ADVANCED TRANSPORTATION MANAGEMENT SYSTEM (ATMS)
MASTER PLAN FOR ST. LUCIE COUNTY
TASK 2-ATMS MASTER PLAN

TECHNICAL MEMORANDUM

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February 27th, 2013
Final Report

ADVANCED TRANSPORTATION MANAGEMENT SYSTEM
MASTER PLAN FOR ST. LUCIE COUNTY

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1 EXECUTIVE SUMMARY

The Master Plan for the Advanced Transportation Management System (ATMS) in St. Lucie County is to provide recommendations for improving existing traffic control system in St Lucie County. The proposed ATMS attempt to take advantage of information that can be provided by roadside traffic sensors and cameras (real-time traffic information) to increase transportation system efficiency, enhance mobility and improve safety, in St Lucie County. The study is funded by Florida Department of Transportation District IV.

Based upon a thorough review and update of the existing traffic signal and ITS database, interviews with project stakeholders, and visioning workshops with the project stakeholders the following items were developed for the Master Plan:

- **Transportation Systems Management and Operations (TSM&O) applications and strategies**
  - Traffic Adaptive and Traffic Management Programs;
- **System Requirements**
  - The hardware and software requirements, as well as the traffic signal equipment requirements needed for development of an ATMS system that meets and exceeds St. Lucie County's vision for an ATMS;
- **Implementation Plan**
  - The requirements to implement the St. Lucie County ATMS and it's estimated cost;
- **Funding Analysis**
  - Available funding resources are analyzed; and
- **Performance Measures**
  - Measures available to measure the effectiveness of the ATMS.

The vision for the St. Lucie ATMS is too have collaboration between the partner agencies to provide highly effective transportation services through the combined use of the partners' collective resources to maximize safety and mobility to the public. Regional collaboration offers significant benefits, and this report focuses on overcoming the barriers that hinder regional traffic signal operations programs. This is best utilized by operating and managing as one entity with the local maintaining agencies providing the maintenance of the system. To best utilize this concept consistency with software and hardware will be required so it is required that all three local agencies use the same software and hardware systems as well as the same traffic signal control technologies such as controllers and communication equipment. The benefits of cross agency collaboration and one entity management are many and some of the major benefits are listed below:

- Operating agencies increase access to funding by participating in joint funding applications;

- Agencies undertake larger, more technologically advanced projects by leveraging their expertise and resources with other agencies;
- Participating agencies help meet regional goals to reduce delay, fuel consumption, and emissions through coordinated initiatives, such as signal timing programs.

The project is best constructed by splitting it into five phases with the emphasis on the early phases of getting the existing St. Lucie County and City of Ft. Pierce communication systems up to par with the existing City of Port St. Lucie system. The three systems can then be connected so that the entire County will operate under one system with one operations center. Then further upgrades to St. Lucie County, City of Ft. Pierce and City of Port St. Lucie ATMS systems can be made. The estimated project cost for each phase and the total cost are shown below:

- Traffic Operation Centers $383,697.00
- Phase 1 $3,286,221.00
- Phase 2 $ 2,016,062.00
- Phase 3 $ 2,237,717.00
- Phase 4 $ 1,268,613.00
- City of Port St. Lucie $791,150.00
- **Total Project Cost** **$9,983,460.00**

With the appropriate funding and performance measures St. Lucie County and its partnering cities of Port St. Lucie and Ft. Pierce can implement an ATMS that can be a model for both the southeast region and the State of Florida. Collaboration and consistency between the three existing agencies is essential to a successful implementation and together with the assistance of the Florida Department of Transportation, the implementation of an ATMS system will increase transportation system efficiency, enhance mobility and improve safety throughout St. Lucie County, the City of Port St. Lucie and the City of Ft. Pierce.

2 INTRODUCTION

2.1 BACKGROUND AND PROJECT OVERVIEW

The purpose of this memorandum is to develop a Master Plan for St. Lucie County's Advanced Traffic Management System (ATMS).

2.2 DOCUMENT OVERVIEW

Section 2 - Introduction

This section provides an overview and background of the St. Lucie County Master Plan.

Section 3 – Inventory Update

An updating of the existing inventory GIS files for St Lucie County and Fort Pierce signal systems. Due to city security policies, the above information could not be obtained for the City of Port St. Lucie.

Section 4 – TSM&O Applications & Strategies for St. Lucie County

A review to identify the Transportation Systems Management and Operations applications and strategies that can be implemented in St. Lucie County, the City of Ft. Pierce and the City of Port St. Lucie.

