approach LOS		B			A			B			D	
Queue Length 50th (ft)		420		1	2		1		0	90	5	102
Queue Length 95th (ft)		#856		m8	10		8		0	#161	16	#191
Internal Link Dist (ft)		436			201			413			373	
Turn Bay Length (ft)				335					250			
Base Capacity (vph)		3433		148	3640		197		292	451	465	474
Starvation Cap Reductn		0		0	0		0		0	0	0	0
Spillback Cap Reductn		0		0	0		0		0	0	0	0
Storage Cap Reductn		0		0	0		0		0	0	0	0
Reduced v/c Ratio		0.84		0.15	0.22		0.03		0.05	0.60	0.03	0.74

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Green			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 20.5		Intersection LOS: C	
Intersection Capacity Utilization 78.7%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

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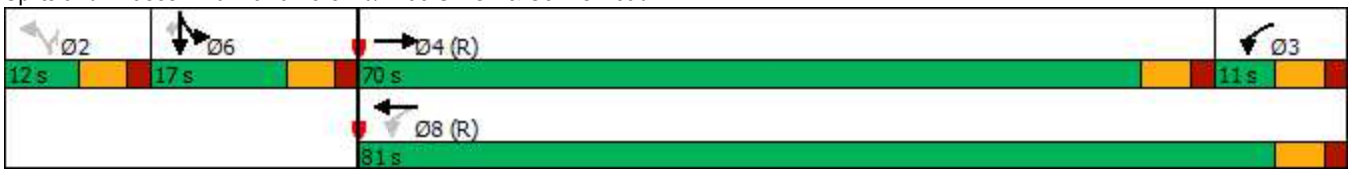
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Parramore Rd/I-295 SB Off & Collins Road



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Lanes, Volumes, Timings
9: Collins Road & Plantation Bay Dr

02/05/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	920	15	10	630	30	55	5	30	55	5	270
Future Volume (vph)	95	920	15	10	630	30	55	5	30	55	5	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	215		0	150		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.993			0.955				0.850
Flt Protected	0.950			0.950				0.970			0.956	
Satd. Flow (prot)	1770	3532	0	1770	3514	0	0	1726	0	0	1781	1583
Flt Permitted	0.324			0.145				0.783			0.712	
Satd. Flow (perm)	604	3532	0	270	3514	0	0	1393	0	0	1326	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			5			21				113
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		267			516			197			555	
Travel Time (s)		4.6			8.8			4.5			12.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	103	1000	16	11	685	33	60	5	33	60	5	293
Shared Lane Traffic (%)												
Lane Group Flow (vph)	103	1016	0	11	718	0	0	98	0	0	65	293
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	pm+ov
Protected Phases	7	4		3	8			2			6	7
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		3	8		2	2		6	6	7

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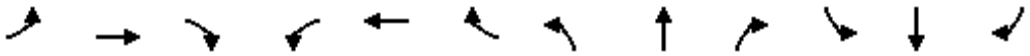
Lanes, Volumes, Timings
9: Collins Road & Plantation Bay Dr

02/05/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	11.0	24.0		11.0	24.0		24.0	24.0		24.0	24.0	11.0
Total Split (s)	30.0	67.0		13.0	50.0		30.0	30.0		30.0	30.0	30.0
Total Split (%)	27.3%	60.9%		11.8%	45.5%		27.3%	27.3%		27.3%	27.3%	27.3%
Maximum Green (s)	24.0	61.0		7.0	44.0		24.0	24.0		24.0	24.0	24.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	6.0
Lead/Lag	Lag	Lag		Lead	Lead							Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		Max	Max		Max	Max	None
Walk Time (s)		7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		11.0			11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effct Green (s)	71.4	71.4		44.0	44.0			24.0			24.0	54.0
Actuated g/C Ratio	0.65	0.65		0.40	0.40			0.22			0.22	0.49
v/c Ratio	0.16	0.44		0.06	0.51			0.31			0.22	0.35
Control Delay	11.4	10.7		20.7	26.3			31.2			37.9	11.5
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	11.4	10.7		20.7	26.3			31.2			37.9	11.5
LOS	B	B		C	C			C			D	B
Approach Delay		10.8			26.2			31.2			16.3	
Approach LOS		B			C			C			B	
Queue Length 50th (ft)	20	113		5	196			45			38	71
Queue Length 95th (ft)	m56	217		16	253			95			78	132
Internal Link Dist (ft)		187			436			117			475	
Turn Bay Length (ft)	215			150								
Base Capacity (vph)	646	2294		203	1408			320			289	834
Starvation Cap Reductn	0	0		0	0			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.16	0.44		0.05	0.51			0.31			0.22	0.35

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 10 (9%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.51			
Intersection Signal Delay: 17.4		Intersection LOS: B	
Intersection Capacity Utilization 56.9%		ICU Level of Service B	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

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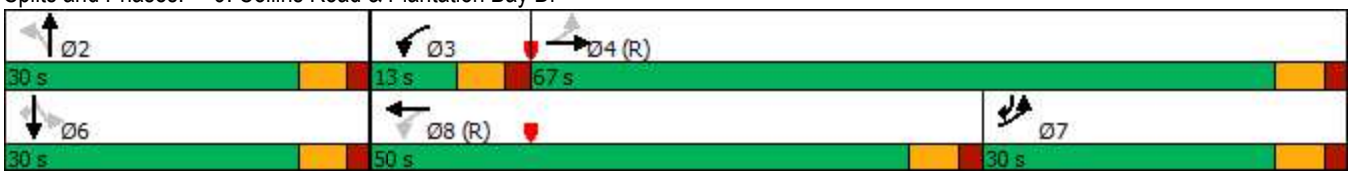
Splits and Phases: 9: Collins Road & Plantation Bay Dr



