



CONGESTION MANAGEMENT PROCESS MAJOR UPDATE



JUNE 2018

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1.0 INTRODUCTION

To improve transportation system performance and reliability, the St. Lucie Transportation Planning Organization (TPO) has retained Stanley Consultants, Inc. to complete the Congestion Management Process (CMP) major update. The completed CMP major update will identify and prioritize CMP projects with potential for inclusion in the Florida Department of Transportation (FDOT) Five-Year Work Program, the TPO's List of Priority Projects (LOPP), and the TPO's Transportation Improvement Program (TIP). It is estimated that approximately \$300,000 - \$400,00 per year of federal funds will be allocated by the St. Lucie TPO to CMP projects.

1.1 WHAT IS A CMP?

The CMP is a systematic, performance-based planning approach for congestion management within the TPO area. It is part of the comprehensive, continuing, and cooperative process utilized to meet the needs, vision, and goals of the area. The CMP allows the TPO to evaluate up-to-date information about the area's transportation system using performance measures and enables decision makers to evaluate alternative strategies and potential projects for congestion mitigation. In addition, it aids in moving these projects into the funding and implementation stages. A flow chart of the CMP process can be seen in **Figure 1**.

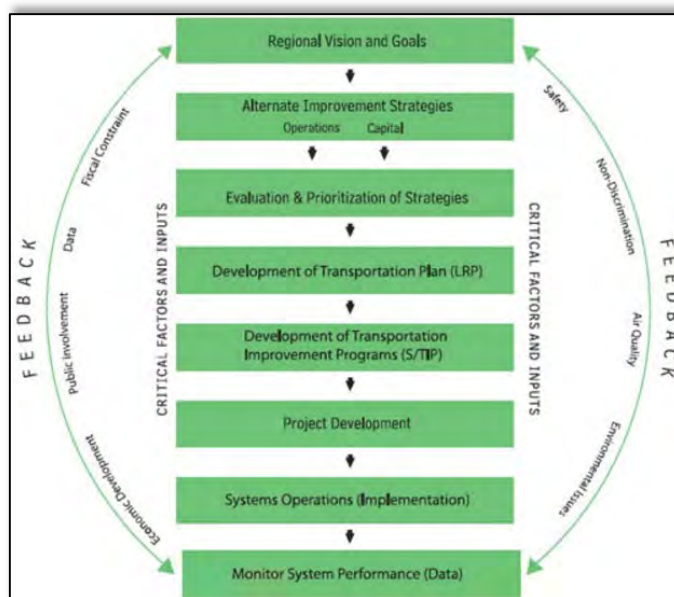


Figure 1 CMP Flow Chart (Source: FHWA)

This CMP major update has been broken into two phases: Phase 1 and Phase 2. Phase 1 is a system-wide screening evaluation of traffic count data and crash data that will identify roadway segments and intersections that experience undesirable levels of congestion and/or have safety issues. A prioritization ranking criteria using these performance measures will be utilized to assist in determining which projects should be further evaluated in Phase 2. Phase 2 of the CMP consists of a more in-depth analysis, developing congestion mitigation strategies and a priority ranking system for project implementation and planning.

1.2 BENEFITS OF A CMP

The CMP will benefit the TPO by providing a framework to respond to congestion and other operational issues. Benefits of the CMP include:

- A detailed identification of issues which enable the allocation of financial resources more effectively
- Reduced travel time delay
- Improved safety

Using the CMP's Phase 2 ranking system, the TPO will identify projects that will provide the most benefit to the multi-modal transportation network and then allocate the funds to these projects accordingly to reduce congestion and improve safety. Reducing travel time delay improves air quality conditions by reducing emissions from idling and helps motorists reduce fuel cost by spending less time in congested conditions.

1.3 GOALS AND OBJECTIVES

According to the Federal Highway Administration (FHWA), the CMP is an objective-driven, performance-based tool used for congestion management. This CMP major update supports the goals and objectives as outlined in the St. Lucie TPO's 2040 Long Range Transportation Plan (LRTP). The goal of the CMP major update is to identify, evaluate, and prioritize CMP projects for potential inclusion in the FDOT Work Program, the TPO's List of Priority Projects (LOPP), and the Transportation Improvement Program (TIP). The CMP Box Funds allocated by the TPO are approximately \$300,000 - \$400,000 annually.

Objectives of the CMP major update include collecting traffic and congestion performance measures, improving modal choice through improvements to bike/pedestrian and public transportation networks, improving efficiency of existing transportation services thru intelligent traffic systems (ITS), ensuring community participation is representative and prioritizing congestion projects.

1.4 CMP NETWORK

The CMP network is comprised of all major roadways in St. Lucie County that are included in the St. Lucie TPO's Traffic Count Data Management System. The Traffic Data Management System is available to the public through the St. Lucie TPO's website. This management system collects historic daily counts and peak hour traffic counts which are used to develop performance measure values. This network includes the City of Fort Pierce, the City of Port St. Lucie, and Unincorporated St. Lucie County. The homepage of the St. Lucie TPO Traffic Data Management System website is shown in **Figure 2**.

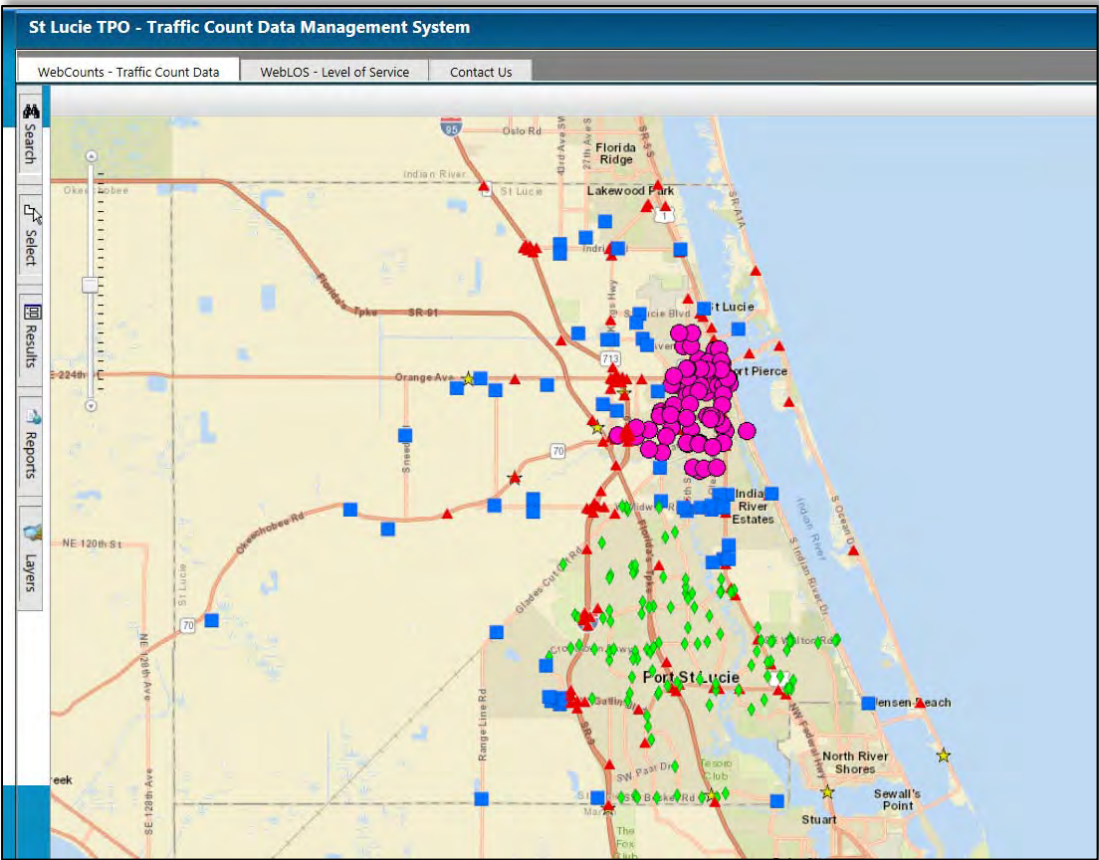


Figure 2 St. Lucie TPO - Traffic Count Data Management System

1.5 FEDERAL HIGHWAY ADMINISTRATION
CMP GUIDEBOOK

The Federal Highway Administration’s ‘Congestion Management Process: A Guidebook’ from April 2011, seen in **Figure 3**, was used as a reference guide for the development of the CMP Major Update. Other documents reviewed and used for this major update include the Federal Highway Administration (FHWA) Highway Capacity Manual (HCM), the Traffic Monitoring Guide (TMG), the St. Lucie TPO’s Go2040 Long Range Transportation Plan (LRTP) and Transportation Improvement Program (TIP).

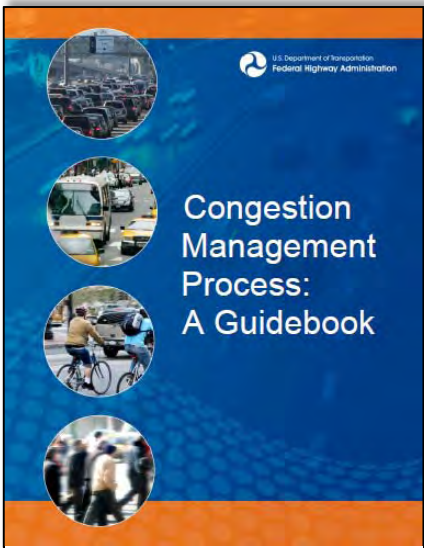


Figure 3 FHWA CMP Guidebook

2.0 PRIORITIZATION CRITERIA AND PERFORMANCE MEASURES

2.1 PERFORMANCE MEASURES

Per the Federal Highway Administration, a CMP must develop performance measures to support congestion management objectives and adequately assess system performance to clearly communicate problem areas. The developed performance measures should define and measure congestion within the CMP network using quantifiable measures. The performance measures developed for this major update considered regional objectives, and the availability of data sources to efficiently identify areas of congestion.

The CMP major update evaluated the network using a two-phase system. The first phase, Phase 1, used the performance measures to evaluate the CMP network on a macroscopic level. Intersections and segments were identified in Phase 1 and evaluated using the performance measures to determine which intersections and segments would be further analyzed in Phase 2. In Phase 2 congestion mitigation strategies were considered for the intersections and segments identified in Phase 1 and were evaluated using the performance measures listed below.

The proposed Phase 1 performance measures are shown below:

- Volume to Capacity ratio (V/C)
- Safety (intersections vs. segments)
- Key Stakeholder Input

The proposed Phase 2 performance measures are shown below:

- Type of Benefit (pedestrian, transit, etc.)
- Need based on safety and V/C
- Potential Issues
- Cost

2.2 PHASE 1 PRIORITIZATION CRITERIA

Three different performance measures were used to evaluate and rank Phase 1 segments and intersections; congestion, safety, and key stakeholder input. Phase 1 of this CMP major update focused on the CMP network on a larger macroscopic level.

SECTION 2

For this CMP major update, congestion was measured using volume to capacity (V/C) ratios. These ratios assist in determining the level of service of a roadway or intersection. This measure allows for an understanding of the intensity and relative severity of the congestion that affects travel.

Crash data for the past three years provided by the St. Lucie TPO was used for the safety performance measure.

Lastly, key stakeholder-identified roadway segments and intersections were assigned a value in the prioritization system as a performance measure. The prioritization criteria for each performance measure can be seen in Table 1 below. Crash segments and intersections identified by Key Stakeholder Input were both given a maximum score of five points to highlight their specialized knowledge of the CMP roadway network.

Prioritization criteria for Phase 1 to identify and assess project ranking is shown in **Table 1**.

Table 1 Prioritization Criteria

	V/C Ratio	Safety	Key Stakeholder Input
Range of Points	<= 0.80; 1 0.80 – 0.94; 2 0.94 – 1.00; 3 1.00 – 1.10; 4 1.10 – 10; 5	Intersections = 3 Segments = 5	5

2.3 PHASE 2 PRIORITIZATION CRITERIA

Performance measures were developed and used to rank projects for the Phase 2 section of the CMP major update. The Phase 2 performance measures and prioritization criteria use a point based system and is described below and in **Figure 4**. The point system utilized assigns more points to intersections and/or segments with a higher measure or perception of congestion and/or safety issues. Criteria consistent with LRTP or other TPO goals and objectives were assigned larger weight by having higher point values.

Benefit: Depending on the type of benefit the congestion mitigation strategy provided a different range of points were assigned to the proposed mitigation strategy. Consistent with the TPO goals and objectives and local agency input, it was determined that real-time traffic data collection and multi-use paths would provide the largest project benefit. If a project provided multiple benefits (i.e. sidewalks and base capacity improvements) the points were added together.

SECTION 2

Need: A score was assigned to each project based on the perceived need of the improvement due to historical crash data and volume to capacity ratio. Segments and intersections that have reported fatalities and current failing LOS received higher points.

Issues: A score was assigned to each project based on potential issues that might arise from the proposed solution. Due to the cost of right way, a proposed strategy that did not require right of way acquisition was scored higher points. If support was expressed for a project from the public, maintaining agency or stakeholder, it was assigned an additional 15 points in this category.

Cost: The CMP box funds are approximately \$300,000 - \$400,000 per year. Project improvements that were within this approximate range were assigned the most amount of points in the cost category. If a project was perceived to be less than \$300,000 it was also assigned the maximum amount of points for this category. If a project improvement was estimated to be more that \$1 million it was assigned the lowest score of one.