Section 5 - Visioning Workshop

The purpose of the workshop is for the Department to provide an update on the status of the project and to provide an opportunity for any additional input that you may have.

Section 6 - System Requirements

A documentation and review of the existing infrastructure, Long Range Plan and stakeholder interviews and the proposed recommendations and system integration for City of Port St. Lucie, City of Ft. Pierce and St. Lucie County ITS and signal systems.

Section 7 - Implementation Plan

A document that serves as a blueprint for how technology may be used to enhance the transportation system in both the short-and long-term. The implementation planning exercise itself has served as a valuable activity in bringing together the diverse set of stakeholders in the region. The Plan coordinates with a variety of other planning activities, both locally and regionally.

Section 8 - Funding Options

This task addresses Financing Options for the proposed ATMS infrastructure Master Plan and includes researching and documenting funding opportunities that can support the execution of the proposed Master Plan.

Section 9 - Performance Measures

This task addresses performance measures that will be used is to establish a method to evaluate the communication network and the ATMS that may be installed in the future. This task identifies the possible performance measures and provides for the basis for the development of the materials required for a presentation workshop to be held in St. Lucie County.

2.3 PROJECT STAKEHOLDERS

- Florida Department of Transportation District 4;
- St. Lucie County;
- City of Ft. Pierce; and
- City of Port St. Lucie.

3 INVENTORY UPDATE

As a part of the St. Lucie ATMS Master Plan, the FRA Team updated the existing inventory GIS files for St Lucie County and Fort Pierce signal systems. The following information was provided / updated in the GIS Maps:

1. Existing Signal System;
2. Central Computer Overview;
3. System Components (devices, software, etc);
4. System Software Overview;
5. System Displays and Reports;
6. Communications Subsystem Overview;
7. Network Architecture;
8. Communication Equipment;
9. Communications Cabinets;
10. Existing Traffic Signals Controllers; and
11. Existing Traffic Signal System Personnel and Resources.

Due to city security policies, the above information could not be obtained for the City of Port St. Lucie.

This section explains the details of the inventory update and the location of the existing fiber optic conduit in the St. Lucie County.

3.1 ST. LUCIE INVENTORY UPDATE

The following explains the inventory updated in the GIS Shape Files:

3.1.1 Traffic Signal System

Appendix A shows the list of traffic signals in the St. Lucie County, City of St. Lucie and City of Ft. Pierce. The updated inventory provided by the agencies has information on the Signal Ids, Built year, Controller Type, Cabinet type, Cabinet Size, Intersection Type, pedestrian signals, detection mode, information on the power supply, etc.

The GIS shape files were build based on the signal information provided by the agencies. The GIS shape files include the physical location of each intersection in the St. Lucie County and associated data for each intersection.

The intersection information was converted into a shape file “SLC-PSL-FP-Traffic Signals” using ARC View 9.3. Universal Transverse Mercator (UTM 17) coordinate system with NAD83/Florida East (ftus) 901 was used for projecting the shape files.

The signal systems information was categorized based on the information provided by the agencies. For example, the signals IDs were categorized based on the type of the signal such as "school", "Signal" and "Old Flasher".