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Lane Group	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Traffic Volume (vph)	2060	0	0	450	430	65
Future Volume (vph)	2060	0	0	450	430	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		2	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	1.00	1.00	0.95	0.97	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	5085	0	0	3539	3433	1583
Flt Permitted					0.950	
Satd. Flow (perm)	5085	0	0	3539	3433	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						9
Link Speed (mph)	40			40	30	
Link Distance (ft)	698			247	758	
Travel Time (s)	11.9			4.2	17.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2239	0	0	489	467	71
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2239	0	0	489	467	71
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Left
Median Width(ft)	0			8	24	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Number of Detectors	2			2	1	1
Detector Template	Thru			Thru	Left	Right
Leading Detector (ft)	100			100	20	20
Trailing Detector (ft)	0			0	0	0
Detector 1 Position(ft)	0			0	0	0
Detector 1 Size(ft)	6			6	20	20
Detector 1 Type	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0			0.0	0.0	0.0
Detector 1 Queue (s)	0.0			0.0	0.0	0.0
Detector 1 Delay (s)	0.0			0.0	0.0	0.0
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA			NA	Prot	Prot
Protected Phases	4			8	2	2
Permitted Phases						
Detector Phase	4			8	2	2

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Lanes, Volumes, Timings
12: I-295 NB Off & Collins Road

02/05/2020

Lane Group	EBT	EBR	WBL	WBT	NWL	NWR
Switch Phase						
Minimum Initial (s)	5.0			5.0	5.0	5.0
Minimum Split (s)	11.0			11.0	11.0	11.0
Total Split (s)	77.0			77.0	33.0	33.0
Total Split (%)	70.0%			70.0%	30.0%	30.0%
Maximum Green (s)	71.0			71.0	27.0	27.0
Yellow Time (s)	4.0			4.0	4.0	4.0
All-Red Time (s)	2.0			2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	6.0			6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Recall Mode	C-Max			C-Max	None	None
Act Effct Green (s)	77.7			77.7	20.3	20.3
Actuated g/C Ratio	0.71			0.71	0.18	0.18
v/c Ratio	0.62			0.20	0.74	0.24
Control Delay	2.7			0.7	49.4	33.9
Queue Delay	0.0			1.5	0.0	0.0
Total Delay	2.7			2.2	49.4	33.9
LOS	A			A	D	C
Approach Delay	2.7			2.2	47.4	
Approach LOS	A			A	D	
Queue Length 50th (ft)	110			4	162	38
Queue Length 95th (ft)	30			m4	204	74
Internal Link Dist (ft)	618			167	678	
Turn Bay Length (ft)						
Base Capacity (vph)	3591			2499	842	395
Starvation Cap Reductn	0			1778	0	0
Spillback Cap Reductn	89			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.64			0.68	0.55	0.18

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 10 (9%), Referenced to phase 4:EBT and 8:WBT, Start of Green			
Natural Cycle: 45			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 10.0		Intersection LOS: B	
Intersection Capacity Utilization 62.1%		ICU Level of Service B	
Analysis Period (min) 15			

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

Splits and Phases: 12: I-295 NB Off & Collins Road

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Lanes, Volumes, Timings
15: I-295 SB On & Collins Road

02/05/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	0	2060	850	0	765	115	0	0	0	0	0	0
Future Volume (vph)	0	2060	850	0	765	115	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	25		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994	0.850		0.980							
Flt Protected												
Satd. Flow (prot)	0	3370	1441	0	4984	0	0	0	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	3370	1441	0	4984	0	0	0	0	0	0	0
Link Speed (mph)		40			40			30			40	
Link Distance (ft)		281			698			728			1032	
Travel Time (s)		4.8			11.9			16.5			17.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2239	924	0	832	125	0	0	0	0	0	0
Shared Lane Traffic (%)			10%									
Lane Group Flow (vph)	0	2331	832	0	957	0	0	0	0	0	0	0
Enter Blocked Intersection	No	Yes	Yes	No	Yes	Yes	No	No	No	No	No	No
Lane Alignment	Left	Right	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 69.3%		ICU Level of Service C	
Analysis Period (min) 15			

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Lane Group	EBU	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations								
Traffic Volume (vph)	1095	0	1030	0	0	955	0	0
Future Volume (vph)	1095	0	1030	0	0	955	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.88	1.00	1.00
Frt						0.850		
Flt Protected	0.950							
Satd. Flow (prot)	1770	0	3539	1863	0	2787	0	0
Flt Permitted	0.950							
Satd. Flow (perm)	1770	0	3539	1863	0	2787	0	0
Link Speed (mph)			40		40		40	
Link Distance (ft)			501		267		201	
Travel Time (s)			8.5		4.6		3.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1190	0	1120	0	0	1038	0	0
Shared Lane Traffic (%)								
Lane Group Flow (vph)	1190	0	1120	0	0	1038	0	0
Enter Blocked Intersection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lane Alignment	R NA	Left	Left	R NA	Left	Right	Left	Right
Median Width(ft)			24		24		0	
Link Offset(ft)			0		0		0	
Crosswalk Width(ft)			16		16		16	
Two way Left Turn Lane								
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	25	25		25		40	25	25
Sign Control			Free		Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 64.0%		ICU Level of Service B	
Analysis Period (min) 15			

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Lanes, Volumes, Timings
22: Collins Road/I-295 NB On Ramp