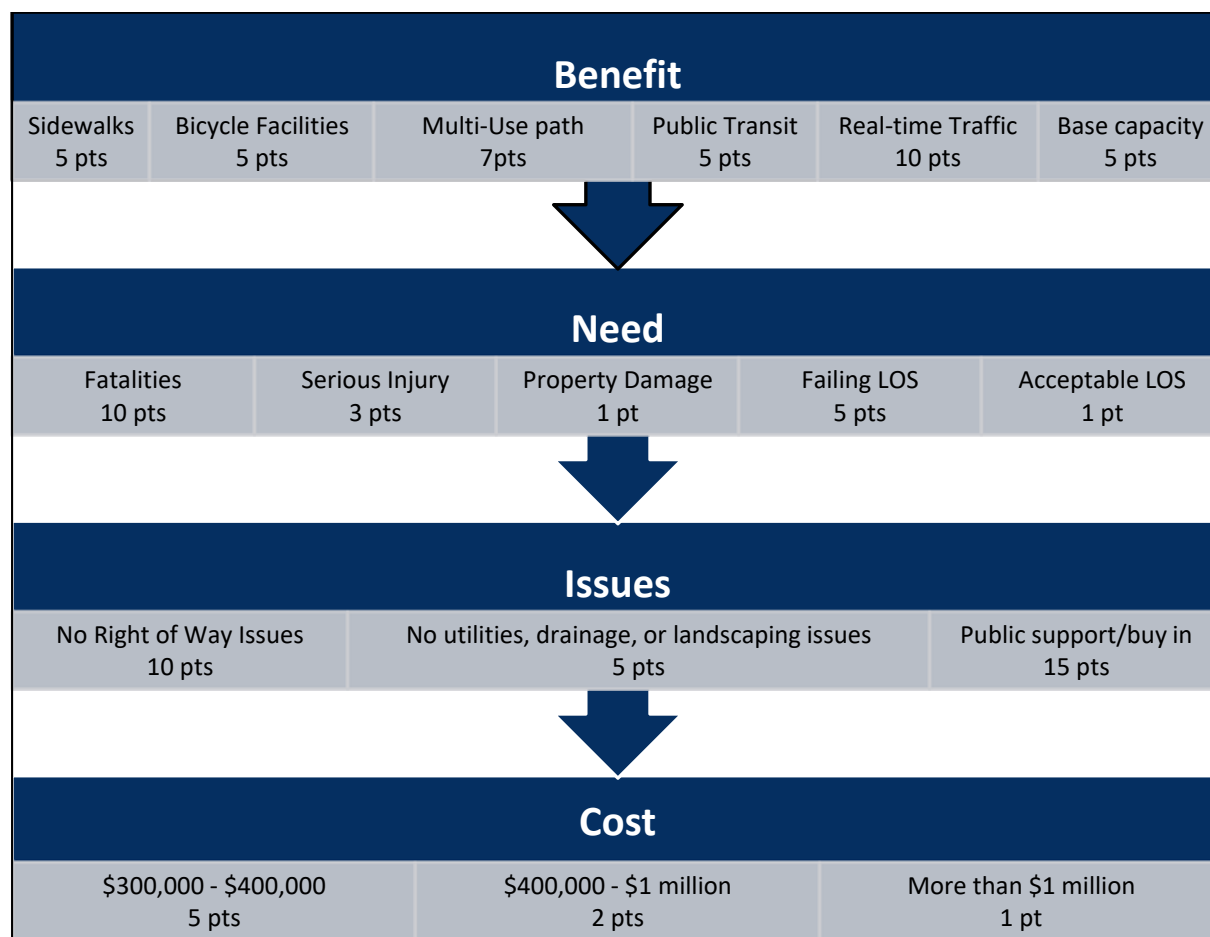


Figure 4 Phase 2 Ranking Criteria

2.4 ONGOING SYSTEM PERFORMANCE AND SYSTEM MONITORING

A main goal of a CMP is to keep an on-going data collection system to determine how efficient the strategies relieve congestion and where the congestion issues might be occurring in the CMP network. Currently the St. Lucie TPO has a Traffic Count Data Management System that collects daily and peak hour traffic counts on roadway segments located throughout the TPO area. The system has been integrated with a Level of Service Analysis System (LOSAS) which allows the TPO to calculate volume to capacity ratios of the segments. Segments with unacceptable volume to capacity ratio values are then used to identify congestion within the network. Unacceptable volume to capacity ratios are any values equal or greater than 1.0.

During the development stage of the update, TPO staff met and talked with several personnel at the City of Port St. Lucie and St. Lucie County. The City has recently implemented Travel-Time reliability data collection equipment at several of their major intersections. This infrastructure can alert traffic operation personnel when there is major congestion due to recurring or non-recurring incidents and readjust signal timing to alleviate congestion. Personnel at St. Lucie County expressed interest in this innovative infrastructure as a method to relieve congestion.

Using intelligent traffic systems (ITS) to collect real travel time data can help with calculating CMP network performance measures for future CMP major updates. Some of the data that can be collected and used to identify areas of congestion include vehicle throughput, person throughput and speed. These performance measures are summarized in **Table 2** below.

Table 2 Measurable Performance Measures

Measure	Definition	Units
Vehicle Throughput	The number of vehicles traversing a roadway section or passing a point per unit time	Vehicles per hour
Person Throughput	Number of persons (including private vehicle occupants, transit riders, pedestrians, and bicyclists) traversing a roadway section per unit time	Persons per hour
Speed	The average speed of vehicles measured in a single lane, for a single direction of flow, at a specific location on a roadway	Miles per hour

3.0 CMP TOOLBOX

The CMP toolbox is a federal guideline that identifies strategies developed to alleviate congestion. Federal guidelines state that a CMP shall include the identification and evaluation of the anticipated performance and expected benefits. Examples of congestion management strategies that can be considered are as follows:

- Demand management measures including growth management and congestion pricing
- Traffic operational improvements
- Public transportation improvements
- Intelligent Transportation Systems (ITS) technologies
- And where necessary, additional system capacity

The St. Lucie TPO CMP toolbox is comprised of 4 categories:

- Multimodal improvements
- Transportation systems management and operations improvements with real travel time data collection
- Transportation demand management
- Roadway capacity improvements

3.1 MULTIMODAL IMPROVEMENTS

Multimodal CMP strategies help support livable communities while providing users modal choice and decreasing vehicular congestion. Multimodal improvements include the following:

- Addition of sidewalks
- Addition of bicycle lanes
- Addition of multi-use paths
- Public transit

Implementing multimodal strategies can further benefit a community by:

- Decreasing household transportation costs
- Improving air quality
- Reducing greenhouse gas emissions
- Improving public health

3.2 IMPLEMENT TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS (TMS&O)

Improving reliability of the roadway CMP network aids in enhancing customer expectations, making more efficient use of the existing transportation system. According to FHWA, TSM&O is more than a group of strategies or technologies and is founded on the guiding principles of managing and operating the transportation system in an integrated, active and performance-driven manner.

By implementing ITS infrastructure into the transportation network, real time traffic data can be collected and used to develop performance-based planning and programming. ITS technologies that collect data that can be used in the CMP include continuous point-based detectors, adaptive signal control cameras and Bluetooth technologies.

The St. Lucie TPO recognizes the need for adaptive traffic signal control (ATSC) and real-time traffic information. With Florida Department of Transportation District IV, a study was completed and a master plan for the Advanced Transportation Management System (ATMS) was developed and can be seen in **Figure 5**. The plan recommends improvements such as fiber optic cable, cameras for vehicle detection, surveillance Closed Circuit Television (CCTV) and traffic operations center. Implementing ATSC can reduce arterial travel time, travel delay, number of stops, intersection delay, queue lengths and increase arterial speed.



Figure 5 St. Lucie TPO ATMS Report

3.3 TRANSPORTATION DEMAND MANAGEMENT (TDM)

TDM tools try to help mitigate congestion by providing more trip choice and redistribute the timing of traffic demand to lessen the amount of peak period trips. Strategies that fall under this category include work site commuter choice programs, carpool and vanpool projects, providing park and ride lots and dedicating travel lanes for transit operations.

3.4 ADDING BASE CAPACITY

Where absolutely necessary and when other mitigation strategies cannot alleviate congestion, adding capacity to the roadway network is considered a strategy to assist in the mitigation of congestion. Capacity improvements include intersection improvements such as adding or extending turn lanes and roadway widening.

4.0 DATA COLLECTION

In order to determine where congestion is located in the CMP network, data collection was performed to calculate performance measures and identify key segments and intersections. The sections below describe the collection data process.

4.1 VOLUME TO CAPACITY RATIO

Volume to capacity information for the CMP network was collected from the St. Lucie TPO. The TPO currently manages a Traffic Count Data Management System (TCDMS), see **Figure 6**, that collects and reports traffic data information. The system contains approximately 485 count stations. The TCDMS has been enhanced with the Level

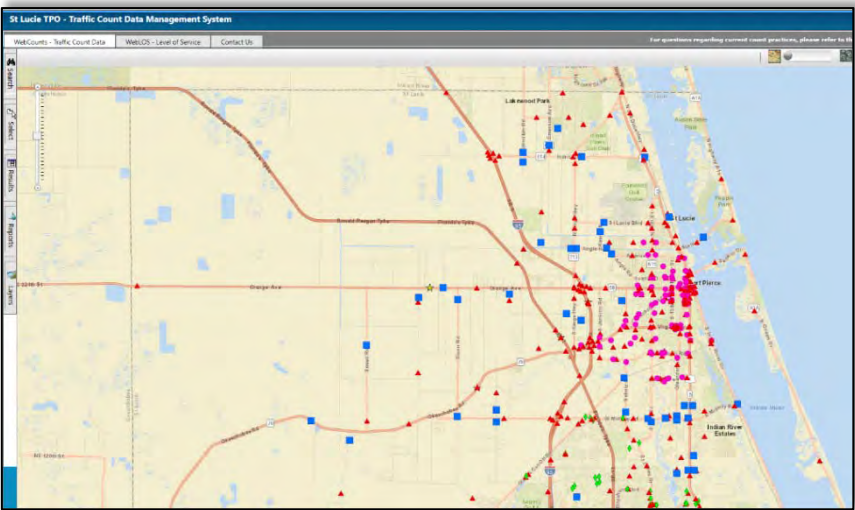


Figure 6 St. Lucie TPO Interactive TCDMS

of Service Analysis System which allows the TPO to evaluate congestion and operating conditions of the roadway network for performance. Volume to capacity ratios are calculated for AM and PM peak period. An example of the report that the TCDMS provides can be seen in **Figure 7**.

St. Lucie Transportation Planning Organization			Traffic Counts and Level of Service Report Fall 2017								Coco Vista Centre 466 SW Port St. Lucie Blvd, Suite 111 Port St. Lucie, FL 34953 772-462-1593 www.stlucietpo.org		
Roadway Name	Location	STATION ID	AADT	Last Count Year	Pk Hr Service Capacity	AM Pk Hr Pk Dir			PM Pk Hr Pk Dir			LOS	V/C
						Volume	LOS	V/C	Volume	LOS	V/C		
EAST TORINO PKWY	TORINO PKWY to MIDWAY RD	237	13,000	2017	880	889	F	1.010	844	D	0.959		
EASY ST	US 1 to BUCHANAN DR	106	9,176	2016	750	825	F	1.031	636	D	0.848		
EASY ST	BUCHANAN DR to YUCCA DR	106	9,176	2016	540	825	F	1.422	636	F	1.097		

Figure 7 Traffic Counts and Level of Service Report (2017)

4.2 CRASH DATA

Crash data was collected using the Signal Four Analytics web-based system database. When the Phase 1 evaluation was completed the three most recent years of data was evaluated (2014-2016). The crash data provided from the Signal Four Analytics database is given in spreadsheet form but is also provided geo-spatially in an ArcGIS shapefile. A screenshot of the Signal Four Analytics user interface can be seen in Figure 8.

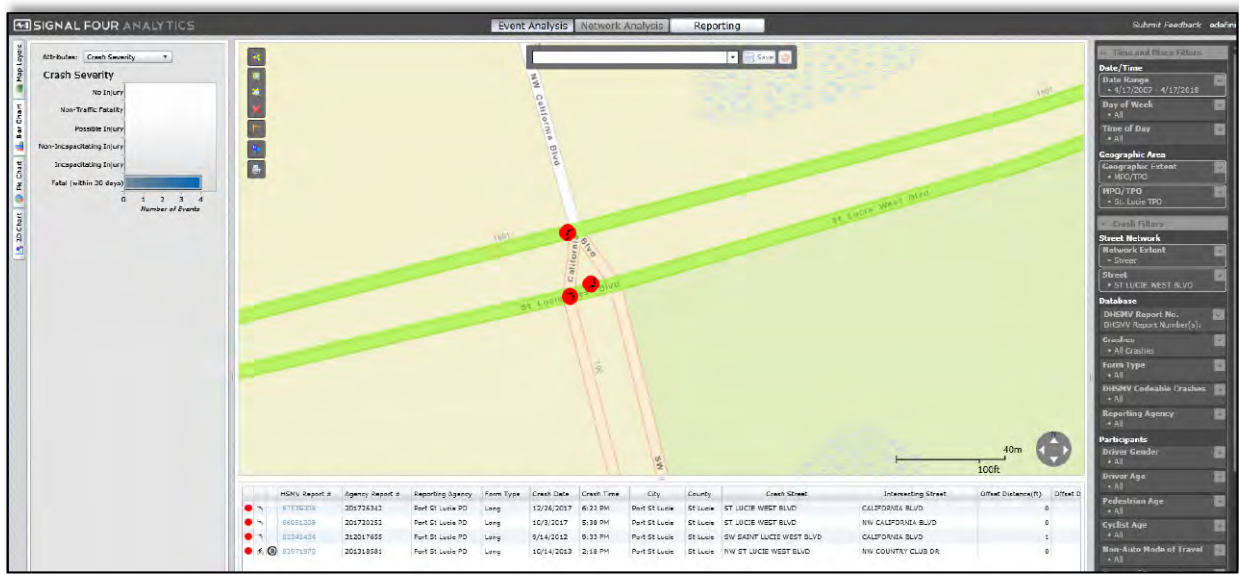


Figure 8 Signal Four Analytics Screenshot

4.3 STAKEHOLDERS/PUBLIC OUTREACH

The St. Lucie TPO receives public and stakeholder input regarding the CMP through meetings with local government officials, presentations to committees established by the TPO for coordination purposes, and having CMP documents available for public review.

As part of Phase 1, meetings were held with local government officials to obtain input on a list of congested corridors and intersections that should be considered for the CMP Major Update Phase 1 evaluation. Items that were discussed in the meeting included key intersections that should be considered for further evaluation, funding for future projects, CMP projects that have already been completed, multimodal needs and other areas need to be evaluated for improvements.

SECTION 4

Phase 1 of the CMP major update was presented at the following public meetings:

- Citizens Advisory Committee (CAC) – Tuesday, March 14, 2017
- Technical Advisory Committee (TAC) – Tuesday, March 14, 2017
- Bicycle/Pedestrian Advisory Committee (BPAC) – Thursday, March 16, 2017
- TPO Board – Wednesday, April 5, 2017

Comments from the meetings were recorded and integrated into the major update Phase 1 analysis and used to develop a list of projects for Phase 2 analysis. A summary of these comments can be found in the **Appendix B**.

Stakeholder and public outreach was continued in Phase 2 of the major update and local government officials commented on proposed congestion management solutions and mitigation strategies. These comments were then integrated in the Phase 2 mitigation strategies and used in the priority ranking criteria.

Phase 2 proposed congestion management solutions and mitigation strategies were presented to the TPO at the following meetings.

- Citizens Advisory Committee (CAC) – Tuesday, May 15, 2018
- Technical Advisory Committee (TAC) – Tuesday, May 15, 2018
- Bicycle/Pedestrian Advisory Committee (BPAC) – Thursday, May 17, 2018
- Transportation Planning Organization Board (TPO) – Wednesday, June 6, 2018

Phase 2 comments are summarized in the **Appendix B**.

5.0 PHASE 1 EVALUATION

The first phase of the CMP major update concentrated on providing a system-wide screening analysis to identify corridors and/or intersection that could require further analysis in the Phase 2 process.

Phase 1 analyzed the CMP Network on a macro scale. Using ArcGIS the network was analyzed to see which roadway segments and intersections experienced the most congestion based on volume to capacity information collected by the TPO on an annual basis. The concerned areas were then ranked and discussed with stakeholders to refine the list of concerned areas for further evaluation and ranking in the Phase 2 analysis.

5.1 VOLUME TO CAPACITY (V/C) – CONGESTION EVALUATION

Using a GIS database system, V/C ratios for the AM and PM peak hours were categorized and visually represented on a network map. The Traffic Data Management System does not provide V/C values for intersections so only segments were evaluated using this criterion. AM and PM peak hour V/C distribution for the County can be seen in **Figure 9**.