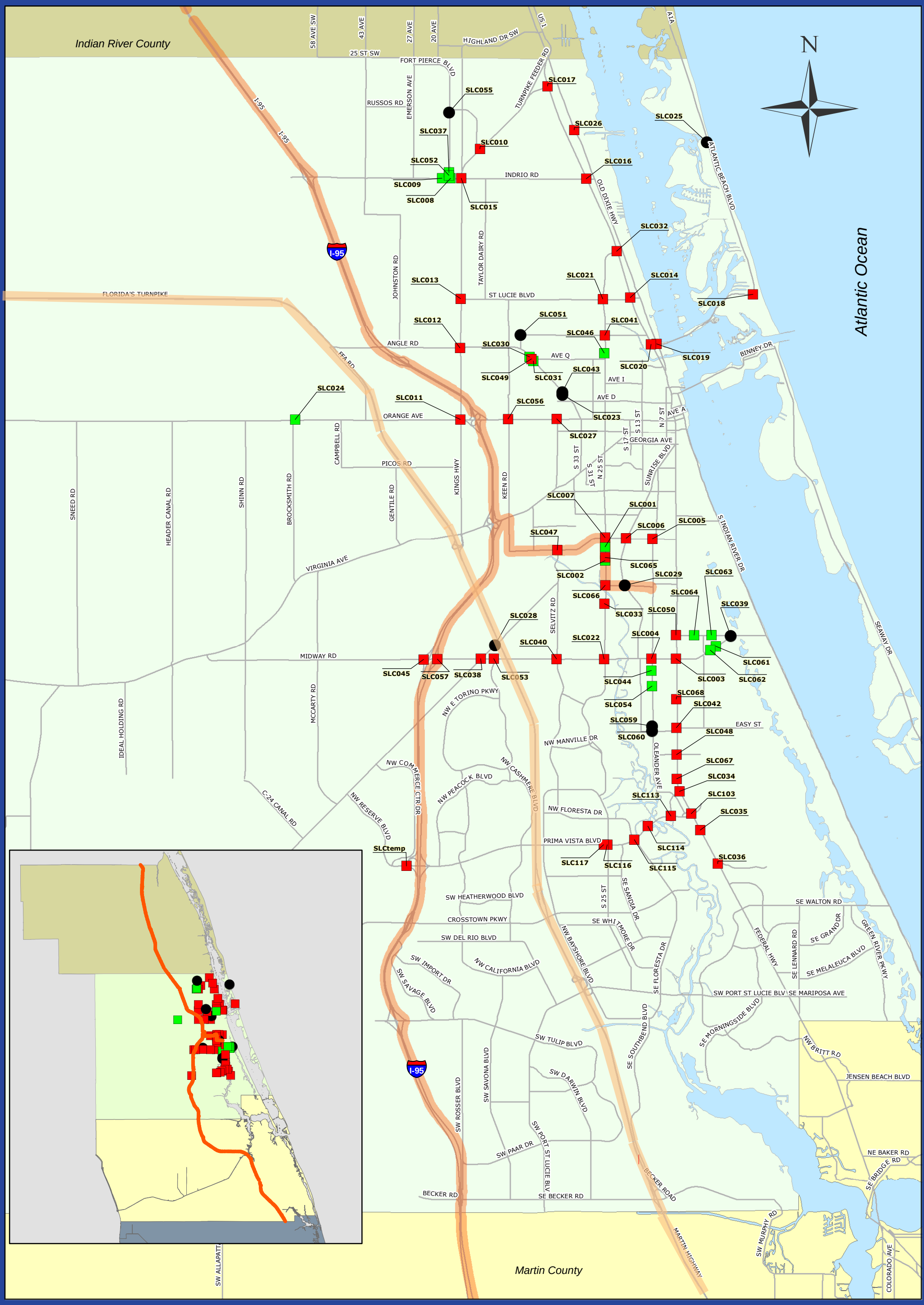
Figure 1 shows the map of the existing traffic signal system in the St. Lucie County.

3.1.2 Fiber Optic Conduit

The information on the location of the existing fiber optic conduit in the county was provided by the department, City of Ft. Pierce and the St. Lucie County. **Figure 1** and **Figure 2** provides the layout of the St. Lucie County with fiber optic conduit locations in the county. **Figure 1** shows the location of the fiber optic along I-95. **Figure 2** shows the location of the existing fiber optic conduit maintained by the Turnpike, City of Ft. Pierce and St. Lucie County.

All the shape files were submitted as per the requirements from the Traffic Operations, Florida Department of Transportation. The maps submitted along with this technical memorandum show the location of the traffic signals, fiber optic conduit, and signal system categories, etc along different sections of the roadway in the county.

Based on our initial interviews with the Indian River County and Martin County, the GIS maps for the county are up to date. Appendix B shows different maps developed for St. Lucie County.