02/05/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	0	0	2125	0	450	505	0	0	0	0	1095	0
Future Volume (vph)	0	0	2125	0	450	505	0	0	0	0	1095	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.76	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.921							
Flt Protected												
Satd. Flow (prot)	0	0	3610	0	3260	0	0	0	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	0	0	3610	0	3260	0	0	0	0	0	1863	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					81							
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		247			434			659			501	
Travel Time (s)		4.2			7.4			11.2			8.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	2310	0	489	549	0	0	0	0	1190	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	2310	0	1038	0	0	0	0	0	1190	0
Enter Blocked Intersection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			0			0			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	25		25	40		25	25		25	25		25
Number of Detectors			1		2						2	
Detector Template			Right		Thru						Thru	
Leading Detector (ft)			20		100						100	
Trailing Detector (ft)			0		0						0	
Detector 1 Position(ft)			0		0						0	
Detector 1 Size(ft)			20		6						6	
Detector 1 Type			Cl+Ex		Cl+Ex						Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)			0.0		0.0						0.0	
Detector 1 Queue (s)			0.0		0.0						0.0	
Detector 1 Delay (s)			0.0		0.0						0.0	
Detector 2 Position(ft)					94						94	
Detector 2 Size(ft)					6						6	
Detector 2 Type					Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0						0.0	
Turn Type			Prot		NA						NA	
Protected Phases			4		8						7	
Permitted Phases												
Detector Phase			4		8						7	
Switch Phase												
Minimum Initial (s)			5.0		5.0						5.0	

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Lanes, Volumes, Timings
22: Collins Road/I-295 NB On Ramp

02/05/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Minimum Split (s)			10.5		11.0						11.0	
Total Split (s)			110.0		37.0						73.0	
Total Split (%)			100.0%		33.6%						66.4%	
Maximum Green (s)			106.0		31.0						67.0	
Yellow Time (s)			4.0		4.0						4.0	
All-Red Time (s)			0.0		2.0						2.0	
Lost Time Adjust (s)			0.0		0.0						0.0	
Total Lost Time (s)			4.0		6.0						6.0	
Lead/Lag					Lead						Lag	
Lead-Lag Optimize?					Yes						Yes	
Vehicle Extension (s)			3.0		3.0						3.0	
Recall Mode			C-Max		C-Max						None	
Act Effct Green (s)			110.0		31.0						67.0	
Actuated g/C Ratio			1.00		0.28						0.61	
v/c Ratio			0.64		1.06						1.05	
Control Delay			2.4		70.5						51.8	
Queue Delay			0.0		0.0						0.0	
Total Delay			2.4		70.5						51.8	
LOS			A		E						D	
Approach Delay		2.4			70.5						51.8	
Approach LOS		A			E						D	
Queue Length 50th (ft)			19		~387						~936	
Queue Length 95th (ft)			32		#510						#1167	
Internal Link Dist (ft)		167			354			579			421	
Turn Bay Length (ft)												
Base Capacity (vph)			3610		976						1134	
Starvation Cap Reductn			0		0						0	
Spillback Cap Reductn			0		0						0	
Storage Cap Reductn			0		0						0	
Reduced v/c Ratio			0.64		1.06						1.05	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 4:EBR and 8:WBT, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.06
Intersection Signal Delay: 31.0 Intersection LOS: C
Intersection Capacity Utilization 96.3% ICU Level of Service F
Analysis Period (min) 15

~ 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.

Splits and Phases: 22: Collins Road/I-295 NB On Ramp

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Design Year 2030

PM Traffic

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Lanes, Volumes, Timings
6: Parramore Rd/I-295 SB Off & Collins Road

01/17/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1670	100	135	1975	0	95	0	225	385	105	690
Future Volume (vph)	0	1670	100	135	1975	0	95	0	225	385	105	690
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	335		0	0		250	0		0
Storage Lanes	0		0	1		0	2		1	2		3
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	0.97	1.00	0.88	0.97	0.95	0.76
Frt		0.992							0.850			0.850
Flt Protected				0.950			0.950			0.950		
Satd. Flow (prot)	0	5045	0	1770	5085	0	3433	0	2787	3433	3539	3610
Flt Permitted				0.083			0.667			0.950		
Satd. Flow (perm)	0	5045	0	155	5085	0	2410	0	2787	3433	3539	3610
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)		12							179			
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		516			281			493			453	
Travel Time (s)		8.8			4.8			8.4			7.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1815	109	147	2147	0	103	0	245	418	114	750
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1924	0	147	2147	0	103	0	245	418	114	750
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	R NA	Right	Left	Left	Right	L NA	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Number of Detectors		2		1	2		1		1	1	2	1
Detector Template		Thru		Left	Thru		Left		Right	Left	Thru	Right
Leading Detector (ft)		100		20	100		20		20	20	100	20
Trailing Detector (ft)		0		0	0		0		0	0	0	0
Detector 1 Position(ft)		0		0	0		0		0	0	0	0
Detector 1 Size(ft)		6		20	6		20		20	20	6	20
Detector 1 Type		Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0		0.0	0.0		0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)		0.0		0.0	0.0		0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)		0.0		0.0	0.0		0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type		NA		pm+pt	NA		Perm		Perm	Split	NA	Perm
Protected Phases		4		3	8					6	6	
Permitted Phases				8			2		2			6
Detector Phase		4		3	8		2		2	6	6	6

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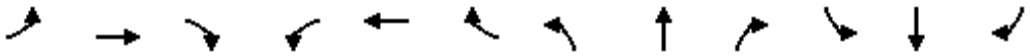
Lanes, Volumes, Timings
6: Parramore Rd/I-295 SB Off & Collins Road