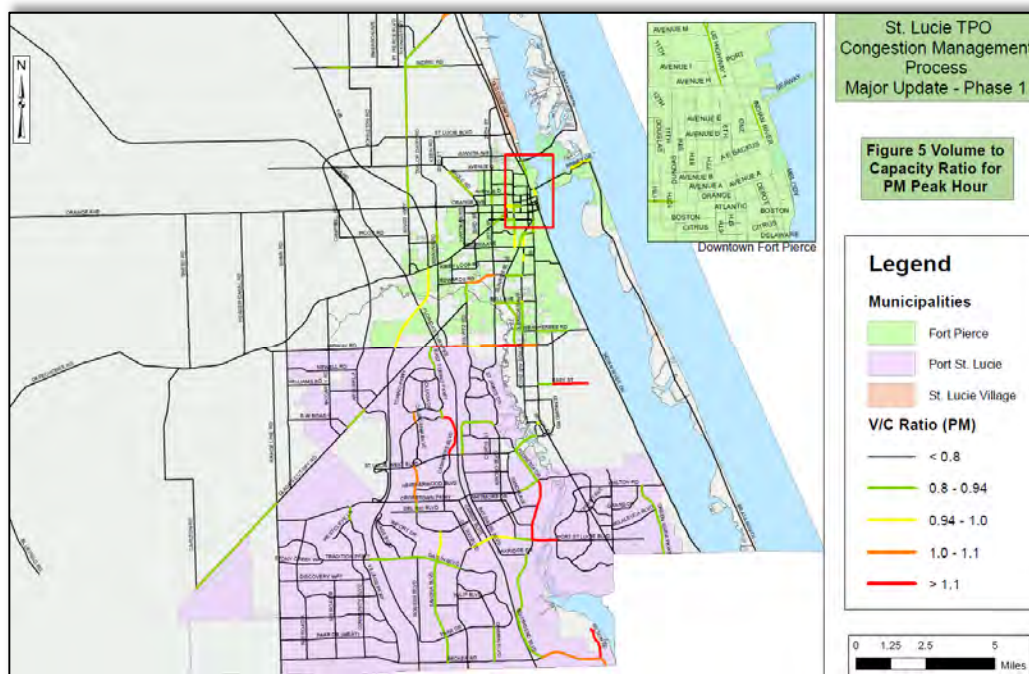


Figure 9 Phase 1 Volume to Capacity Ratio PM Peak

SECTION 5

5.2 SAFETY EVALUATION

Crash history for the entire TPO area was collected for three years (2014-2016) for the Phase 1 evaluation. The data was analyzed further in GIS to determine areas that experienced the highest intensity of crashes. The roadway segments that experienced high crash incidents in the City of Port St. Lucie can be seen in **Figure 10**. The roadway segments that experienced high crash incidents in the City of Fort Pierce can be seen in **Figure 11**.



Figure 10 High Crash Locations for City of Port St. Lucie

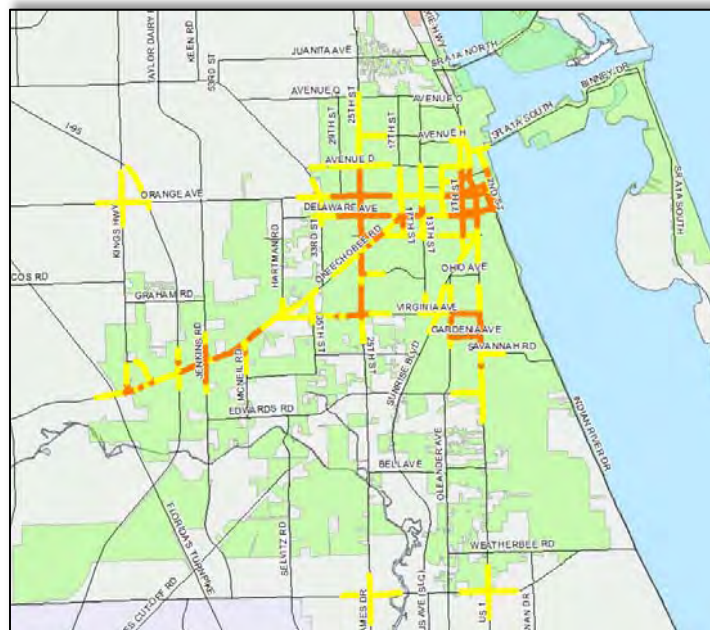


Figure 11 High Crash Locations for City of Fort Pierce

SECTION 5

5.3 KEY STAKEHOLDER INPUT

To obtain key stakeholder input, meetings were held to discuss key intersections and corridors where congestion was a known issue throughout the community. A geographical representation of the key stakeholder input can be seen in **Appendix B**. In addition, all projects listed by key stakeholders were assigned a one-time maximum value of 5. Due to stakeholders having a large understanding of the roadway network, projects they recommended for the CMP Major Update were weighed heavily.

5.4 PHASE 1 RANKING

The Phase 1 of the CMP Major Update evaluated the St. Lucie TPO roadway network for congestion issues using an analytic system approach with performance measures to prioritize existing congestion. Problem segments and intersections within the CMP network were evaluated based on existing volume to capacity ratios, number of vehicle crashes and stakeholder input. A complete list of identified and evaluated segments for CMP Phase 1 can be seen in **Table 3**.

Table 3 CMP Phase 1 Segments

ON STREET	FROM STREET	TO STREET	PHASE 1 PRIORITIZATION CRITERIA				TOTAL PTS
			V/C AM	V/C PM	SAFETY	STAKEHOLDERS	
Port St Lucie Blvd	Bayshore Blvd	Veterans Memorial Pkwy	5	5	5	0	15
Easy St	Buchanan Dr	Yucca Dr	5	5	0	5	15
Gatlin Blvd	W Of I-95	Port St Lucie Blvd	3	2	5	5	15
Floresta Dr	Port St Lucie Blvd	Prima Vista Blvd	5	5	0	5	15
Becker Rd	Southbend Blvd	Gilson Rd	4	4	0	5	13
Easy St	US 1	Buchanan Dr	5	2	0	5	12
California Blvd	Crosstown Pkwy	St Lucie West Blvd	3	4	0	5	12
Midway Rd	25th St	Oleander Ave	5	5	0	0	10
Cashmere Blvd	St Lucie West Blvd	Peacock Blvd	5	5	0	0	10
Gilson Rd	Becker Rd	Lakeridge Dr	5	5	0	0	10
Midway Rd	Milner Dr	W of Selvitz Rd	5	5	0	0	10
Crosstown Pkwy	Manth Ln	Floresta Dr	3	2	0	5	10
Port St Lucie Blvd	Tulip Blvd	Gatlin Blvd	0	0	5	5	10
St Lucie West Blvd	I 95	Bayshore Blvd	0	0	5	5	10
California Blvd	Peacock Blvd	Torino Pkwy	5	4	0	0	9
Midway Rd	East Torino Pkwy	Milner Dr	4	5	0	0	9
Midway Rd	Oleander Ave	US 1	4	4	0	0	8
Edwards Rd	Selvitz Rd	25th St	4	4	0	0	8

SECTION 5

ON STREET	FROM STREET	TO STREET	PHASE 1 PRIORITIZATION CRITERIA				TOTAL PTS
			V/C AM	V/C PM	SAFETY	STAKEHOLDERS	
Gilson Rd	Martin C.L.	Becker Rd	4	4	0	0	8
Midway Rd	W of Selvitz Rd	Selvitz Rd	4	4	0	0	8
Turnpike Feeder Rd	Turnpike Feeder Rd SB Ramp	US 1	4	4	0	0	8
Midway Rd	Christensen Rd	25th St	4	4	0	0	8
Port St Lucie Blvd	Del Rio Blvd	Bayshore Blvd	4	3	0	0	7
Prima Vista Blvd	Naranja Ave	Rio Mar Dr	5	2	0	0	7
Oleander Ave	Wisteria Ave	Gardenia Ave	4	3	0	0	7
Midway Rd	Selvitz Rd	Christensen Rd	3	3	0	0	6
Oleander Ave	Virginia Ave	Sunrise Blvd	3	3	0	0	6
Oleander Ave	Bell Ave	Farmer's Market Rd	3	3	0	0	6
Prima Vista Blvd	Floresta Dr	Naranja Ave	4	2	0	0	6
Southbend Blvd	Becker Rd	Floresta Dr	4	2	0	0	6
Bayshore Blvd	Prima Vista Blvd	Floresta Dr	3	2	0	0	5
Kings Hwy	St Lucie Blvd	Indrio Rd	3	2	0	0	5
Okeechobee Rd	25th St	Georgia Ave	3	2	0	0	5
Weatherbee Rd	US 1	Midway Rd	3	2	0	0	5
Rio Mar Dr	Beach Ave	US 1	2	3	0	0	5
I-95	Midway Rd	Okeechobee Rd	2	3	0	0	5
East Torino Pkwy	Torino Pkwy	Midway Rd	3	2	0	0	5
Savona Blvd	Gatlin Blvd	California Blvd	2	3	0	0	5
SR A1A South	Ocean Dr	Binney Dr	2	3	0	0	5
Savona Blvd	Paar Dr	Gatlin Blvd	3	2	0	0	5
Bayshore Blvd	Floresta Dr	Selvitz Rd	3	2	0	0	5
Bayshore Blvd	Selvitz Rd	25th St	3	2	0	0	5
Cashmere Blvd	Peacock Blvd	Torino Pkwy	3	2	0	0	5
Orange Ave	17th St	13th St	2	3	0	0	5
California Blvd	Del Rio Blvd	Crosstown Pkwy	3	2	0	0	5
Edwards Rd	Sunrise Blvd	Oleander Ave	3	2	0	0	5
Darwin Blvd	Becker Rd	Paar Dr	3	2	0	0	5
Glades Cut-Off Rd	Reserve Blvd	Commerce Center Dr	3	2	0	0	5
Indian River Dr	Avenue D	Seaway Dr	2	3	0	0	5
Indrio Rd	Kings Hwy	Slash Pine Trl	3	2	0	0	5
Okeechobee Rd	King HWY	Virginia AVE	0	0	5	0	5
25th ST	Virginia Ave	Orange Ave	0	0	5	0	5
S 2 nd St	Citrus Blvd	Ave A	0	0	5	0	5
US 1	Florida Ave	Seaway	0	0	5	0	5
US 1	Gardenia	Virginia Ave	0	0	5	0	5
Bayshore Blvd	Crosstown Pkwy	St Lucie West Blvd	0	0	5	0	5

SECTION 5

ON STREET	FROM STREET	TO STREET	PHASE 1 PRIORITIZATION CRITERIA				TOTAL PTS
			V/C AM	V/C PM	SAFETY	STAKEHOLDERS	
US 1	Dyer	Rio Mar	0	0	5	0	5
Crosstown Pkwy	Airoso Blvd	Floresta Dr	0	0	0	5	5
Lennard Rd	Mariposa Ave	Walton Rd	0	0	0	5	5
Alt A1A	N 4th St	End of Bridge	0	0	0	5	5
St James Dr	Royce Ave	Lazy River	0	0	0	5	5
Port St Lucie Blvd	Morningside Blvd	US 1	3	1	0	0	4
Floresta Dr	Oaklyn St	Port St Lucie Blvd	3	1	0	0	4
13th St	Virginia Ave	Nebraska Ave	1	3	0	0	4
35th St	Cortez Blvd	Virginia Ave	3	1	0	0	4
Mc Neil Rd	Kirby Loop Rd	Edwards Rd	3	1	0	0	4
Ft Pierce Blvd	Indrio Rd	Emerson Ave	3	1	0	0	4

Roadway segments located on the State Highway System or are currently under construction or undergoing a Project Development and Environment (PD&E) study were eliminated from being carried into the CMP Phase 2 analysis. This included major roadways such as Port St. Lucie Blvd, Midway Road, Crosstown Parkway, US 1 and Okeechobee Road. Due to safety being a key objective of the CMP Major Update and St. Lucie TPO, roadway segments that received five safety points have been included in the list of recommended projects for Phase 2 analysis regardless of total score. Segments identified in this safety analysis that are currently under construction, have planned funds or are on the State Highway System were not carried forward to Phase 2. A list of recommended roadway segments for Phase 2 analysis are listed in **Table 4**.

Table 4 Segments Recommended for Phase 2 Analysis

	ON STREET	FROM STREET	TO STREET
1	Easy St	US 1	Yucca Dr
2	Gatlin Blvd	W Of I-95	Port St Lucie Blvd
3	Floresta Dr	Port St Lucie Blvd	Prima Vista Blvd
4	Becker Rd	Southbend Blvd	Gilson Rd
5	California Blvd	Crosstown Pkwy	St Lucie West Blvd
6	Cashmere Blvd	St Lucie West Blvd	Peacock Blvd
7	Gilson Rd	Becker Rd	Lakeridge Dr
8	Crosstown Pkwy	Manth Ln	Floresta Dr
9	St Lucie West Blvd	I 95	Bayshore Blvd
10	S 2 nd St	Citrus Blvd	Ave A
11	Bayshore Blvd	Crosstown Pkwy	St Lucie West Blvd
12	Port St. Lucie Blvd	Tulip Blvd	Gatlin Blvd

SECTION 5

Intersections within the CMP network were evaluated based on key stakeholder and safety performance measures since volume to capacity ratios cannot be calculated for intersections. A complete list of identified and evaluated intersections for CMP Phase 1 is presented in **Table 5**.

Table 5 CMP Phase 1 Intersections

ROADWAY 1	ROADWAY 2	PHASE 1		TOTAL PTS.
		STAKEHOLDERS	SAFETY	
Mariposa Ave	US 1	5	3	8
Port St. Lucie Blvd	Gatlin Blvd	5	3	8
Gatlin Blvd	Savona Blvd	5	3	8
Prima Vista Blvd	Airoso Blvd	5	3	8
US 1	Virginia	5	3	8
Orange Ave	25th St	5	3	8
US 1	Georgia Ave	5	3	8
Orange Ave	Kings Hwy	5	3	8
Prima Vista Blvd	US 1	5	0	5
US 1	Edwards Rd	5	0	5
Virginia	25th St	5	0	5
US 1	SR-68	5	0	5
US 1	Ave H	5	0	5
Ft Pierce	Winter Garden	5	0	5
Okeechobee Rd	Midway Rd	5	0	5
Glades Cut Off Rd	Sevitz	5	0	5
Kings Hwy	Angle Rd	5	0	5
Village Green	Spanish Lakes	5	0	5
St. Lucie West	Peacock Blvd	5	0	5
Bayshore Blvd	Lakehurst Dr	5	0	5
Port St. Lucie Blvd	Cameo	5	0	5
Torino	Cashmere Blvd	5	0	5
St. James Dr	Peachtree	5	0	5
Gatlin Blvd	Brigantine	5	0	5
Port St. Lucie Blvd	Bayshore Blvd	0	3	3
Port St. Lucie Blvd	Veterans Memorial	0	3	3
Midway Rd	US 1	0	3	3
Midway Rd	25th St	0	3	3
Lennard Rd	Mariposa Ave	0	3	3

SECTION 5

Intersections that were given points for both the safety and stakeholder performance measures or received the maximum amount of points for safety and are not on the State Highway System or currently under construction were recommended for the Phase 2 analysis. Intersections that were eliminated from Phase 2 due to being on the State Highway System include US Highway 1, Orange Avenue, Port St. Lucie Boulevard and Midway Road. **Table 6** illustrates the intersections recommended for Phase 2 analysis.

Table 6 Intersections Recommended for Phase 2 Evaluation

ROADWAY 1		ROADWAY 2
1	Mariposa Ave	US 1
2	Gatlin Blvd	Savona Blvd
3	Prima Vista Blvd	Airoso Blvd
4	Lennard Road	Mariposa Ave

6.0 PHASE 2 EVALUATION

6.1 EXISTING CONDITIONS

To develop congestion management strategies for each intersection and segment, collected data was further analyzed. Volume to capacity ratios and calculated level of service based on capacity was analyzed for the past three years for all Phase 2 segments. The results from this analysis can be seen in **Table 7** below.