Legend

Traffic Signals

- Flasher
- School
- Signal

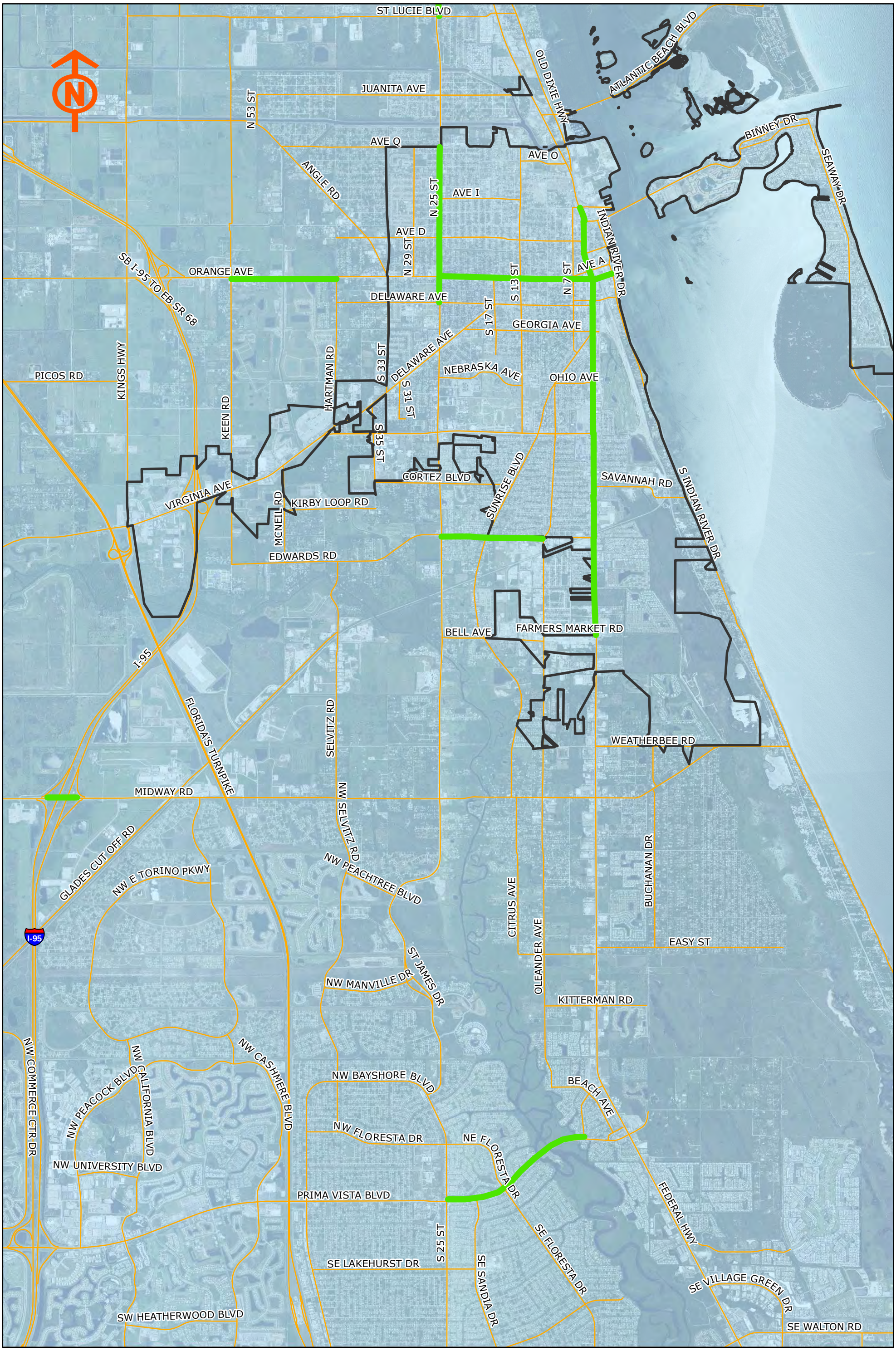
Base Map

Fiber Conduit

0 0.5 1 2 Miles

St. Lucie County

FIGURE 1: ST. LUCIE TRAFFIC SIGNAL SYSTEM



Legend

- Conduits
- Fort Pierce City
- Base Map

0 0.3 0.6 1.2 Miles

St. Lucie County/City of Fort Pierce

FIGURE 2: ST. LUCIE FIBER OPTIC COMMUNICATION SYSTEM

4 TSM&O APPLICATIONS & STRATEGIES FOR ST. LUCIE COUNTY

Transportation Systems Management and Operations (TSM&O) is an integrated program to optimize the performance of the existing and the proposed infrastructure though the implementation of various multi-modal and cross-jurisdictional services and projects. The various services and projects developed as a part of the TSM&O are designed to improve the travel times, security, safety, and reduce the delays and congestion along the surface transportation systems. TSM&O improvement projects include a diverse range of activities and services, which include but not limited to:

- Traffic Detection and Surveillance
- Arterial Management
- Freeway management
- Demand management
- Work zone management
- Emergency management
- Electronic toll collection
- Automated enforcement
- Traffic incident management
- Traveler information services
- Commercial vehicle operations
- Traffic control
- Freight management
- Coordination of highway, rail, transit, bicycle, and pedestrian operations

This section explains TSM&O applications and strategies that can be implemented in the St. Lucie County. This can be achieved with a close coordination between the three traffic maintaining agencies: St. Lucie County, City of Ft. Pierce and City of Port St. Lucie.