01/17/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)		20.0		4.0	20.0		6.0		6.0	6.0	6.0	6.0
Minimum Split (s)		48.0		11.0	27.0		12.0		12.0	13.0	13.0	13.0
Total Split (s)		48.0		11.0	59.0		12.0		12.0	24.0	24.0	24.0
Total Split (%)		50.5%		11.6%	62.1%		12.6%		12.6%	25.3%	25.3%	25.3%
Maximum Green (s)		42.0		5.0	53.0		6.0		6.0	18.0	18.0	18.0
Yellow Time (s)		4.0		4.0	4.0		4.0		4.0	4.0	4.0	4.0
All-Red Time (s)		2.0		2.0	2.0		2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0		0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0		6.0	6.0		6.0		6.0	6.0	6.0	6.0
Lead/Lag		Lead		Lag								
Lead-Lag Optimize?		Yes		Yes								
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0	3.0	3.0	3.0
Recall Mode		C-Max		None	C-Max		None		None	None	None	None
Walk Time (s)		7.0			7.0		7.0		7.0	7.0	7.0	7.0
Flash Dont Walk (s)		11.0			11.0		11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0			0		0		0	0	0	0
Act Effct Green (s)		42.0		53.0	53.0		6.0		6.0	18.0	18.0	18.0
Actuated g/C Ratio		0.44		0.56	0.56		0.06		0.06	0.19	0.19	0.19
v/c Ratio		0.86		0.86	0.76		0.68		0.71	0.64	0.17	1.10
Control Delay		28.7		72.8	18.3		66.5		26.2	40.7	33.0	101.2
Queue Delay		0.0		0.0	0.0		0.0		0.0	0.0	0.0	0.0
Total Delay		28.7		72.8	18.3		66.5		26.2	40.7	33.0	101.2
LOS		C		E	B		E		C	D	C	F
Approach Delay		28.7			21.8			38.1			75.4	
Approach LOS		C			C			D			E	
Queue Length 50th (ft)		369		40	339		31		22	121	30	~226
Queue Length 95th (ft)		438		#149	401		#71		#75	171	55	#322
Internal Link Dist (ft)		436			201			413			373	
Turn Bay Length (ft)				335					250			
Base Capacity (vph)		2237		171	2836		152		343	650	670	684
Starvation Cap Reductn		0		0	0		0		0	0	0	0
Spillback Cap Reductn		0		0	0		0		0	0	0	0
Storage Cap Reductn		0		0	0		0		0	0	0	0
Reduced v/c Ratio		0.86		0.86	0.76		0.68		0.71	0.64	0.17	1.10

Intersection Summary			
Area Type:	Other		
Cycle Length: 95			
Actuated Cycle Length: 95			
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Green			
Natural Cycle: 95			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.10			
Intersection Signal Delay: 36.8		Intersection LOS: D	
Intersection Capacity Utilization 72.0%		ICU Level of Service C	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			

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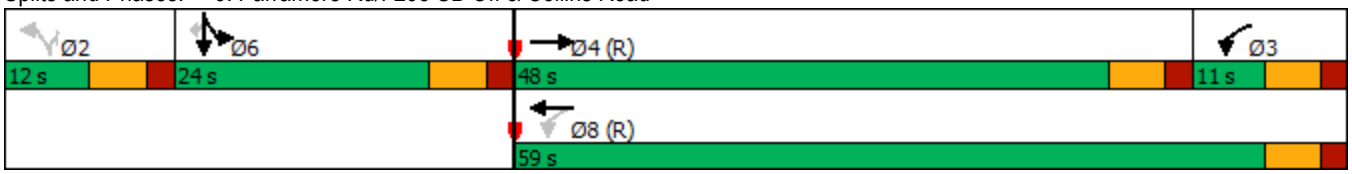
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Parramore Rd/I-295 SB Off & Collins Road



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	215	930	55	35	985	80	25	5	25	30	5	180
Future Volume (vph)	215	930	55	35	985	80	25	5	25	30	5	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	215		0	150		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992			0.989			0.938				0.850
Flt Protected	0.950			0.950				0.978			0.958	
Satd. Flow (prot)	1770	3511	0	1770	3500	0	0	1709	0	0	1785	1583
Flt Permitted	0.230			0.230				0.875			0.771	
Satd. Flow (perm)	428	3511	0	428	3500	0	0	1529	0	0	1436	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			14			27				151
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		267			516			197			555	
Travel Time (s)		4.6			8.8			4.5			12.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	234	1011	60	38	1071	87	27	5	27	33	5	196
Shared Lane Traffic (%)												
Lane Group Flow (vph)	234	1071	0	38	1158	0	0	59	0	0	38	196
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	pm+ov
Protected Phases	7	4		3	8			2			6	7
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		3	8		2	2		6	6	7

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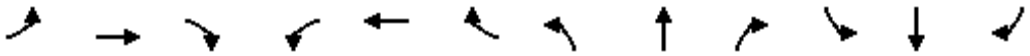
Lanes, Volumes, Timings
9: Collins Road & Plantation Bay Dr

01/17/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	11.0	24.0		11.0	24.0		24.0	24.0		24.0	24.0	11.0
Total Split (s)	12.0	30.0		11.0	29.0		24.0	24.0		24.0	24.0	12.0
Total Split (%)	18.5%	46.2%		16.9%	44.6%		36.9%	36.9%		36.9%	36.9%	18.5%
Maximum Green (s)	6.0	24.0		5.0	23.0		18.0	18.0		18.0	18.0	6.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	6.0
Lead/Lag	Lag	Lag		Lead	Lead							Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		Max	Max		Max	Max	None
Walk Time (s)		7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		11.0			11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effct Green (s)	30.6	30.6		23.0	23.0			18.0			18.0	30.0
Actuated g/C Ratio	0.47	0.47		0.35	0.35			0.28			0.28	0.46
v/c Ratio	0.72	0.65		0.15	0.93			0.13			0.10	0.24
Control Delay	35.8	17.0		15.4	34.9			12.3			18.3	4.2
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	35.8	17.0		15.4	34.9			12.3			18.3	4.2
LOS	D	B		B	C			B			B	A
Approach Delay		20.4			34.3			12.3			6.5	
Approach LOS		C			C			B			A	
Queue Length 50th (ft)	45	133		10	224			9			11	9
Queue Length 95th (ft)	#165	#278		27	#354			34			31	41
Internal Link Dist (ft)		187			436			117			475	
Turn Bay Length (ft)	215			150								
Base Capacity (vph)	325	1658		254	1247			442			397	811
Starvation Cap Reductn	0	0		0	0			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.72	0.65		0.15	0.93			0.13			0.10	0.24