Table 7 Phase 2 Volume to Capacity Analysis

ON STREET	FROM	TO	2015		2016		2017	
			AM	PM	AM	PM	AM	PM
EASY ST	US 1	YUCCA DR	F (1.543)	F (1.212)	D (0.981)	D (0.757)	F (1.543)	F (1.212)
GATLIN BLVD	WEST of I-95	PORT ST. LUCIE BLVD	C (0.997)	C (0.813)	--	---	--	---
FLORESTA DR	PORT ST LUCIE BLVD	PRIMA VISTA BLVD	F (1.387)	F (1.207)	F (1.401)	F (1.163)	F (1.387)	F (1.207)
BECKER RD	SOUTHBEND BLVD	GILSON RD	F (1.076)	F (1.065)	F (1.134)	F (1.122)	F (1.157)	F (1.195)
CALIFORNIA BLVD	CROSTOWN PKWY	ST LUCIE WEST BLVD	D (0.952)	F (1.062)	F (1.074)	C (0.959)	D (0.989)	F (1.073)
CASHMERE BLVD	ST LUCIE WEST BLVD	PEACOCK BLVD	F (1.22)	F (1.188)	F (1.149)	F (1.132)	F (1.22)	F (1.188)
GILSON RD	BECKER RD	LAKERIDGE DR	F (1.376)	F (1.341)	F (1.555)	F (1.517)	F (1.619)	F (1.691)
CROSTOWN PKWY	MANTH LN	FLORESTA DR	C (0.996)	C (0.930)	C (0.978)	C (0.915)	D (0.506)	C (0.948)
ST. LUCIE WEST BLVD	I-95	BAYSHORE BLVD	C (0.852)	C (0.795)	C (0.763)	C (0.735)	C (0.858)	C (0.832)
2nd STREET	CITRUS AVE	AVE A	C (0.781)	C (0.641)	C (0.781)	C (0.641)	C (0.496)	C (0.467)
BAYSHORE BLVD	CROSTOWN PKWY	ST. LUCIE WEST BLVD	C (0.573)	C (0.562)	C (0.706)	C (0.742)	C (0.596)	C (0.580)
PORT ST. LUCIE BLVD	TULIP BLVD	GATLIN BLVD	C (0.534)	C (0.521)	C (0.555)	C (0.501)	C (0.538)	C (0.546)

In-depth crash analysis of each Phase 2 intersection and segment was completed in order to determine specific safety needs or concerns for these areas. The results from this analysis can be seen in **Table 8** for segments and **Table 9** for intersections. The top three (or four when tied) crash types for each segment and intersection are highlighted for clarity.

SECTION 6

Table 8 Phase 2 Segment Crash Analysis

	ON STREET	FROM STREET	TO STREET	Angle	Animal	Bike	Head On	Left Turn	Off Road	Pedestrian	Rear End	Right Turn	Rollover	Sideswipe	Other
1	Easy Street	US 1	Yucca Drive	0%	0%	0%	0%	7%	18%	0%	42%	0%	0%	15%	18%
2	Gatlin Blvd	W Of I-95	Port St Lucie Blvd	6%	0%	0%	0%	9%	3%	0%	45%	2%	1%	12%	22%
3	Floresta Dr	Port St Lucie Blvd	Prima Vista Blvd	7%	0%	0%	2%	10%	4%	0%	56%	2%	1%	9%	10%
4	Becker Rd	Southbend Blvd	Gilson Rd	7%	5%	0%	2%	10%	7%	0%	41%	3%	0%	12%	12%
5	California Blvd	Crosstown Pkwy	St Lucie West Blvd	2%	0%	2%	0%	13%	10%	0%	61%	0%	0%	7%	6%
6	Cashmere Blvd	St Lucie West Blvd	Peacock Blvd	6%	0%	1%	0%	9%	2%	0%	52%	2%	1%	9%	18%
7	Gilson Rd	Becker Rd	Lakeridge Dr	8%	0%	0%	0%	13%	4%	0%	63%	4%	0%	0%	8%
8	Crosstown Pkwy	Manth Ln	Floresta Dr	7%	0%	0%	2%	10%	4%	0%	56%	2%	1%	9%	10%
9	St Lucie West Blvd	I 95	Bayshore Blvd	4%	0%	1%	0%	7%	2%	1%	52%	2%	1%	9%	22%
10	S 2 nd St	Citrus Blvd	Ave A	4%	0%	0%	0%	4%	4%	2%	6%	0%	2%	8%	71%
11	Bayshore Blvd	Crosstown Pkwy	St Lucie West Blvd	3%	0%	1%	1%	4%	5%	1%	54%	2%	1%	14%	14%
12	Port St. Lucie Blvd	Tulip Blvd	Gatlin Blvd	3%	0%	1%	0%	12%	2%	1%	53%	2%	1%	11%	14%

Table 9 Phase 2 Intersection Crash Analysis

	Roadway 1	Roadway 2	Angle	Animal	Bike	Head On	Left Turn	Off Road	Pedestrian	Rear End	Right Turn	Rollover	Sideswipe	Other
1	Mariposa Ave /Port St. Lucie Blvd	US 1	4%	0%	1%	0%	4%	3%	0%	68%	0%	0%	17%	3%
2	Gatlin Blvd	Savona Blvd	4%	0%	0%	1%	8%	3%	1%	65%	2%	0%	6%	10%
3	Prima Vista Blvd	Airosa Blvd	7%	0%	2%	3%	13%	3%	0%	28%	7%	0%	16%	21%
4	Lennard Road	Mariposa Ave	9%	0%	0%	9%	0%	0%	0%	55%	9%	0%	9%	9%

SECTION 6

6.2 ANALYSIS AND RECOMMENDED IMPROVEMENTS

SEGMENTS

1. Easy Street from US-1 to Yucca Drive (Unincorporated St. Lucie County)

The level of service for the Easy Street corridor from US-1 to Yucca Drive was reported as failing in year 2015 and 2017. With coordination of the maintaining agency, St. Lucie County, a congestion mitigation strategy to improve the east leg of the intersection of Easy Street and US-1 Highway was developed. Currently there is a bulb-out raised median on this approach which can be confusing to drivers and causes congestion. An aerial of the existing intersection can be seen in **Figure 12**. It is recommended that this approach be improved to provide a narrow consistent width median with three lanes westbound and two lanes eastbound merging into the existing roadway. Sidewalks and wide paved shoulders for bike lanes should be included along with this proposed improvement. A preliminary sketch of the improvements can be seen in **Figure 13**.



Figure 12 Existing Easy St and US 1 Intersection



Figure 13 Proposed Mitigation Strategy

SECTION 6

2. Gatlin Boulevard from West of I-95 to Port St. Lucie Boulevard (City of Port St. Lucie)

The Gatlin Boulevard corridor from west of I-95 to Port St. Lucie Boulevard is a six-lane divided arterial with turn lanes at each intersection, good access management, sidewalks and public transit. The corridor has several signalized intersections as can be seen in **Figure 14**. Currently there is fiber optic cable that runs along Gatlin Boulevard. It is recommended that camera or video detection to collect travel-time data is implemented at these closely spaced intersections to improve progression. The travel-time traffic data could then be used to optimize signal timing plans to optimize green time for the corridor. If it is found that off-peak traffic or special event traffic is causing the majority of congestion, the City could consider utilizing adaptive signal control along this major corridor to help mitigate congestion.

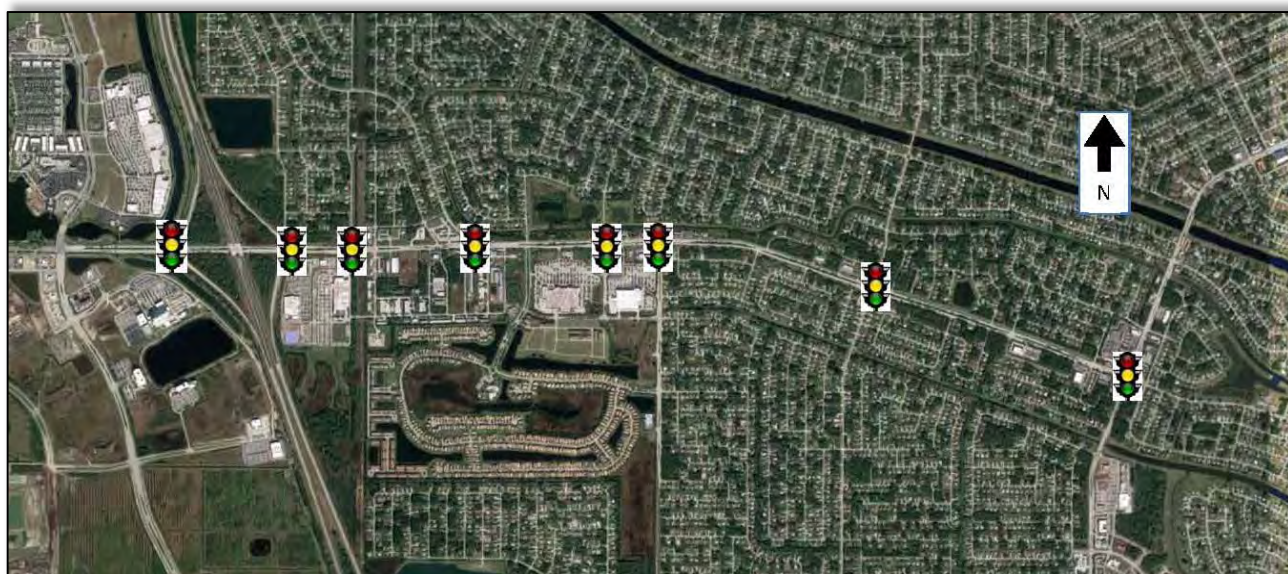


Figure 14 Gatlin Blvd Signalized Intersections

SECTION 6

3. Floresta Drive from Port St. Lucie Boulevard to Prima Vista Boulevard (City of Port St. Lucie)

This segment is currently being evaluated by the City of Port St. Lucie. The City of Port St. Lucie recognized the need for improvements on this corridor and on the 30th of October of 2017 a 2-Lane Conceptual Improvement Roadway Plan for Floresta Drive was approved by the City Council. The Master Plan for the Floresta Drive corridor enhances surrounding residential lane use with proposed roundabouts at cross streets, 8-foot wide concrete sidewalks and 7-foot buffered bicycle lanes. Exhibits, provided on the City of Port St. Lucie website, from the Floresta Drive Corridor Master Plan can be found in the **Appendix C. Figure 15** shows the existing typical section of Floresta Drive.



Figure 15 Existing Floresta Drive

After coordination with the City of Port St. Lucie and with St. Lucie County it was determined that the congestion issue on Floresta Drive corridor will be mitigated with the City's planned improvements. However, the intersection of Floresta Drive and Prima Vista Boulevard is owned and maintained by St. Lucie County. This segment has been reduced to the intersection of Floresta Drive and Prima Vista Boulevard. Currently this intersection is not equipped with fiber optic cable and conduit or real-time traffic data collection infrastructure.



Figure 16 Wawa Plan Site

Furthermore, a future Wawa convenience store and gas station, as shown in **Figure 16**, is planned at the southwest corner of Floresta Drive and Prima Vista Boulevard and will generate many trips at the intersection. By collecting real-time traffic data at this intersection, the maintaining agency, can mitigate congestion by redefining traffic signal timing plans or set up queue zones a certain distance from the intersection. Additional improvements to Prima Vista Boulevard are discussed later in this section.

SECTION 6

4. Becker Road from Southbend Blvd to Gilson Road (City of Port St. Lucie)

The corridor of Becker Road from Southbend Blvd to Gilson Road has two signalized intersections and two t-intersections that are stop sign control. During discussions with the City of Port St. Lucie, the roadway maintaining agency, it was identified that a local developer is responsible to widen the eastern portion of Becker Road to four lanes in the future.

A mitigation strategy to reduce current congestion in this corridor is to provide real-time traffic technology at the signalized intersections. This data could then be used to enhance progression along the corridor by refining signal timing plans. If performance measures don't show enhanced operations for the roadway, adaptive signal control could be considered. If adaptive signal control is considered, the project limits should be extended west to include Florida Turnpike's Interchange intersections for optimum corridor flow.

The proposed real-time traffic data collection and adaptive signal control mitigation improvements could utilize existing fiber optic cable along the corridor and the majority of cost would be incurred from the purchase of cameras for the intersections. The location of the signalized intersections along the Becker Road segment can be seen in **Figure 17**.

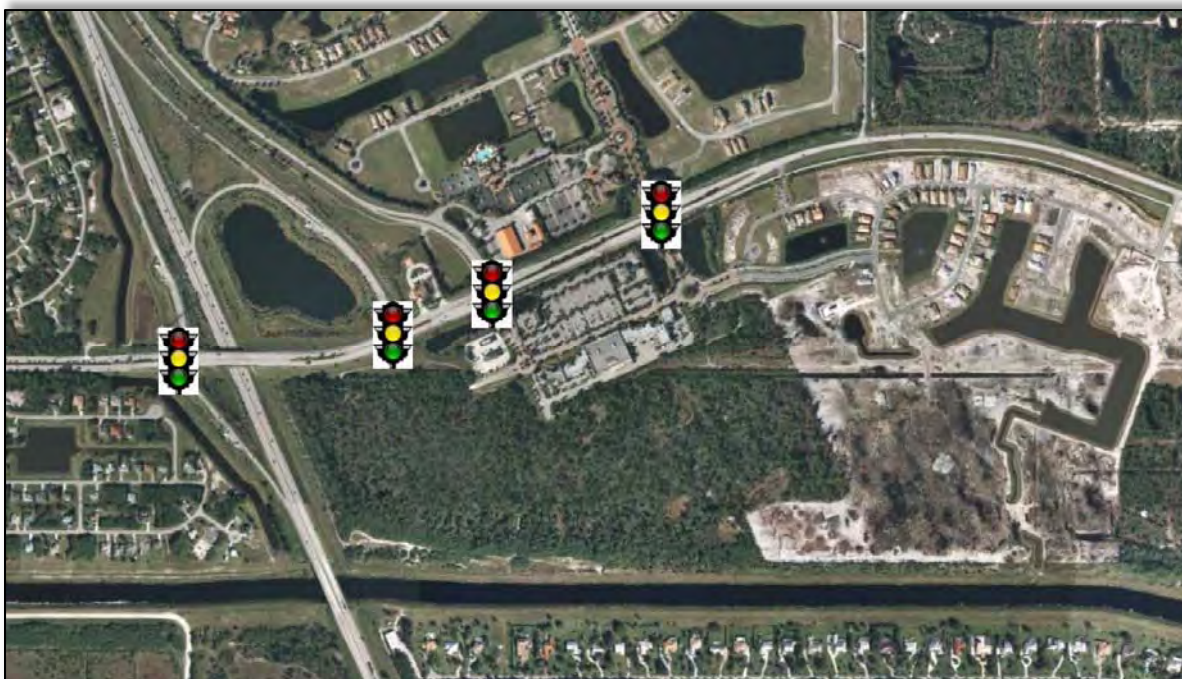


Figure 17 Signalized Intersections along Becker Road

SECTION 6

5. California Boulevard from Crosstown Parkway to St. Lucie West Boulevard (City of Port St. Lucie)

The corridor of California Boulevard from Crosstown Parkway to St. Lucie West Boulevard has three signalized intersections: Crosstown Parkway, SW Heatherwood Boulevard and St. Lucie West Boulevard. Manatee Elementary School is located on SW Heatherwood Boulevard just east of the intersection of California Boulevard and generates traffic congestion during peak morning and afternoon periods. Furthermore, long southbound traffic queues have been observed at the intersection. The City of Port St. Lucie has \$1 million planned for year 2027/2028 to widen this corridor to four lanes. The St. Lucie TPO Go2040 LRTP identifies the California Boulevard segment from Crosstown Parkway to SW Heatherwood Boulevard as a potential CMP concern with a V/C ratio of 1.00 – 1.10.