Detailed TSM&O applications and strategies that can be implemented in the St. Lucie County have been reviewed and presented in the following sections. A through literature review had been conducted to present the TSM&O ideas and strategies implemented throughout the country.

4.1 TRAFFIC SIGNAL COORDINATION

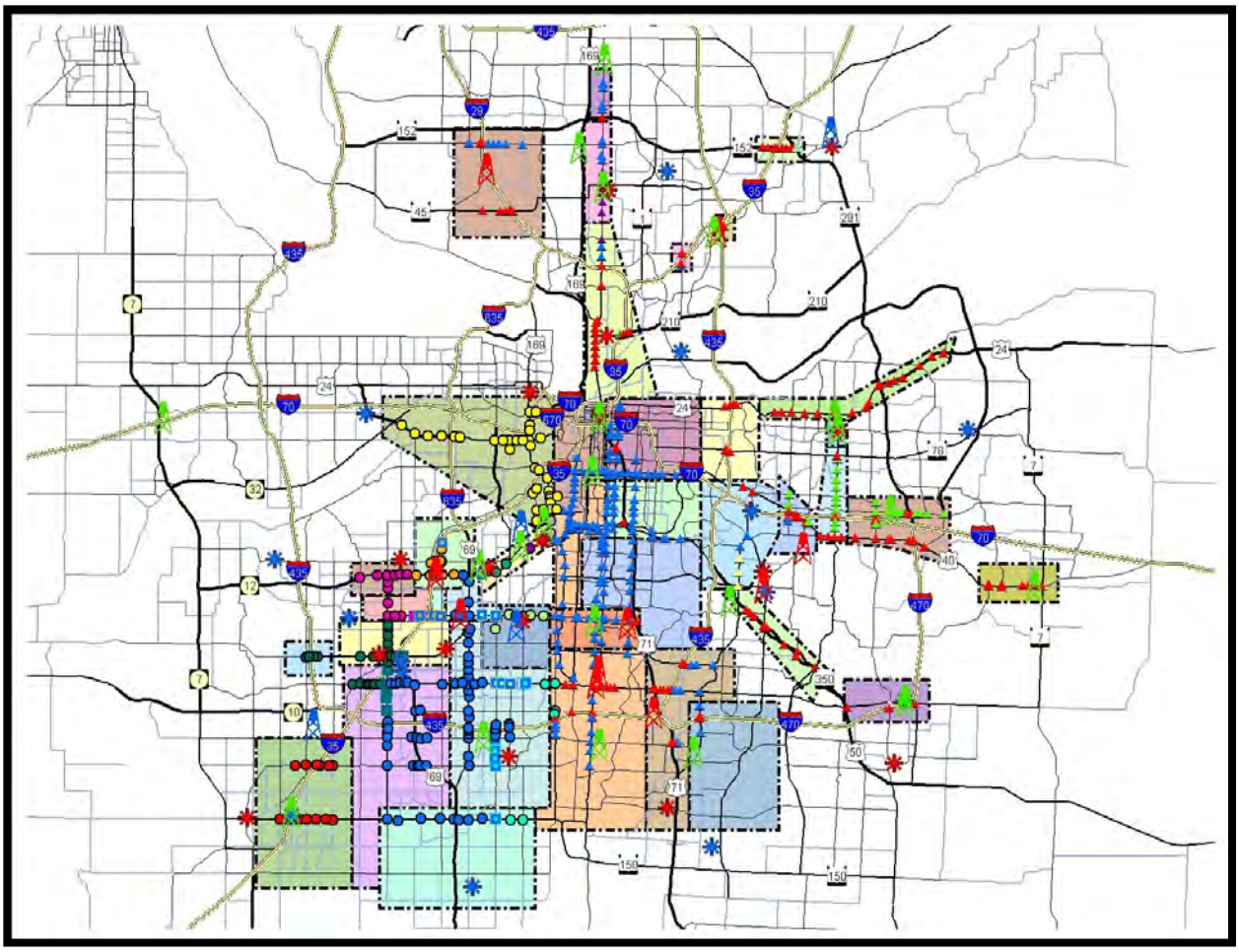
Traffic Signal Coordination along the priority corridors of St. Lucie County can be implemented with a joint effort between the three maintaining agencies: St. Lucie County, City of Ft. Pierce and City of Port St. Lucie. A similar strategy was implemented by the City of Kansas City and is presented below:

The Kansas City Operation Green Light (OGL) Program [(1)] is a joint effort between the State of Missouri and local governments to improve the coordination for traffic signals at 1500 intersections throughout the Kansas City area. The OGL program objectives as listed by its technical advisory committee are:

- Simplified Database Management of signal timing, data collection, inventory programs, etc;
- Improved System Monitoring using data summaries, event reporting, video surveillance, etc;
- Increase Operational Flexibility,
- Cross-Agency Coordination to provide coordinated traffic movement across jurisdictional boundaries;
- Enhanced Maintenance Capability for failure identification, equipment reliability, local service, etc; and
- Individual Agency Timing in providing the ability of an individual agency to develop and implement their own timing plans.

Figure 3 shows the priority corridors considered for the signal optimization in the City of Kansas. A feasibility study conducted for this study presented the benefits of the program using a computer model developed in "MOBILE 5a".

Figure 3: Priority Corridors for Operation Green Light Program, Kansas City



Benefits

The results of the pilot study showed the following benefits from the Green Light Program:

- The average travel times or speeds along the selected corridors reduced by 17 percent.
- Decrease in the Hydro Carbon and Carbon Monoxide emissions was observed by 9 percent and 14 percent respectively, throughout the study area.

Cost Estimate

The total costs associated with the Kansas City Operation Green Light Program, which includes the signals along the priority corridors and non-priority corridors (for 1500 intersections) are approximately $56.544 million dollars. The cost estimate included the costs associated with design, central hardware & software, controller & cabinet, radio cost, signal timing, system management and other contingencies.

Similar benefits with the above mentioned approximate cost (per each intersection) can be achieved if the Green Light Program is implemented in the St. Lucie County.

4.1.1 Traffic Adaptive System

A traffic adaptive subsystem can be developed in the county to provide real-time access to the traffic control system operation for a signal network. The following programs are recommended for developing a traffic adaptive system in the St. Lucie County:

ACS Lite

ACS Lite is an arterial-based adaptive control software application that has been developed under contract to the Federal Highway Administration Association (FHWA).

Adaptive Signal Control (ACS Lite) continuously adjusts and distributes green time to enhance traffic movements, and as a result, improves travel time reliability, reduces traffic congestion levels, and accommodates variable/unpredictable traffic demands. Moreover, Adaptive Signal Control extends the effectiveness of signal timing strategies. The benefits of using ACS Lite include:

- Helps ease traffic congestion.
- Widely deployable.
- Low cost design.
- Works with closed-loop systems.
- Operates in real time.
- Does not require calibration.

SynchroGreen

SynchroGreen is developed by Trafficware, Inc and provides a fully adaptive real-time traffic control system operation for any signal network. Synchro Green provides many innovative features in controlling the traffic signal systems such as improve corridor progression, improve travel times and reduce delays for all approaches, determines optimum operation for each intersection independently that provides the best progression, determines critical intersections in a network and decides which intersection to associate and disassociate.

SCOOT

Split, Cycle and Offset Optimization Technique (SCOOT) developed by Siemens Corporation are dynamic, on-line, real-time method of signal control. This system provides times that are continuously updated eliminating the need for a signal timing plan. SCOOT allows systems integration and commonality of hardware across the range of traffic management and control systems. This in turn reduces maintenance requirements and provides more opportunities for implementing a range of intelligent transportation systems. The SCOOT system is a traffic model that predicts a short-term traffic demand and uses this model to predict the effect of small changes to the current timing of signals. The SCOOT traffic model is based on data collected from presence detectors at the rate of once per second on each link to the network.

4.2 DEPLOYMENT OF SUNGUIDE SYSTEM

A SunGuide Transportation Management Center (TMC)[(2)] deployed to manage and maintain the intelligent transportation systems in District Four operates a series of traffic management services and provide motorists with a transportation system that is safe, efficient and capable of meeting real-time traveler demands. The objective of the SunGuide TMC is to collect traffic information from within the center and provide motorists with incident management, traffic management and travel information services. The SunGuide system is currently deployed in District Four for ITS device management along I-95. This includes the section of I-95 through St. Lucie County.

4.2.1 Incident Management Programs

Incident Management Programs work to reduce the negative effects of traffic events or crashes on the surface transportation system. It should promote a multi-agency approach to incident response to reduce clearance duration times and restore highway capacity back to free flowing conditions. The goal of this program should be reducing traffic congestion and the chances of secondary crashes caused by a prolonged exposure to traffic incidents. Few example of such programs implemented in the District Four is deployment of the following services:

- Road Ranger Service Patrols;
- Rapid Incident Scene Clearance (RISC);
- Incident Response Vehicle (IRV) Program; and
- Traffic Incident Management Team.