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 65			
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.93			
Intersection Signal Delay: 25.0		Intersection LOS: C	
Intersection Capacity Utilization 66.5%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

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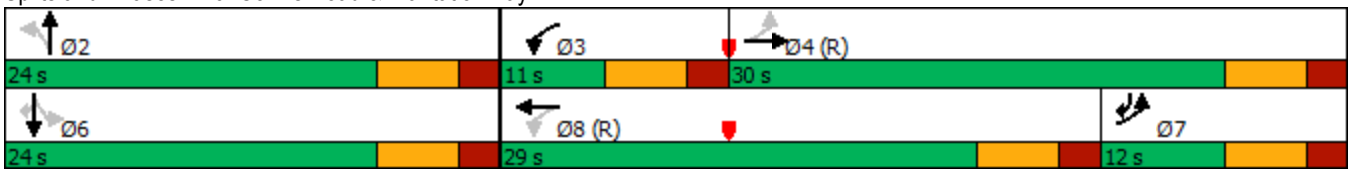
Splits and Phases: 9: Collins Road & Plantation Bay Dr



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Lane Group	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Traffic Volume (vph)	1560	0	0	840	1355	170
Future Volume (vph)	1560	0	0	840	1355	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		2	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	1.00	1.00	0.95	0.97	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	5085	0	0	3539	3433	1583
Flt Permitted					0.950	
Satd. Flow (perm)	5085	0	0	3539	3433	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						2
Link Speed (mph)	40			40	30	
Link Distance (ft)	698			247	758	
Travel Time (s)	11.9			4.2	17.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1696	0	0	913	1473	185
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1696	0	0	913	1473	185
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Left
Median Width(ft)	0			8	24	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Number of Detectors	2			2	1	1
Detector Template	Thru			Thru	Left	Right
Leading Detector (ft)	100			100	20	20
Trailing Detector (ft)	0			0	0	0
Detector 1 Position(ft)	0			0	0	0
Detector 1 Size(ft)	6			6	20	20
Detector 1 Type	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0			0.0	0.0	0.0
Detector 1 Queue (s)	0.0			0.0	0.0	0.0
Detector 1 Delay (s)	0.0			0.0	0.0	0.0
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA			NA	Prot	Prot
Protected Phases	4			8	2	2
Permitted Phases						
Detector Phase	4			8	2	2

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Lanes, Volumes, Timings
12: I-295 NB Off & Collins Road

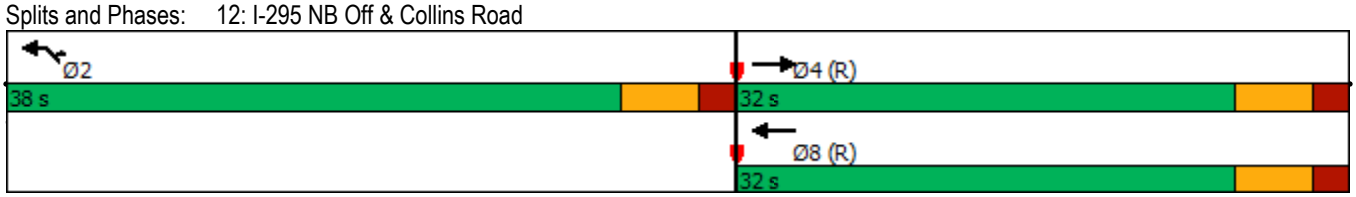
01/17/2020

Lane Group	EBT	EBR	WBL	WBT	NWL	NWR
Switch Phase						
Minimum Initial (s)	5.0			5.0	5.0	5.0
Minimum Split (s)	11.0			11.0	11.0	11.0
Total Split (s)	32.0			32.0	38.0	38.0
Total Split (%)	45.7%			45.7%	54.3%	54.3%
Maximum Green (s)	26.0			26.0	32.0	32.0
Yellow Time (s)	4.0			4.0	4.0	4.0
All-Red Time (s)	2.0			2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	6.0			6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Recall Mode	C-Max			C-Max	None	None
Act Effct Green (s)	26.2			26.2	31.8	31.8
Actuated g/C Ratio	0.37			0.37	0.45	0.45
v/c Ratio	0.89			0.69	0.94	0.26
Control Delay	28.3			21.9	32.5	12.8
Queue Delay	0.0			50.4	0.0	0.0
Total Delay	28.3			72.3	32.5	12.8
LOS	C			E	C	B
Approach Delay	28.3			72.3	30.3	
Approach LOS	C			E	C	
Queue Length 50th (ft)	246			170	295	46
Queue Length 95th (ft)	#342			234	#448	86
Internal Link Dist (ft)	618			167	678	
Turn Bay Length (ft)						
Base Capacity (vph)	1901			1323	1569	724
Starvation Cap Reductn	0			499	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.89			1.11	0.94	0.26

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 38.5 Intersection LOS: D
Intersection Capacity Utilization 78.8% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 12: I-295 NB Off & Collins Road



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Lanes, Volumes, Timings
15: I-295 SB On & Collins Road