Base capacity improvements at several intersections could help improve congestion along the California Boulevard corridor prior to widening. **Figure 18** and **Figure 19** illustrate the following congestion management strategies:

At SW Heatherwood Boulevard

- Extend westbound right turn lane
- Extend southbound right turn lane
- Extend northbound right turn lane

At Crosstown Parkway

- Extend southbound dual left turn lanes
- Add an additional SB through lane at California



Figure 18 California Boulevard and Heatherwood Boulevard Improvements



Figure 19 California Boulevard and Crosstown Parkway Improvements

Extending the turn lanes listed above will provide more storage and allow more through traffic to be filtered by the intersections. High visibility crosswalks should also be considered at the intersection of SW Heatherwood Boulevard due to the nearby school. Potential drainage issues with widening SW California Boulevard to the west at Crosstown Parkway will need to be considered. Additionally, the signal timing between the two intersections should be analyzed for coordination and offset.

SECTION 6

6. Cashmere Boulevard from St. Lucie West Boulevard to Peacock Boulevard (City of Port St. Lucie)

Congestion mitigation strategies for Cashmere Boulevard from St. Lucie West Boulevard to Peacock Boulevard include a combination of intersection and base capacity improvements. The base capacity solution is to extend the 4-lane divided section to north of Swan Lake Circle. The merge back to a two-lane section would occur north of this intersection and would require re-striping and minimal asphalt. **Figure 20** shows the existing northbound merge. The intersection strategy is to complete a signal warrant analysis for the intersection of Cashmere Boulevard and the main entrance of the West Gate K-8 school. The signal timing plan could be adjusted to service school traffic at peak periods and have a loop detector of the school entrance for non-peak periods. The location of the proposed signal is shown in **Figure 21**.



Figure 20 Cashmere Boulevard Merge



Figure 21 Cashmere Boulevard looking north at West Gate School

SECTION 6

7. Gilson Road from Becker Road to Lakeridge Drive (Unincorporated St. Lucie County)

The base capacity improvement of a roundabout at the intersection of Gilson Road and Becker Road could potentially mitigate much congestion in this corridor. As seen in the existing aerial in **Figure 22**, the intersection is currently a t-intersection with stop sign control on Becker Road. The geometry of a roundabout at this intersection could optimize current right of way and provide enhanced service. The geometry of a roundabout would provide the eastbound right turns from Becker Road more gaps for turning and reduce conflicts points. Pedestrian and bicycle improvements should also be accommodated in the design of the roundabout.

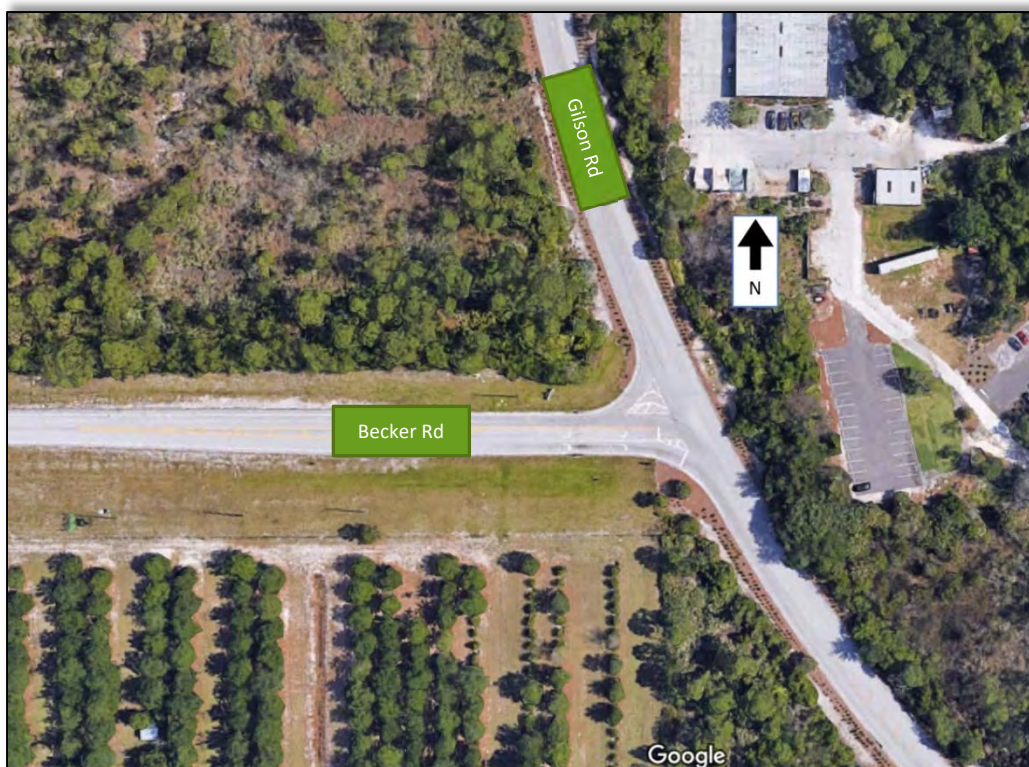


Figure 22 Existing Becker Road and Gilson Road Intersection

After further coordination in the Phase 2 process it was found that a local developer will be funding the construction of a roundabout improvements at this intersection. Therefore, this mitigation strategy was not included in the implementation plan.

SECTION 6

8. Crosstown Parkway from Manth Lane to Floresta Drive (City of Port St. Lucie)

This corridor is currently under construction and was eliminated from the Phase 2 evaluation.

SECTION 6

9. St Lucie West Boulevard from I-95 to Bayshore Boulevard (City of Port St. Lucie)

The corridor of St. Lucie West Boulevard from I-95 to Bayshore Boulevard is currently a four-lane divided roadway with paved shoulders and 8-foot sidewalks on both sides. There is current transit on the corridor provided by St. Lucie County’s Treasure Coast Connector Plus. This corridor is included in Route 6 and operates Monday thru Friday from 6 am to 8 pm and Saturday from 8 am to 11 am and 1 pm to 4 pm. The headway between buses is approximately one hour. An overview of the corridor can be seen in **Figure 23**.

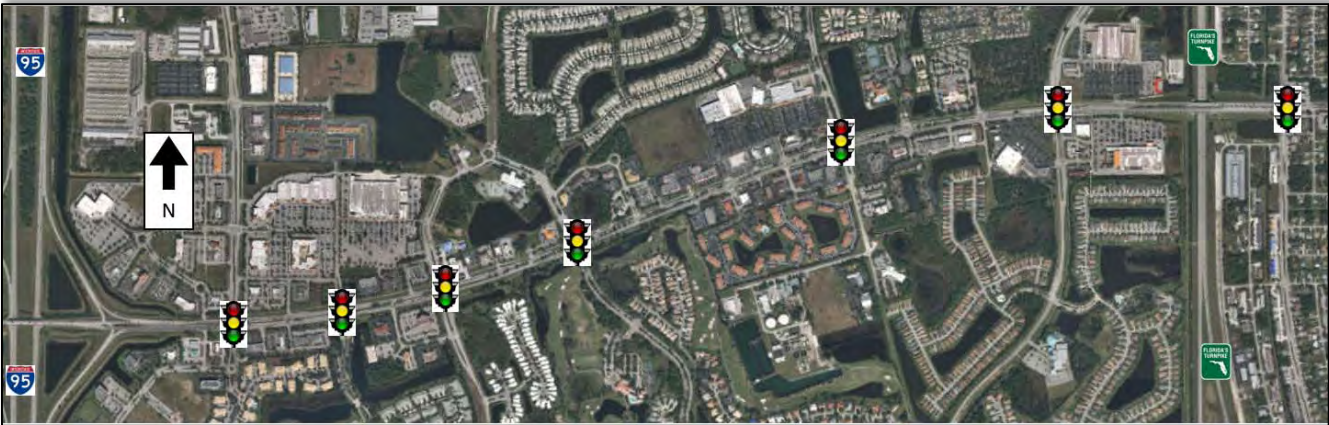


Figure 23 Overview of St. Lucie West Boulevard Segment

The City of Port St. Lucie has implemented adaptive traffic signal control along this corridor since November 2017. Congestion appears to have been alleviated since the implementation of this technology according to the City of Port St. Lucie. In a memorandum from the City of Port St. Lucie Public Works Department to the Mayor and City Council, provided in **Appendix C**, performance measure results of the pre vs. post signal adaptive coordination are listed. **Table 10** shows the results from the most conservative case for the eastbound direction for both AM and PM peak periods.

Table 10 Results of Adaptive Signal Control for Eastbound Condition

PERFORMANCE MEASURE	AM PEAK	PM PEAK
Travel time	-32.88% (131.2 seconds)	-12.61% (63.2 seconds)
Number of stop	-65.79% (2.5 less stops)	-24% (1.2 less stops)
Average Speed	49.34% (11.3 mph)	14.21% (2.6 mph)
Total Delay	-63.66% (112.8 seconds)	-20.6% (56.4 seconds)

SECTION 6

Crash data analysis discovered four fatalities at the intersection of St. Lucie West Boulevard and California Boulevard. Due to the large safety need, further study of this intersection was considered. A base capacity strategy to assist in the mitigation of congestion could be to add another southbound left turn lane on California Boulevard. There is a lot of traffic exiting the Walmart shopping center and making a left turn. Providing dual left turns would provide more room for vehicles to stack and queue at the intersection. Furthermore, northbound dual lefts would also enhance intersection operations. The City provided turning movement counts for the intersections from the adaptive signal control system and peak hour northbound left turn volumes are over 300 vehicles per hour during peak periods. It is recommended that dual lefts be provided when turning volumes exceed 300 vehicles per hour. Intersection widening could be needed to accommodate both dual left movements. Turning movement counts can be found in **Appendix C**.

SECTION 6

10. South 2nd Street from Citrus Boulevard to Ave A (City of Fort Pierce)

Multimodal improvements could be made to the corridor of South 2nd Street from Citrus Boulevard to Ave A. This roadway segment is located in a highly commercial urban area. There are several shopping stores and restaurants that are adjacent to the roadway. The existing roadway typical section for this segment can be seen in **Figure 24**. This roadway segment was added to the list of projects in Phase 1 due to potential for safety improvements. In Phase 2 further crash analysis was completed.

In order to make the roadway safer and friendlier for all users it is recommended that on-street parking be eliminated to provide wider sidewalks and bike lanes. Removed parking spaces will be mitigated with a local shuttle service (i.e. 8-person golf cart) and new parking facility to service South 2nd Street and major points of interest within the Ft. Pierce downtown area.



Figure 24 South 2nd Street Facing North

SECTION 6

11. Bayshore Boulevard from Crosstown Parkway to St. Lucie West Boulevard (City of Port St. Lucie)

The only signalized intersections along this corridor are located at the intersections with Crosstown Parkway and St. Lucie West Boulevard which are the segment limits. Therefore, adaptive signal control was not used as a mitigation strategy for this corridor. During coordination with the City of Port St. Lucie, it was identified that the intersection of Bayshore Boulevard and Lakehurst warrants signalization but funding for design and construction has not occurred. An overview of Bayshore Boulevard is shown in **Figure 25**.



Figure 25 Overview of Bayshore Boulevard

SECTION 6

12. Port St. Lucie Boulevard from Tulip Boulevard to Gatlin Boulevard (City of Port St. Lucie)

Portions of this roadway segment are included in other improvement projects in the TIP. The first project is for intersections improvements at Port St. Lucie Boulevard and Gatlin Boulevard. The second project is a widening project for Port St. Lucie Boulevard from Paar Drive to Darwin Boulevard. These planned improvements will address congestion issues for the segment. As a TSM&O solution, ITS should be equipped at the SW Aurelia Ave and SW Darwin Boulevard intersections to mitigate congestion with real travel time information along the corridor. It is recommended to install fiber optic cable along the Port St. Lucie Boulevard corridor to interconnect the traffic signals to optimize signal timing. An overview of the segment is illustrated in **Figure 26**.

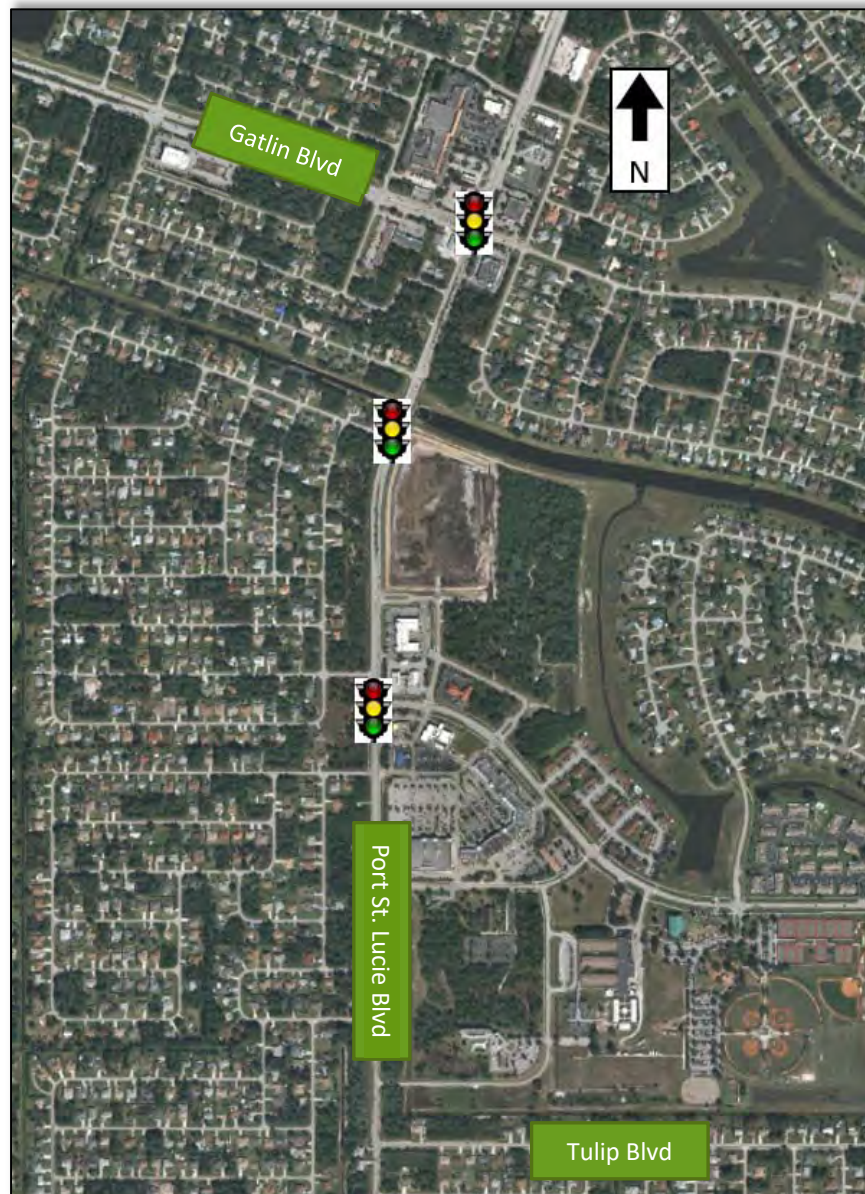


Figure 26 Overview of Port St. Lucie Blvd from Tulip Blvd to Gatlin Blvd

SECTION 6

INTERSECTIONS

1. Mariposa/Port St. Lucie Boulevard and US 1 (City of Port St. Lucie)

Currently real-time traffic data is being collected at this intersection with traffic camera technology. The City of Port St. Lucie provided turning movements counts for this intersection. Reviewing the count data, it was found that the predominant movements are the northbound thru, southbound thru and eastbound right turn. **Figure 27** shows the current dual eastbound right turn lanes with

no turn on red designation. A channelized right turn could be provided for the eastbound right turn movement, like what is provided for the southbound right turn and shown in **Figure 28**. This recommended improvement would require relocating signal mast arms and providing a receiving lane on US 1. Potential drainage, utility, right of way and lighting conflicts could arise.