4.2.2 Traffic Management Programs

Traffic Management Programs implement a series of innovative transportation strategies that together work to improve traffic conditions and optimize the capacity of the existing roadway systems. The programs should utilize advanced technologies to manage travel conditions, which reduces the need to build additional roads or widen existing ones, making the traffic management program a viable alternative to traditional highway construction projects. Examples of such programs implemented in the State of Florida include:

- Express Lanes along I-95 (Miami-Dade County); and
- Ramp Metering along I-95 (Miami-Dade County).

4.2.3 Travel Time Information Services

Travel Time Information Services involves collecting traffic information using the camera images generated through ITS technologies, and post traffic reports to help drivers learn about upcoming traffic delays, alternate route information and travel times. Few examples of such traveler information services implemented in the District Four are:

- 511 Traveler Information System;
- Dynamic Message Signs (DMS); and
- Travel Time Information System.

Benefits

The benefits of the SunGuide system is a safe, secure and efficient surface transportation system through the implementation of interoperable ITS technology in support of local, regional, and statewide mobility. This system, if implemented in the St. Lucie County in coordination with the local agencies can minimize delays and increase safety conditions in the county.

4.3 ACCESS MANAGEMENT IN TRANSPORTATION PLANNING

Access management is a systematic control of the location, spacing, design, and operation of driveways, median openings, interchanges and street connections. Access management ensures safe and efficient operation of the traffic while providing reasonable access to the adjacent land use. Access management when implemented effectively can provide a cost-effective approach for accomplishing transportation plan goals. Research practice shows that implementing access management principles to our highways provides a cost-effective means for supporting the mobility, safety and environmental goals that are established in transportation plans at the state, metropolitan, and local levels[(5)].

As per the NCHRP Report 548 "*A Guidebook for Including Access Management in Transportation Planning*"[(5)] the application of the best access management techniques will result

in a safer vehicular and pedestrian traffic, allows motorists to operate vehicles with fewer delays, less fuel consumption, and fewer emissions.

Benefits

The following benefits on proper access management were observed based on various research documents:

- A major synthesis of research on signal spacing that each additional signal over two per mile (i.e., a one-half mile signal spacing) increased travel time by over six percent [(6)];
- A research synthesis found that roadway speeds were reduced an average of 2.5 miles per hour for every 10 access points per mile, up to a maximum of a 10 miles per hour reduction (at 40 access points per mile) [(6)]; and
- Based on the analysis of crash data in seven states, raised medians reduce crashes by over 40 percent in urban areas and over 60 percent in rural areas [(6)].

4.4 DEPLOYMENT OF TRAVEL TIME SYSTEM

The Travel Time Information services involve collecting traffic information using various ITS technologies, and posting traffic reports onto the 511 Traveler Information System and Dynamic Message Signs (DMS) to help drivers learn about upcoming traffic delays, alternate route information and travel times. This information helps the motorists to divert away from the congested traffic and plan for alternative routes of travel. The following technologies are recommended for the travel time information systems in the St. Lucie County.

4.4.1 BlueTOAD

The Bluetooth Travel-Time Origin and Destination (BlueTOAD) [(3)] is one of the advanced traffic monitoring system, directly measuring travel times using cost-effective, non-intrusive roadside technology. BlueTOAD detects anonymous MAC address of Bluetooth signals broadcasted from mobile devices in vehicles, such as phones, headsets and music players, and thereby punches the location and time stamp of the vehicles. This enables the system to determine accurate travel times and average speeds along the existing road network. The BlueTOAD devices provide a secure interface for the clients to initiate services, view content, and manage permissions to access various levels of the data. The BlueTOAD devices manufactured by the TrafficCast can be a permanent or a portable device and can be installed independently using a cellular data connection and a solar panel.

4.4.2 Sensys Networks

The Sensys Networks Wireless Arterial Travel Time System (ATTS) accurately estimates travel time distributions in real time, and derives various performance measures, including delay, LOS, emissions, etc[(4)]. The ATTS works with a sensor comprising an array of five 3 inch-cube magnetic nodes is embedded in the pavement at the two ends of a *single* lane in the segment.