01/17/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	0	1560	720	0	2110	85	0	0	0	0	0	0
Future Volume (vph)	0	1560	720	0	2110	85	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	25		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993	0.850		0.994							
Flt Protected												
Satd. Flow (prot)	0	3366	1441	0	5055	0	0	0	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	3366	1441	0	5055	0	0	0	0	0	0	0
Link Speed (mph)		40			40			30			40	
Link Distance (ft)		281			698			728			1032	
Travel Time (s)		4.8			11.9			16.5			17.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1696	783	0	2293	92	0	0	0	0	0	0
Shared Lane Traffic (%)			10%									
Lane Group Flow (vph)	0	1774	705	0	2385	0	0	0	0	0	0	0
Enter Blocked Intersection	No	Yes	Yes	No	Yes	Yes	No	No	No	No	No	No
Lane Alignment	Left	Right	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 54.1%		ICU Level of Service A	
Analysis Period (min) 15			

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Lane Group	EBU	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations								
Traffic Volume (vph)	530	0	1200	0	0	1190	0	0
Future Volume (vph)	530	0	1200	0	0	1190	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.88	1.00	1.00
Frt						0.850		
Flt Protected	0.950							
Satd. Flow (prot)	1770	0	3539	1863	0	2787	0	0
Flt Permitted	0.950							
Satd. Flow (perm)	1770	0	3539	1863	0	2787	0	0
Link Speed (mph)			40		40		40	
Link Distance (ft)			516		267		201	
Travel Time (s)			8.8		4.6		3.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	576	0	1304	0	0	1293	0	0
Shared Lane Traffic (%)								
Lane Group Flow (vph)	576	0	1304	0	0	1293	0	0
Enter Blocked Intersection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lane Alignment	R NA	Left	Left	R NA	Left	Right	Left	Right
Median Width(ft)			24		24		0	
Link Offset(ft)			0		0		0	
Crosswalk Width(ft)			16		16		16	
Two way Left Turn Lane								
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	25	25		25		40	25	25
Sign Control			Free		Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 45.0%		ICU Level of Service A	
Analysis Period (min) 15			

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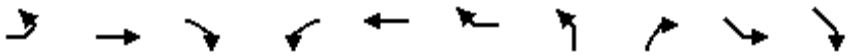

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SEL	SER
Lane Configurations										
Traffic Volume (vph)	0	0	1730	0	840	350	530	0	0	0
Future Volume (vph)	0	0	1730	0	840	350	530	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.76	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frt			0.850		0.956					
Flt Protected							0.950			
Satd. Flow (prot)	0	0	3610	0	3383	0	1770	0	0	0
Flt Permitted							0.950			
Satd. Flow (perm)	0	0	3610	0	3383	0	1770	0	0	0
Right Turn on Red			Yes			Yes		Yes		
Satd. Flow (RTOR)					135					
Link Speed (mph)		40			40		40		40	
Link Distance (ft)		247			434		516		659	
Travel Time (s)		4.2			7.4		8.8		11.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	1880	0	913	380	576	0	0	0
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	0	1880	0	1293	0	576	0	0	0
Enter Blocked Intersection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Left	Right
Median Width(ft)		12			0		12		0	
Link Offset(ft)		0			0		0		0	
Crosswalk Width(ft)		16			16		16		16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	25		25	40		25	25	25	25	25
Number of Detectors			1		2		1			
Detector Template			Right		Thru		Left			
Leading Detector (ft)			20		100		20			
Trailing Detector (ft)			0		0		0			
Detector 1 Position(ft)			0		0		0			
Detector 1 Size(ft)			20		6		20			
Detector 1 Type			Cl+Ex		Cl+Ex		Cl+Ex			
Detector 1 Channel										
Detector 1 Extend (s)			0.0		0.0		0.0			
Detector 1 Queue (s)			0.0		0.0		0.0			
Detector 1 Delay (s)			0.0		0.0		0.0			
Detector 2 Position(ft)					94					
Detector 2 Size(ft)					6					
Detector 2 Type					Cl+Ex					
Detector 2 Channel										
Detector 2 Extend (s)					0.0					
Turn Type			Prot		NA		Prot			
Protected Phases			4		8		7			
Permitted Phases										
Detector Phase			4		8		7			
Switch Phase										
Minimum Initial (s)			5.0		5.0		5.0			

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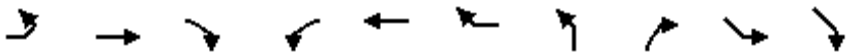
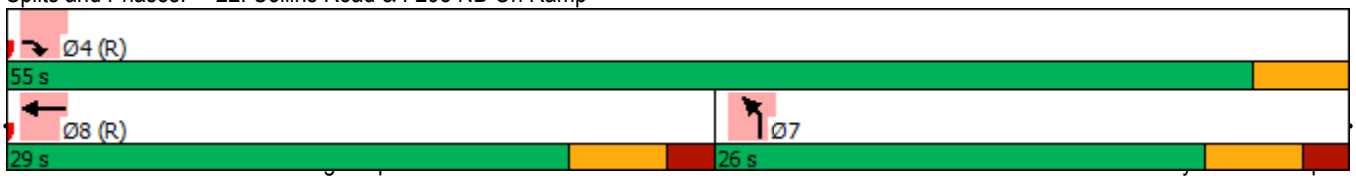