Figure 27 Existing Eastbound Approach with Dual Right

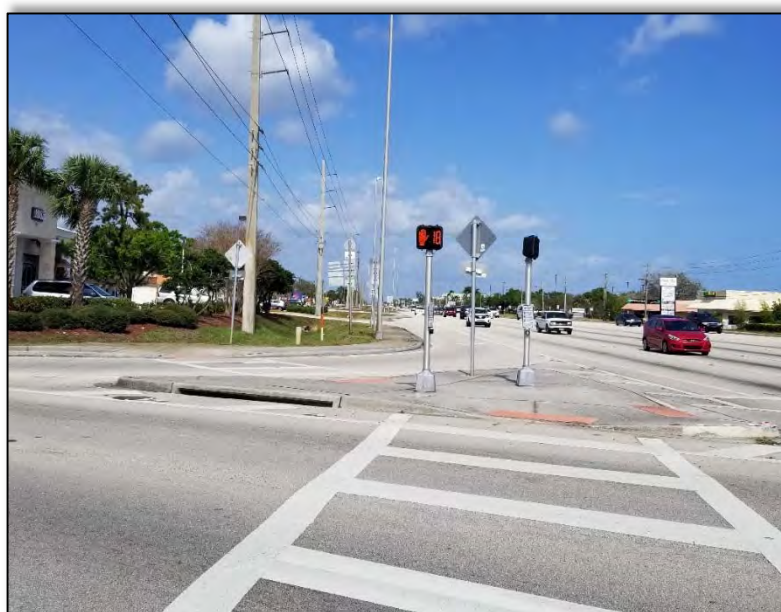


Figure 28 Southbound Free Flow Channelized Right

SECTION 6

2. Gatlin Boulevard and Savona Boulevard (City of Port St. Lucie)

Base capacity improvements are recommended for the intersection. Congestion could be mitigated by providing additional right turn lanes on the northbound and southbound Savona Boulevard approaches. Adding a right turn lane on Gatlin Boulevard for the westbound approach was also evaluated but eliminated due to numerous utility, lighting and drainage conflicts. Proposed widening for the intersection can be seen in **Figure 29**.

Furthermore, adding real-time traffic data collection infrastructure to the intersection could help enhance performance measures and operations of the intersection. As stated previously in this section, it is recommended that the corridor of Gatlin Boulevard be equipped with fiber optic cable to enhance video detection at the intersections, connection between signalized intersection and the green time progression of the corridor. If congestion is not mitigated through real-time data collection and refinement of signal timing plan coordination because of the presence of recurring non-peak congestion or incident driven congestion, adaptive signal control could be implemented.



Figure 29 Gatlin Boulevard and Savona Boulevard

SECTION 6

3. Prima Vista Boulevard and Airoso Boulevard (Unincorporated St. Lucie County)

Congestion at the intersection of Prima Vista Boulevard and Airoso Boulevard could be lessened with access management improvements. Currently the south approach is the only approach with a raised traffic separator. Adding a raised traffic separator or median can help restrict access and increase safety of the intersection. Crash data for the intersection was analyzed. It was found that 13% of crashes were classified as left turn crashes, 16% as sideswipe and 28% as rear-end.

A fire station is located to the south of the intersection of SW Ravenswood Lane and Prima Vista Boulevard. Difficulties of fire engines not being able to access Prima Vista Boulevard due to congestion at the Airoso Boulevard intersection have been identified. Mitigation strategies for the eastbound queues blocking the intersection of SW Ravenswood Lane to fire trucks was further analyzed. It is recommended that “Don’t block the intersection” or “Don’t block the box” signs are put in place along with appropriate pavement markings. Further strategies, that are more costly include, the addition of an emergency signal control at the intersection. The emergency signal improvement was analyzed as the congestion mitigation strategy for the Phase 2 analysis.

A mid-block crosswalk also needs to be analyzed for Prima Vista Boulevard between SW Ravenswood Lane and Irving Street due to the area being a Major Activity Center (MAC). The MAC is comprised of Sportman’s Park, Ravenswood Pool, Indian River State College and the St. Lucie County Library generating many pedestrian trips. **Figure 30** shows the location for the proposed emergency signal and mid-block crosswalk.



Figure 30 Proposed Mitigation Strategies for Prima Vista Boulevard and Airoso Boulevard

SECTION 6

4. Lennard Road and Mariposa Avenue (City of Port St. Lucie)

The Lennard Road and Mariposa Avenue is a four-legged signalized intersection. The intersection is currently experiencing heavy congestion issues and was added to the Phase 1 intersection list due to stakeholder input. A base capacity strategy of adding a westbound right turn lane could assist in mitigating the issue. Overhead utilities run east to west along the north side of Mariposa Avenue and could be a potential conflict with widening the east approach for the dedicated right turn lanes. An aerial of the intersection with the proposed improvement can be seen in **Figure 31**.



Figure 31 Mariposa Avenue and Lennard Road

6.3 PHASE 2 PRIORITY RANKING RESULTS

The final ranking scores for the Phase 2 project priority criteria can be seen in **Table 11**. The roadway segment of Floresta Drive from Port St. Lucie Boulevard to Prima Vista Boulevard has been reassigned as an intersection improvement project due to previous planning by the City of Port St. Lucie on the Floresta Drive corridor and stakeholder concern for the intersection at Prima Vista Boulevard and Floresta Drive. A detailed spreadsheet of the project ranking can be found in **Appendix A**.

Table 11 Phase 2 Rankings

CMP Segment/Intersection	Score
Easy Street from US 1 to Yucca Drive	59
Floresta Dr and Prima Vista Blvd	51
Prima Vista Blvd and Airoso Blvd	49
St. Lucie West Blvd from I-95 to Bayshore Blvd	40
Becker Road from Southbend Blvd to Gilson Road	39
Gilson Road from Becker Road to Lakeridge Drive	39
Gatlin Blvd from West of I-95 to Port St. Lucie Blvd	35
Port St. Lucie Blvd from Tulip Blvd to Gatlin Blvd	35
Cashmere Blvd from St. Lucie West Blvd to Peacock Blvd	31
Lennard Drive and Maripose Ave	29
2nd Street from Citrus Ave to Avenue A	27
Bayshore Blvd from Crosstown Pkwy to St. Lucie West Blvd	27
California Blvd from Crosstown Pkwy to St. Lucie West Blvd	26
Gatlin Blvd and Savona Blvd	19
Mariposa/Port St. Lucie Blvd and US 1	16
Crosstown Pkwy from Manth Ln to Floresta Drive	0

6.4 IMPLEMENTATION PLAN

Implementation of CMP strategies is a critical process and includes the following steps:

Step 1 – Determine funding sources

Step 2 – Prioritizing strategies

Step 3 – Programming projects in the Transportation Improvement Program (TIP)

The funding source that is approximately \$300,000 per year will be available for the St. Lucie TPO for the implementation of CMP strategies. If a project was estimated to be significantly less than \$300,000 and could not be combined with another project it was eliminated from the implementation plan. The prioritization of CMP strategic projects is detailed in Section 6.3 of this report. Prior to programming projects in the TIP, estimated construction costs based on current generalized construction costs will need to be updated. The CMP Implementation Plan is provided in Appendix A.

APPENDIX A

Roadway Segments

Roadway Segments			Benefit						Need					Issues			Cost			Total
Segment	From	To	sidewalk	bike	multi-use	public transit	real-time traffic info	Base capacity	Fatalaties	serious injury	PD	Fail LOS	acceptable LOS	ROW	utilities, drainage, landscaping	public support	\$300-\$400	\$400-\$1,000,000	over \$1,000,000	
EASY ST	US 1	YUCCA DR	5	5				5		3	1	5		10	5	15	5			59
GATLIN BLVD	W OF I-95	PORT ST LUCIE BLVD					10			3	1		1	10	5		5			35
BECKER RD	SOUTHBEND BLVD	GILSON RD					10			3	1	5		10	5		5			39
CALIFORNIA BLVD	CROSSTOWN PKWY	ST LUCIE WEST BLVD						5		3	1	5		10				2		26
CASHMERE BLVD	ST LUCIE WEST BLVD	PEACOCK BLVD						5		3	1	5		10	5			2		31
GILSON RD	BECKER RD	LAKERIDGE DR	5	5				5		3	1	5		10			5			39
CROSSTOWN PKWY	MANTH LN	FLORESTA DR																		0
ST. LUCIE WEST BLVD	I-95	BAYSHORE BLVD						5	10	3	1		1	10	5		5			40
2nd STREET	CITRUS AVE	AVE A	5	5		5				3	1		1		5			2		27
BAYSHORE BLVD	CROSSTOWN PKWY	ST. LUCIE WEST BLVD						5		3	1		1	10	5			2		27
PORT ST LUCIE BLVD	TULIP BLVD	GATLIN BLVD					10			3	1		1	10	5		5			35

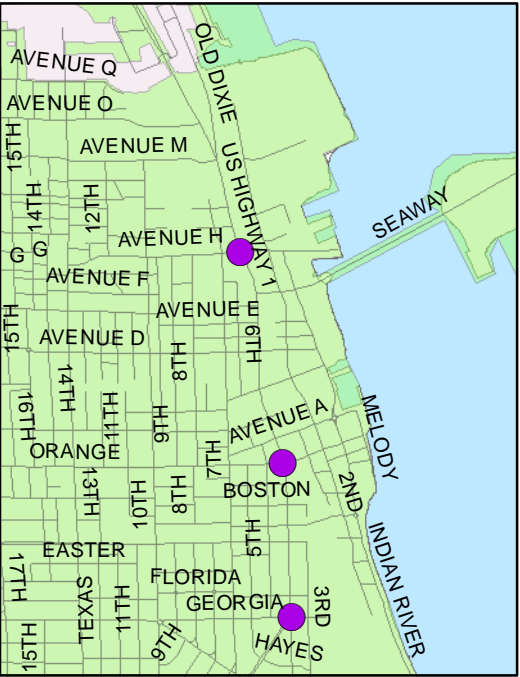
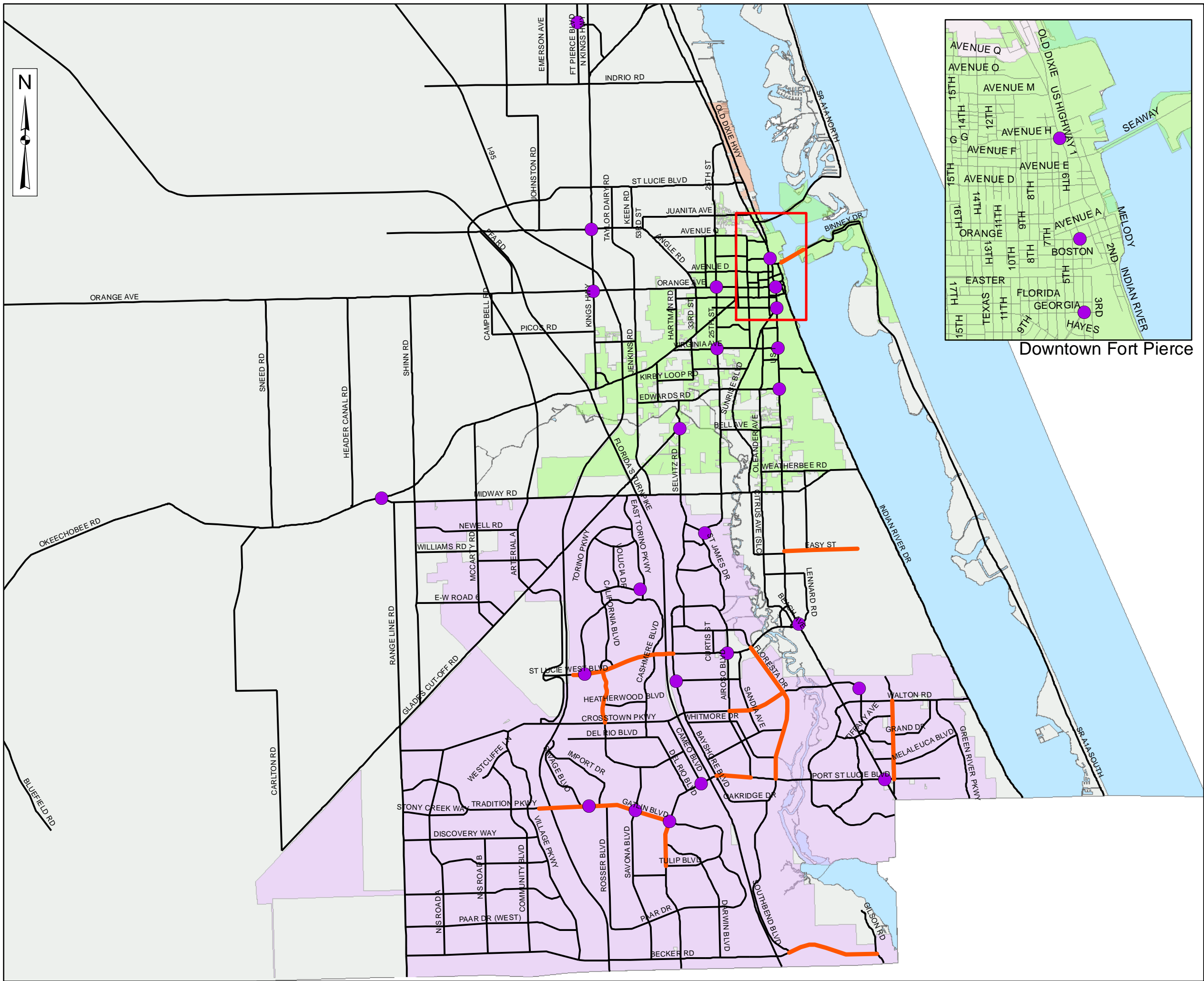
Intersections

Intersections		Benefit						Need					Issues			Cost			Total
Roadway 1	Roadway 2	sidewalk	bike	multi-use	public transit	real-time traffic info	Base capacity	Fatalaties	serious injury	PD	Fail LOS	acceptable LOS	ROW	utilities, drainage, landscaping	public support	\$300-\$400	\$400-\$1,000,000	over \$1,000,000	
Mariposa/Port St. Lucie Blvd	US1						5		3	1	5						2		16
Gatlin Blvd	Savona Blvd						5		3	1	5					5			19
Prima Vista Blvd	Airoso Blvd	5				10	5		3	1	5		10	5		5			49
Lennard Drive	Mariposa Ave						5		3	1	5				15				29
FLORESTA DR	PRIMA VISTA BLVD					10			3	1	5		10	5	15		2		51

Rank	Project	Improvement Description	Estimated Cost	1	2	3	4	5
1	Easy Street from US 1 to Yucca Drive	Reconstruct East approach at US 1 to consist of three lanes westbound include sidewalk and wide paved shoulders for bike lanes	\$300,000	\$300,000				
2	Prima Vista Boulevard at Floresta Drive	Provide real-time traffic technology at the signalized intersection and incorporate signal timing adjustments	\$50,000		\$50,000			
3	Prima Vista Boulevard at Airoso Boulevard	Add raised medians at intersection approaches, emergent signal at SW Ravenswood Ln and mid-block crosswalk	\$250,000		\$250,000			
7	Gatlin Blvd from West of I-95 to Port St Lucie Blvd	Install real time traffic infrastructure, optimize green time and add adaptive traffic control if needed	\$280,000			\$280,000		
8	Port St. Lucie Blvd from Tulip Blvd to Gatlin Blvd	Install fiber optic cable along Port St. Lucie Blvd and equip intersections with real time traffic data collection infrastructure	\$275,000				\$275,000	
9	Cashmere Blvd from St. Lucie West Blvd to Peacock Blvd	Extend 4 lane typical section north of the intersection at Swan Lake Circle, evaluate signal at the main entrance at the West Gate K-8 school	\$335,000					\$335,000
Estimated Available Revenue (From CMP box funds)				\$300,000	\$300,000	\$300,000	\$300,000	\$300,000
Revenue Rollover from Previous Years				--	\$0	\$0	\$20,000	\$45,000
Total Available Revenue				\$300,000	\$300,000	\$300,000	\$320,000	\$345,000
Revenue Used for Improvements				\$300,000	\$300,000	\$280,000	\$275,000	\$335,000
Remaining Balance				\$0	\$0	\$20,000	\$45,000	\$10,000

*Projects estimated to be \$50,000 short of the \$300,000 - \$400,000 CMP box fund amount were eliminated from the implementation plan.

APPENDIX B



Downtown Fort Pierce

St. Lucie TPO Congestion Management Process Major Update - Phase 1

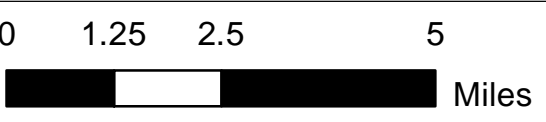
Figure 9 Key Stakeholder Congestion Areas of Concern

Legend

- Stakeholder Intersections
- Stakeholder Segments

Municipalities

- Fort Pierce
- Port St. Lucie
- St. Lucie Village



Congestion Management Process Major Update – Phase I Summary of Comments

Comment	Commenter	Date/Method Received	Incorporation into Study
The most congested time of year for the county is from Thanksgiving to Easter.	CAC Member	3/14/2017, CAC meeting	The volumes used for the volume to capacity ratio consider the AADT and seasonal factors.
St. Lucie West is a very congested corridor, especially from I-95 to Bayshore Blvd	CAC Member	3/14/2017, CAC meeting	This roadway segment is added to the list of Phase I projects.
The intersection at Peacock and St. Lucie West have congestion issues, check V/C.	CAC Member	3/14/2017, CAC meeting	V/C ratio was checked for the corridor and it was found not to have a large value, congestion along St. Lucie West Blvd could be due to signal timing and not capacity of the Blvd.
The safety performance measure should have higher weight in the prioritization.	TAC Member	3/14/2017, TAC meeting	Segments that were given just points on safety but did not receive points in other performance measure categories have been added to the project that should be further analyzed in Phase II.
The severity of accidents and fatalities should be considered in the safety performance measure.	TAC Member	3/14/2017, TAC meeting	Comment was considered for evaluation.
Intersection improvements at PSL Blvd and Gatlin are underway and will be constructed next fiscal year.	Roxanne Chesser	3/14/2017, TAC meeting	Segments and intersections currently under construction have been eliminated from the recommended Phase II projects.

Comment	Commenter	Date/Method Received	Incorporation into Study
Roadway segments on the State Highway System are evaluated and funded by the FDOT	TAC Member	3/14/2017, TAC meeting	Segments and intersections on the State Highway System have been eliminated from the recommended Phase II projects.
Roadway segment on SW Port St. Lucie Blvd from Tulip Blvd to Gatlin Blvd should be included for Phase II evaluation	TPO Member, Shannon Martin	4/5/2017, TPO Board meeting	Segment will be added to recommendation for Phase 2.

Summary Completion Date: April 7, 2017

Congestion Management Process Major Update – Phase 2 Summary of Comments

Comment	Commenter	Date/Method Received	Incorporation into Study
Concerned regarding the proposed elimination of on-street parking in downtown Fort Pierce.	Commissioner Townsend	June 6, 2018/TAC meeting	The proposed strategy to eliminate on-street parking is mitigated by providing some type of parking lot/structure to off-set the eliminated spaces.
The intersection of St. Lucie West Blvd and King's Isle Blvd is providing much more green time addressing the major traffic on St. Lucie West Blvd causing traffic on King's Isle Blvd.	Ms. Hensley	June 6, 2018/TAC meeting	This comment was noted at the meeting and coordination with the City of Port St. Lucie will occur to address this comment.
Some state roads were not included in the Phase 2 elevation despite getting a high ranking in Phase 1.	Commissioner Johnson	June 6, 2018/TAC meeting	Some state road projects were eliminated from the CMP list due to FDOT funding improvements to the state system.

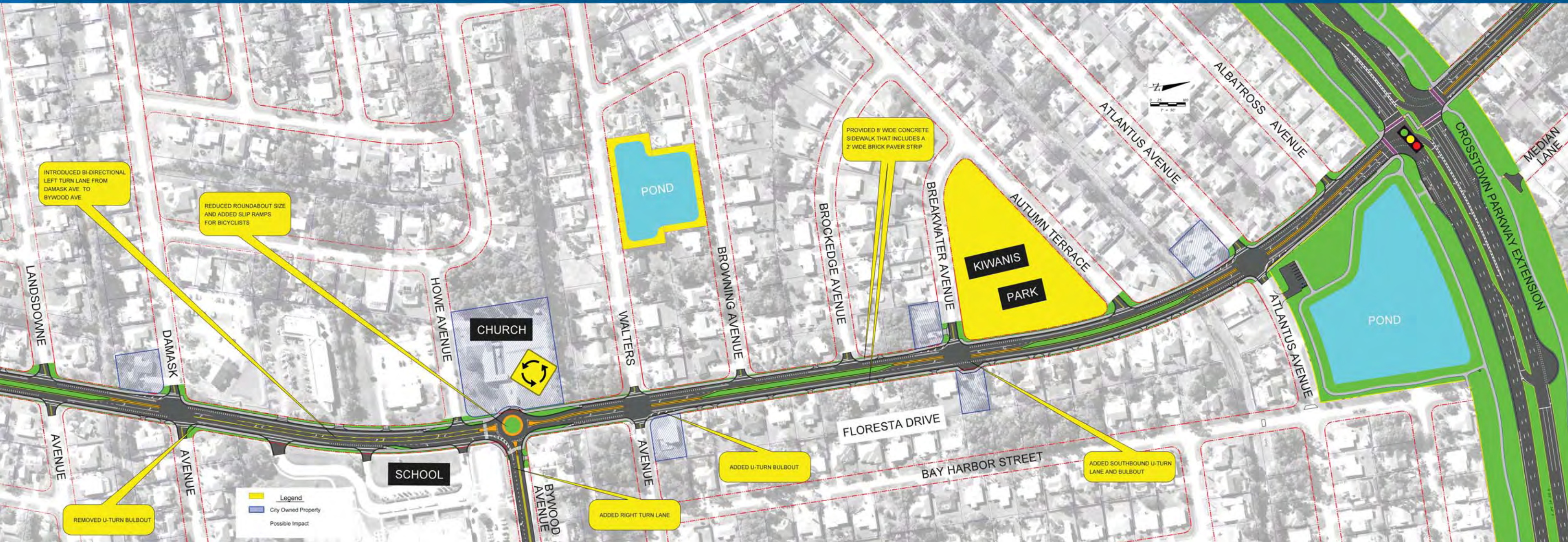
Summary Completion Date: June 7, 2018

APPENDIX C



FLORESTA DRIVE MASTER PLAN

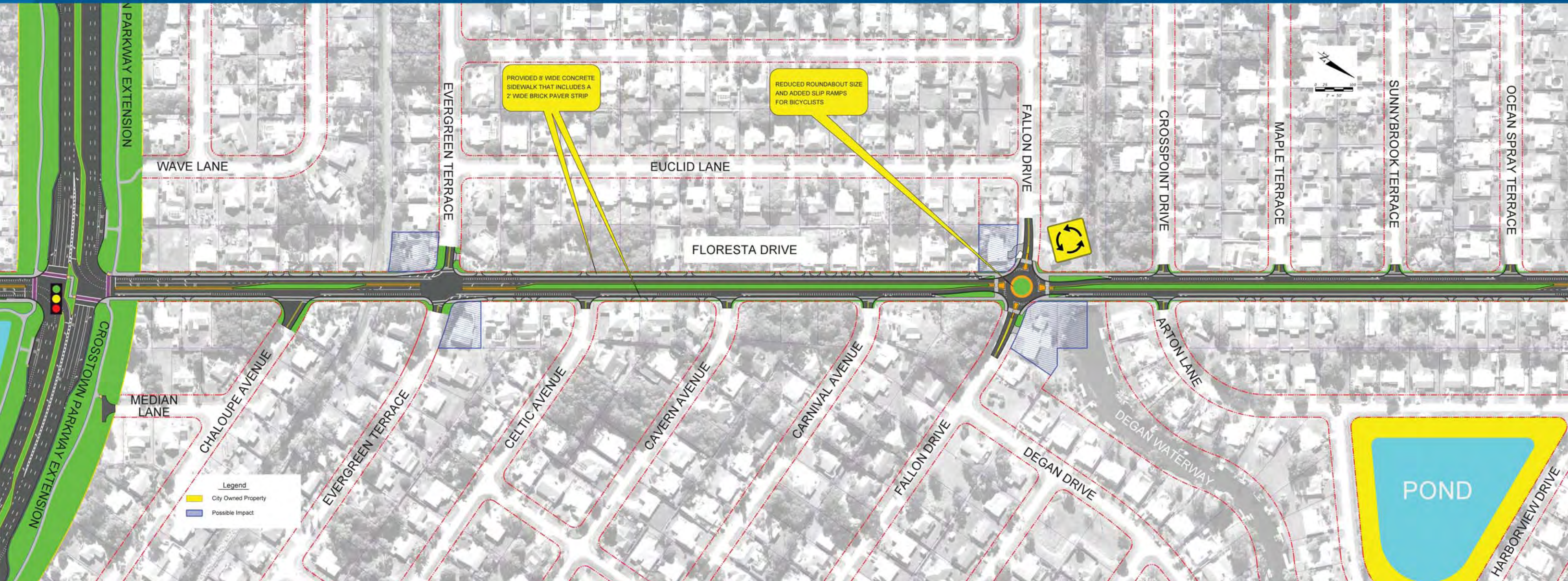
SEGMENT 2 ELKCAM WATERWAY TO CROSTOWN PKWY.





FLORESTA DRIVE MASTER PLAN

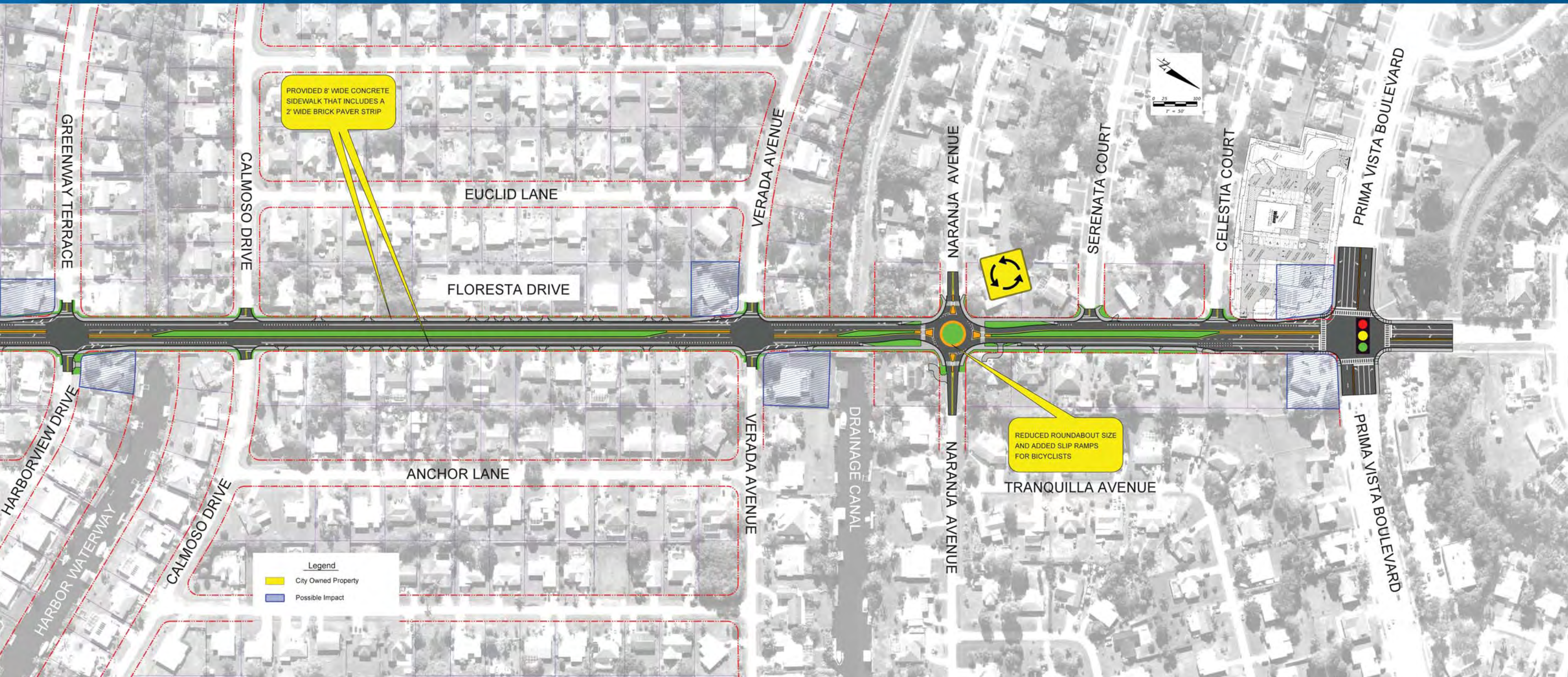
SEGMENT 3 CROSTOWN PARKWAY TO PRIMA VISTA BLVD.





FLORESTA DRIVE MASTER PLAN

SEGMENT 3 CROSSTOWN PARKWAY TO PRIMA VISTA BLVD.

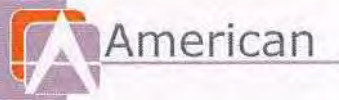




Revised Typical Sections



Floresta
Corridor
Master Plan



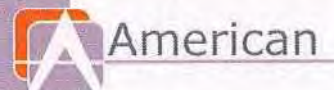
OPTION 1: 2-lane Divided Roadway with:
bike lanes, turn lanes at intersections, landscaping in
median and strip between curb & gutter and sidewalk



Revised Typical Sections



Floresta
Corridor
Master Plan



OPTION 2: 3-lane Un-Divided Roadway with:
bike lanes, bidirectional left turn lanes, sidewalks
split between curb & gutter and ROW



City of Port St. Lucie
PUBLIC WORKS DEPARTMENT
Accredited Agency – American Public Works Association

MEMORANDUM

TO: MAYOR & CITY COUNCIL

VIA: RUSS BLACKBURN, CITY MANAGER
JESUS MEREJO, UTILITY SYSTEMS DIRECTOR & SPECIAL PROJECTS

THRU: ROXANNE M. CHESSER, P.E., INTERIM PUBLIC WORKS DIRECTOR *RMC*

FROM: HEATH STOCTON, P.E., TRANSPORTATION ENGINEER *HS*

DATE: APRIL 5, 2018

SUBJECT: ST. LUCIE WEST BOULEVARD – ADAPTIVE SIGNAL COORDINATION

This memorandum provides information about two recent events that resulted in significant delays and congestion along the St. Lucie West Boulevard after the Mets Spring Training Games and during the evening of April 3rd. Additionally, operational data prior to and after the installation of the Adaptive Signal Coordination System is provided to illustrate the effects of the System. For clarity, the coordination system was installed from the I-95 Northbound entrance/exit ramps to and including Bayshore Boulevard.