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SEL	SER
Minimum Split (s)			10.5		11.0		11.0			
Total Split (s)			55.0		29.0		26.0			
Total Split (%)			100.0%		52.7%		47.3%			
Maximum Green (s)			51.0		23.0		20.0			
Yellow Time (s)			4.0		4.0		4.0			
All-Red Time (s)			0.0		2.0		2.0			
Lost Time Adjust (s)			0.0		0.0		0.0			
Total Lost Time (s)			4.0		6.0		6.0			
Lead/Lag					Lead		Lag			
Lead-Lag Optimize?					Yes		Yes			
Vehicle Extension (s)			3.0		3.0		3.0			
Recall Mode			C-Max		C-Max		None			
Act Effct Green (s)			55.0		23.0		20.0			
Actuated g/C Ratio			1.00		0.42		0.36			
v/c Ratio			0.52		0.87		0.90			
Control Delay			0.5		21.3		35.3			
Queue Delay			0.0		0.0		0.0			
Total Delay			0.5		21.3		35.3			
LOS			A		C		D			
Approach Delay		0.5			21.3		35.3			
Approach LOS		A			C		D			
Queue Length 50th (ft)			0		173		172			
Queue Length 95th (ft)			0		#302		#343			
Internal Link Dist (ft)		167			354		436		579	
Turn Bay Length (ft)										
Base Capacity (vph)			3610		1493		643			
Starvation Cap Reductn			0		0		0			
Spillback Cap Reductn			0		0		0			
Storage Cap Reductn			0		0		0			
Reduced v/c Ratio			0.52		0.87		0.90			

Intersection Summary

Area Type: Other
Cycle Length: 55
Actuated Cycle Length: 55
Offset: 0 (0%), Referenced to phase 4:EBR and 8:WBT, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 13.0 Intersection LOS: B
Intersection Capacity Utilization 73.8% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 22: Collins Road & I-295 NB On Ramp



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APPENDIX D

Safety Technical Memo

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I-295 at Collins Road IOAR
Safety Analysis

1.0 Purpose

The purpose of this memo is to document the safety analysis performed for the I-295 at Collins Road Interchange Operational Analysis Report (IOAR) Re-Evaluation. The Florida Department of Transportation (FDOT) has updated its original design, specifically at the I-295 at I-295 Northbound Ramps, in order to address existing and future congestion on the I-295 at Collins Road interchange. This safety analysis is an update to the previous IOAR safety analysis.

2.0 Methodology

2.1 Study Area

The study area for the I-295 at Collins Road IOAR is along Collins Road from Rampart Road to Plantation Bay Drive and includes the I-295 Collector-Distributer (CD) road at Collins Road signalized ramp terminals.

2.2 Data Collection

Historical crash data for the project study area was obtained for a five-year crash period, 2012 through 2016, along the Collins Road mainline at I-295 study CD system interchange ramps, and the intersections of Plantation Bay Drive, Rampart Road, Parramore Road, and Star Rush Road/Collins Crossing. This data included the number of crashes, type, location, severity, and property damage as well as driver information and incident descriptions recorded by emergency responders.

2.3 Safety Analysis

Safety analysis was performed on the collected data using methodology found in the FDOT Highway Safety Manual. Crash Modification Factors (CMF) from the Federal Highway Administration's online clearinghouse were reviewed, but the proposed design is unique and therefore there were no applicable CMFs in the clearinghouse. The previously approved safety analysis performed by FDOT used FDOT specific Crash Reduction Factors (CRF) from the Crash Reduction Analysis System Hub (CRASH) provided by the FDOT Safety Office. Traffic data from Florida Traffic Online and the previous IOAR was also used.

3.0 Analysis Results

3.1 Crash locations

The study area for the Collins Road at I-295 interchange improvement experienced 238 crashes within the study time frame. Figure 1 shows the general trend in crash incidents documented along the project area. These crashes were primarily concentrated around the intersection of Rampart Road and the I-295 ramp terminals with Collins Road.

3.2 Crash Severity and Type

During the five-year crash analysis period (2012-2016), 238 crashers were reported along the project area. Of the 208 crashes, 84 (35 percent) were injury related and 154 (65 percent) resulted in Property Damage Only (PDO). No fatal crashes were reported during the crash analysis period. Other crash metrics along this project area include:

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- Rear-end crashes were the most common
- Angle crashes were the second highest type

Table 1: Reported Crash Severity and Type

	On I-295 Intersecting Collins Rd	On Plantation Bay Dr Intersecting Collins Rd	On Rampart Rd Intersecting Collins Rd	On Collins Rd Intersecting Parramore Rd	On Collins Rd Intersecting Plantation Bay Dr	On Collins Rd Intersecting Rampart Rd	On Collins Rd Intersecting Star Rush Rd	
Crash Severity								**Total**
Fatality	0	0	0	0	0	0	0	**0**
Injury	17	0	15	6	6	30	10	**84**
PDO*	18	4	29	8	13	71	11	**154**
Total:	**35**	**4**	**44**	**14**	**19**	**101**	**21**	**238**
Crash Type								**Total**
Rear End	20	1	30	14	3	64	18	**150**
Head On	2	0	2	0	2	3	0	**9**
Angle	11	1	6	0	9	15	1	**43**
Side Swipe	0	1	4	0	1	12	0	**18**
Rear to Side	0	0	0	0	1	1	0	**2**
Rear to Rear	0	0	0	0	0	0	0	**0**
Off Road	0	0	1	0	0	3	1	**5**
Rollover	0	0	0	0	0	0	0	**0**
Bike/Ped	1	0	0	0	0	0	0	**1**
Other/ Unknown	1	1	1	0	3	3	1	**10**
Total:	**35**	**4**	**44**	**14**	**19**	**101**	**21**	**238**

*Property Damages Only

Figure 2 emphasizes the high number of rear end collisions when compared to other types of crashes experienced along the project study area. The high volume of rear-end collisions is an indicator of heavily congested operational conditions along the project corridor.

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Figure 2: Crash Volume by Type

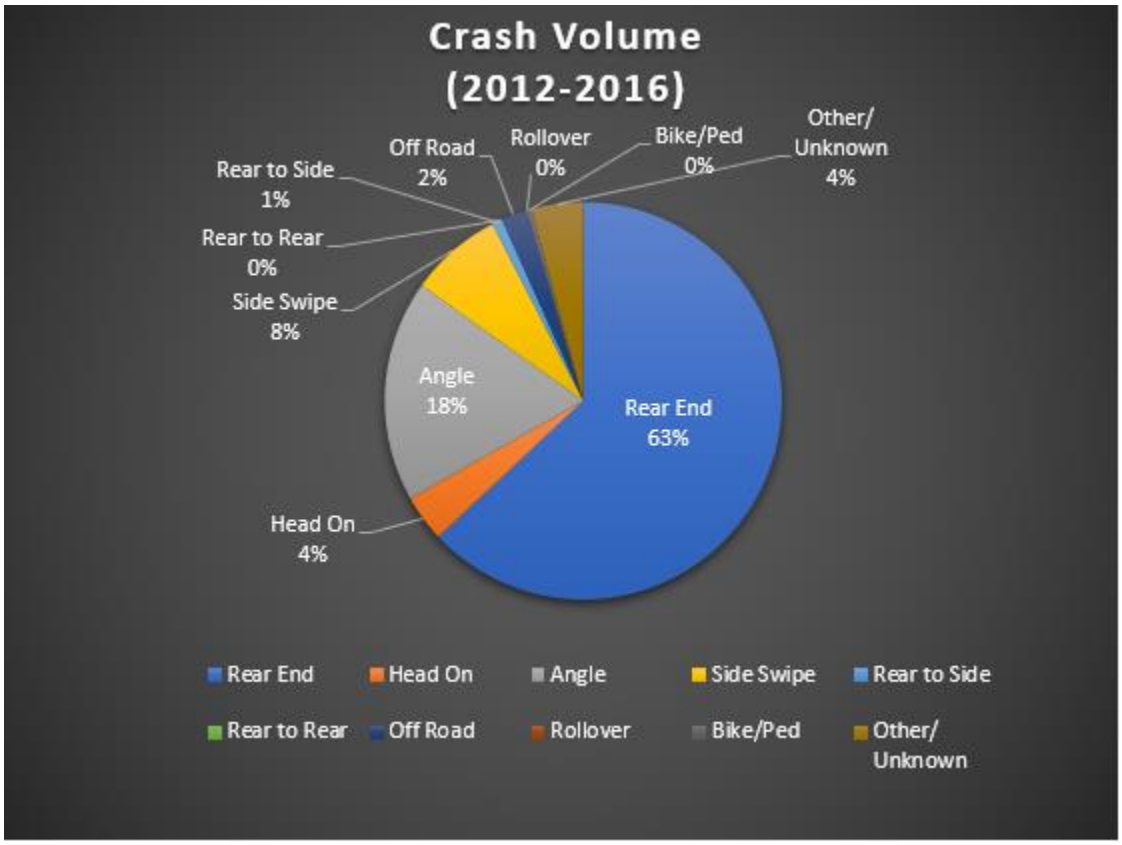

Table 2 shows the crash frequency and rates along the project area when compared against the 2016 AADT along Collins Road. As traffic continues to grow, the volume of crashes are anticipated to increase at a rate proportional to the crash rates below if no improvements are made along the project limits.

Table 2: Crash Rates and Frequency (2016 AADT)

	On I-295 Intersecting Collins Rd	On Plantation Bay Dr Intersecting Collins Rd	On Rampart Rd Intersecting Collins Rd	On Collins Rd Intersecting Parramore Rd	On Collins Rd Intersecting Plantation Bay Dr	On Collins Rd Intersecting Rampart Rd	On Collins Rd Intersecting Star Rush Rd
Crash Frequency (Crashes/yr)	7.0	0.8	8.8	2.8	3.8	20.2	4.2
Collins Rd 2016 AADT	18000	18000	18000	18000	18000	18000	18000
Crash Rate	1.1	0.1	1.3	0.4	0.6	3.1	0.6

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3.3 Crash Reduction

The Revised Build Alternative provides a displaced left turn, for the eastbound to northbound movement at the interchange. The originally approved design had the left turns crossing the westbound through traffic at a standard signalized intersection. The Revised Build Alternative has the turn around between the westbound and eastbound lane which brings the turning vehicles parallel to the westbound through vehicles, but on the left-hand side. A two-phase signal is provided which stops the westbound through vehicles while the eastbound to northbound vehicles cut across the westbound through lanes. The CRFs, from CRASH, were applied as applicable to the study intersections. The CRFs used are provided below.

- Add turn lane(s) and pavement resurfacing – 35%
- Modify intersection at signalized intersection – 6%

The crash reduction analysis was performed and provided below in Table 3.

Table 3: Crash Reduction Analysis

Intersection	Historical Crash Total	Historical Crash Frequency	CRF	Annual Reduction in Crashes
Collins Road at Rampart Road	144.0	28.8	0.35	10.1
Collins Road at Collins Crossing	12.0	2.4	0.00	0.0
Collins Road at I-295 SB Ramps	29.0	5.8	0.35	2.0
Collins Road at I-295 NB Ramps	20.0	4.0	0.06	0.2
Collins Road at Plantation Bay Drive	24.0	4.8	0.00	0.0
Total	229.0	45.8		12.4

Because of the unconventional design, CRFs that were the most appropriate were applied to the proposed intersection design. The total annual reduction in crashes is 12.4 crashes reduced per year. There are additional safety benefits specifically at the revised Collins Road at I-295 Northbound Ramps intersection that cannot be analyzed using the CRFs. For example, the proposed concept at the Northbound Ramps will extend the storage for the Collins Road Eastbound to I-295 Northbound movement. This should result in a reduction in rear-end crashes in the queue and some angle crashes at the adjacent intersection. The updated design will also help eliminate the weave along Collins Road in the westbound direction. This should reduce the number of sideswipe crashes.