Mets Spring Training

City Council Members and City Staff received several complaints regarding congestion and delays along St. Lucie West Boulevard over the past few weeks. On March 23rd, Staff received an email from a resident with concerns over the manner in which traffic was being directed and controlled for a Mets Spring Training Game. He stated that he works in St. Lucie West and was out for his lunch hour when he got “stuck” in the Spring Training traffic at St. Lucie West and Peacock Boulevards. He indicated a police officer had placed the traffic signal in flash and was manually directing traffic, providing preference to ballpark traffic.

Placing the signal on a flash mode overrides the adaptive operation and results in the signals along the corridor functioning as individual signals. Because the signals are not communicating, the overall system decreases in efficiency and delays occur at the other signals along the corridor.

The Public Works Department has taken the following measures to ensure that this issue is addressed and will not be repeated during the next Spring Training Season or when large events occur at First Data Field.

- Staff will monitor the traffic cameras and make needed adjustments to the signal coordination during Spring Training Games or when other such large events occur.
- Staff has scheduled meetings with the City Police Department (PD) and the St. Lucie County Sheriff's Office (SLCSO) to review the operation of the system, explain the effects of manual operation, and develop a plan for traffic control during large events at First Data Field.
- Staff will work with the adaptive signal consultant to develop an alternative coordination plan, which can be implemented to address the extremely high volumes to/from I-95 and to/from Peacock Boulevard during games or other large events.

Evening of April 3rd

On the evening of April 3rd, a hardware malfunction at the Kings Isle signal on St. Lucie West Boulevard (SLW Blvd) caused significant gridlock and delays. A resident contacted 911 at 6:19 pm to report the congestion and by 6:45 pm on-call staff arrived at the site and determined that the malfunction was due to a faulty detection module. The detection module was replaced and traffic was observed to have normal flow patterns by 7:25 pm.

The detection module is standard in every traffic cabinet and its replacement was not necessary during the Adaptive Signal Coordination System upgrade. Similar to other electronic devices, detection modules have a limited useful life and there is no advance warning of the impending failure. Unfortunately, the failure of the detection module had ripple effects in both the east- and west-bound directions on SLW Blvd. Once the coordination plan was broken, the remainder of the corridor worked at a much lower efficiency. Because this occurred during peak traffic volume, the entire corridor became gridlocked within 15 to 20 minutes and was not resolved until the traffic volumes subsided and the detection module was replaced.

In the review of the events of that evening, the first error code logged by the adaptive software was at 3:19; however, because staff does not continually monitor the system, the code was not realized until after the event. Additionally, there were several notifications of the event made to the Public Works Department:

- 4:41 PM – Delays along SLW Blvd were reported by a resident, and a Request for Service was sent to Traffic Operations Staff via email.
- 5:30 PM – City staff left a voice mail indicating that traffic is gridlocked in St. Lucie West.
- 5:59 PM – Email indicating congestion problems along SLW Blvd that occurred around 4:30 PM.
- 6:19 PM – Public Works on-call staff was contacted by the 911 Call Center.
- 8:09 PM – Email indicating that there were numerous complaints about traffic along SLW Blvd. throughout the evening.

Once the on-call Staff was notified, the following events occurred:

- 6:45 PM – On-call staff arrive at site and determined that the Kings Isle intersection is malfunctioning.
- 7:15 PM – Detection module replacement is complete.
- 7:25 PM – Traffic flow returned to normal.

In review of the events there are two areas where improvements can be made. First, using the adaptive software to notify staff in the event of errors or faults. Second, the timeliest manner to notify appropriate staff about malfunctioning traffic signals, pedestrian lights, school zone flashers or stop signs is to call 911. Based upon these findings, the following actions have or will be taken by the Department to decrease the Department's response time for similar situations in the future.

- Staff worked with the consultant to expand the types of notifications for failures and errors that Staff receives from the system. In the future, if this type of failure occurs, the appropriate Staff will act upon notification from the system rather than wait until it is reported to 911.
- Public Works Staff was reminded that the Department protocol for reporting malfunctioning traffic equipment is to call 911.
- Public Works Staff will prepare and request the disbursement of a reminder to all City Staff to report malfunctioning traffic equipment to 911.
- Staff will also work with the Communications Department to issue reminders for residents to call 911 in the event of malfunctioning traffic equipment.

Pre vs Post Adaptive Signal Coordination

Except for the events previously discussed, the normal operations of the corridor are more efficient with the Adaptive Signal Coordination System. Background or "before" data was collected on July 17, 2017 and July 18, 2017, prior to deployment of the adaptive system. The system was placed into full operation on July 19, 2017. Improvement or "after" data was collected on July 20, 2017 and then again January 31, 2018 - February 1, 2018.

The data collected for the eastbound (EB) and westbound (WB) traffic in the morning (AM) and evening (AM) peak hours includes:

- Travel time in seconds between Bayshore Blvd. and the I-95 NB exit/entrance ramp (distance ≈ 2.54 miles)
- Number of stops is defined as any point in time the study vehicle slows to less than 5 mph
- Average speed in miles per hour (mph)
- Total delay is the time, in seconds, spent traveling at a speed less than the posted 40 mph

The three attached sheets provide the comparison of the before and after data as follows:

- Exhibit A: Before Data 7/17/17 - 7/18/17 vs After Data 7/20/17
- Exhibit B: Before Data 7/17/17 - 7/18/17 vs After Data 1/31/18 - 2/1/18
- Exhibit C: Before Data 7/17/17 - 7/18/17 vs After Data 7/20/17 & 1/31/18 - 2/1/18 (average)

As expected, the comparison with the after-data set for July (Exhibit A) shows the more drastic improvement in operation compared to the after-data set for January/February (Exhibit B) due to the lower traffic volumes during the summer months. Exhibit C provides a blended comparison showing the average of the two after-data sets.

In review of the operational gains, the most conservative case would be that of Exhibit B which reflects the following range of improvements depending upon the direction of travel and the time of day:

- Travel Time Decrease- 12.61% (63.2 seconds) to 32.88% (131.2 seconds)
- Decrease in Number of Stops – 24.00% (1.2 less stops) to 65.79% (2.5 less stops)
- Average Speed Increase – 14.21% (2.6 mph) to 49.34% (11.3 mph)
- Total Delay Decrease – 20.6% (56.4 seconds) to 63.66% (112.8 seconds)

In addition to the information provided, summaries per segment (from intersection to intersection) or a full copy of the data are available upon request. Should you have any questions or require additional information, please contact me at 344-4239.

Attachments

Cc: John Bolduc – Chief of Police
Paul Johnson – Manager, Traffic Operations
Patricia Roebling, P.E. – Asst. City Manager/City Engineer

EXHIBIT A

St Lucie West Blvd Before & After			Travel Time	# of Stops	Avg Speed	Total Delay
AM	EB	Before	399	3.8	22.9	177.2
		After	265.9	1.4	34.4	50
		Change	-133.1	-2.4	11.5	-127.2
		% Change	-33.36%	-63.16%	50.22%	-71.78%
	WB	Before	359.6	3.2	25.4	137.8
		After	246.7	0.9	37	30.1
		Change	-112.9	-2.3	11.6	-107.7
		% Change	-31.40%	-71.88%	45.67%	-78.16%
PM	EB	Before	501	5	18.3	273.2
		After	283.5	0.8	32.3	64.7
		Change	-217.5	-4.2	14	-208.5
		% Change	-43.41%	-84.00%	76.50%	-76.32%
	WB	Before	441.4	4.8	20.7	214.2
		After	259.4	0.9	35.2	37
		Change	-182	-3.9	14.5	-177.2
		% Change	-41.23%	-81.25%	70.05%	-82.73%

Before Data: 7/17/17 - 7/18/17

After Data: 7/20/17

Date: 4/4/2018

EXHIBIT B

St Lucie West Blvd Before & After			Travel Time	# of Stops	Avg Speed	Total Delay
AM	EB	Before	399	3.8	22.9	177.2
		After	267.8	1.3	34.2	64.4
		Change	-131.2	-2.5	11.3	-112.8
		% Change	-32.88%	-65.79%	49.34%	-63.66%
	WB	Before	359.6	3.2	25.4	137.8
		After	283.6	1.3	32.2	64.9
		Change	-76	-1.9	6.8	-72.9
		% Change	-21.13%	-59.38%	26.77%	-52.90%
PM	EB	Before	501	5	18.3	273.2
		After	437.8	3.8	20.9	216.8
		Change	-63.2	-1.2	2.6	-56.4
		% Change	-12.61%	-24.00%	14.21%	-20.64%
	WB	Before	441.4	4.8	20.7	214.2
		After	350.2	2.1	26	140.8
		Change	-91.2	-2.7	5.3	-73.4
		% Change	-20.66%	-56.25%	25.60%	-34.27%

Before Data: 7/17/17 - 7/18/17

After Data: 1/31/18 - 2/1/18

Date: 4/4/2018

EXHIBIT C

St Lucie West Blvd Before & After			Travel Time	# of Stops	Avg Speed	Total Delay
AM	EB	Before	399	3.8	22.9	177.2
		After	267.2	1.3	34.3	60
		Change	-131.8	-2.5	11.4	-117.2
		% Change	-33.03%	-65.79%	49.78%	-66.14%
	WB	Before	359.6	3.2	25.4	137.8
		After	272.9	1.2	33.4	54.8
		Change	-86.7	-2	8	-83
		% Change	-24.11%	-62.50%	31.50%	-60.23%
PM	EB	Before	501	5	18.3	273.2
		After	395.7	3	23.1	175.3
		Change	-105.3	-2	4.8	-97.9
		% Change	-21.02%	-40.00%	26.23%	-35.83%
	WB	Before	441.4	4.8	20.7	214.2
		After	322.6	1.7	28.3	109.2
		Change	-118.8	-3.1	7.6	-105
		% Change	-26.91%	-64.58%	36.71%	-49.02%

Before Data: 7/17/17 - 7/18/17

After Data: 7/20/17 & 1/31/18 - 2/1/18

Date: 4/4/2018



City of Port St. Lucie

PUBLIC WORKS DEPARTMENT

Accredited Agency – American Public Works Association

MEMORANDUM

TO: MAYOR & CITY COUNCIL

VIA: RUSS BLACKBURN, CITY MANAGER
JESUS MEREJO, UTILITY SYSTEMS DIRECTOR & SPECIAL PROJECTS *[Signature]*

THRU: ROXANNE M. CHESSEY, P.E., INTERIM PUBLIC WORKS DIRECTOR *[Signature]*

FROM: HEATH STOCTON, P.E., TRANSPORTATION ENGINEER

DATE: APRIL 12, 2018 *HS*

SUBJECT: ST. LUCIE WEST BOULEVARD – ADAPTIVE SIGNAL COORDINATION FOLLOW UP

This memorandum serves as a follow up providing additional information requested by Mayor Oravec regarding the St. Lucie West (SLW) – Adaptive Signal Coordination Memo dated April 5, 2018.

As stated in the previous memo, to proactively address equipment failures along the St. Lucie West corridor, Staff has implemented a notification system. The system will send an email (or text message) to pertinent staff whenever there is one of several failure types. The loss of detection that occurred on April 3rd, would have triggered a notification. In the event of malfunction or equipment failure after-hours, the on-call staff will be notified via email. All on-call staff are equipped with smart phones enabled to alert to an incoming email from the notification system.

Traffic signals rely on a constant power supply for operation. If a signal loses power, the uninterruptible power supply (UPS) or batter backup comes online and keeps the signal operating until power is restored, the signal is connected to a generator, or the battery is depleted. Public Works staff has implemented hardware and software within the signal cabinets to allow staff to monitor battery health, battery life, and receive notifications for certain alerts. So, if a signal loses power and is relying upon the UPS, a notification is sent via email to staff so that they may mobilize and supply generator power to the signal prior to depletion of the battery to provide continuous operation of the signal.

The FDOT-owned signals along Port St. Lucie Blvd. and US1 utilize a different uninterruptible power supply (UPS) than the City signals. Unfortunately, these UPS devices aren't compatible with the monitoring and notification software that is deployed on City-owned signals. Public Works has budgeted and is moving forward changing the UPS devices to ensure they are compatible with the

notification system. There are 21 remaining signals that are not compatible and staff plans to change 2-3 per year as funding allows.

Lastly, Public Works staff has the ability to view the cameras along St. Lucie West Blvd. as well as most other intersections in the City from the Traffic Operations office. For the benefit of the signal technicians and on-call personnel, Public Works management is exploring software solutions that will enable these technicians and personnel to remotely view the cameras along St. Lucie West Blvd. from a laptop, iPad or similar device. The goal is to have this implemented before the end of this physical year. The next step is to expand these remote viewing capabilities to other intersections throughout the City.

The second paragraph of Mayor Oravec's email iterated several questions. Those questions are summarized with a response below.

- Do our cameras calculate volume by counting cars, etc.? *Yes. The adaptive system collects volume data for each phase (i.e. eastbound through, westbound through, eastbound left, etc.). Unfortunately, due to the massive amount of data collected daily, it is only stored and retrievable for 30 days.*
- Do we have any legacy data so that we could compare 2/1/18 to 2/1/17? *Public Works has not collected volume data on St. Lucie West Boulevard recently. The Transportation Planning Organization (TPO) collects and reports data for SLW Blvd. on an annual basis. The volume data is broken down into five (5) segments. A summary of the data collected by the TPO is provided below.*

From	To	Fall 2016 ADT Vehicles per Day (vpd)	Fall 2017 ADT Vehicles per Day (vpd)	Increase
Commerce Center Drive	I-95	11,500	11,500	0%
I-95	California Blvd.	33,500	37,000	10%
California Blvd.	Country Club Drive	33,500	37,000	10%
Country Club Drive	Cashmere Blvd.	33,500	37,000	10%
Cashmere Blvd.	Bayshore Blvd.	47,500	48,500	2%

For comparison, US1 between the Martin County line and Port St. Lucie Blvd. carried an ADT volume of 45,287 in 2015 (most recent year available). Simplistically, St. Lucie West Blvd. moves 82% of the volume of US1 with 50% the capacity (8 lanes vs. 4 lanes).

- Are the performance measures reported for 2/1/18 superior to 7/18/17 even though there would likely be substantive differences in total volume, as in heavier traffic on 2/1/18? *The interpretation that the corridor was more efficient on 2/1/18 than on 7/18/17 is correct. The summary below is average statistics for the entire corridor (I95 NB Ramp to Bayshore Blvd.). These are the averages of data collected during the AM eastbound peak, PM eastbound peak, AM westbound peak, and PM westbound peak. Peak hours are defined as 7AM – 9AM and 4PM – 6PM.*

Memorandum

April 12, 2018

St Lucie West Boulevard - Adaptive Signal Coordination Follow Up

	Travel Time (s)	# Stops	Speed (mph)	Total Delay (s)
7/18/17	425	4	22	201
2/1/18	335	2	28	122
Change	-90	-2	7	-79
% Change	-22%	-50%	29%	-43%

Should you have any questions or require additional information, please contact me at 344-4239.

Attachments

Cc: John Bolduc – Chief of Police
Paul Johnson – Manager, Traffic Operations
Patricia Roebeling, P.E. – Asst. City Manager/City Engineer

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