Each sensor records the time when a vehicle goes over it together with the vehicle's magnetic signature, and sends the record via radio to an 'access point' (AP) on the side of the road. The AP matches the signatures from the two sensors: if a match is made, the corresponding travel time is found. Field measurements indicate that the ATTS matching rate is 70 percent of the total number of vehicles traversing the segment [(4)]. Thus the sampling rate (70 percent) is sufficiently high to yield accurate travel time distributions.

BlueTOAD and Sensys Networks collect travel time and delay information along the roadway system that should be reachable to public using DMS Signs, Websites, Smart phone applications, etc.

DMS Signs

Dynamic Message Signs (DMS) are one of the tools used by the Transportation Management Center to inform motorists with any information of the travel times, delays, incidents and other related information that occurs on the highways. A dedicated software system allows the staff at the transportation management center to post messages on the DMS Signs.

Website & Smartphone Applications

The travel time information obtained from BlueTOAD and Sensys Networks should also be available for public through a website. Once the information is available for public, Smartphone applications can be developed for different operating systems. The travel time information obtained from the St. Lucie County traffic maintaining agencies should be integrated with the SunGuide Regional Transportation Management Center. Various other systems that can provide travel time information for public are:

Naztec Web.now

Naztec ATMS.now is a complete traffic and data management that includes real-time reporting, integration with Crystal Reports™, XML data exchange, GIS interface and many other features. Web.now is one of the additional software modules that provide a website delivery mechanism for **ATMS.now** information.

TrafficCast TrafficSuite

TrafficSuite is a complete traffic management system comprised of a range of programs and applications that manage the collection and integration of traffic information.

4.5 FREEWAY, INCIDENT AND EMERGENCY MANAGEMENT

Deploying intelligent infrastructure along the roads, with freeway and incident management can significantly contribute to improving travel conditions by addressing delay caused by both recurring and nonrecurring congestion. Incident management systems have proven to be highly successful, and are now found in many major urban areas around the United States.

Incident management is the process of managing multi-agency, multi-jurisdictional responses to highway traffic disruptions. Efficient and coordinated management of incidents reduces their adverse impacts on public safety, traffic congestions, and on the local economy. Incident management yields significant benefits through reduced vehicle delays and enhanced safety to motorists through the reduction of incident frequency and improved response and clearance times. These delay savings and the consequent increased travel speeds considerably reduce vehicle emissions.

A study performed by Johnson and Thomas (2000)[7], shows that incident-related traffic congestion detrimentally affects public safety, the local economy, and the environment. It is estimated that this congestion will cost the U.S. public $75 billion in lost productivity and 8.4 billion gallons of wasted fuel in the year 2005.

A case study performed on Minnesota Highway Helper Program [7] showed that Duration of vehicle stalls reduced by 8 minutes, annual delay savings due to reduced delay assessed at a total savings of $1.4 million.

Benefits

Based on the various case studies presented by Johnson and Thomas (2000) [7], the following benefits can be observed with the freeway, incident and emergency management:

- Improve travel conditions by reducing delay caused by the incidents;
- Reduction in the secondary traffic incidents;
- Significant improvements in driver confidence; and
- Reduction in Hydrocarbon, Carbon Monoxide & Nitrous Oxide emissions.

The existing Road Ranger Service Patrol in the St. Lucie County covers I-95 Monday through Friday, from 6 a.m. – 10 pm [8]. Similar to Broward and Palm Beach Counties, the Road Ranger Service Patrol should cover I-95 24 hours a day, 7 days a week and 365 days a year.

4.6 RAMP MANAGEMENT

The increasing demand for fast, efficient and convenient means of travel has resulted in greater use and dependency on existing transportation infrastructure, including freeways and their associated ramps. As a result, congestion, collisions and other transportation-related problems

continued to increase and improvements to transportation infrastructure in the form of additional lanes and new roadways have not been implemented proportionally. Ramp management is one of the techniques that can be used to improve the operation of freeways and their associated ramps.

FHWA, USDOT has developed a handbook on *Ramp Management & Control*[9] that provides information on ramp management and control procedures by providing support, information, guidance, and recommended practice to practitioners responsible for freeway management and operations. A Transportation Management System (TMS) Master Plan was developed by Caltrans with an objective to deploy and integrate TMS strategies in the State in a systematic and coordination fashion.

Benefits

A case study performed by Caltrans [9] estimated the performance of the TMS master plan with different scenarios. The study showed the following benefits of ramp metering on previously un-metered, congested corridors:

- The travel time saving benefits of ramp metering were higher in more congested corridors;
- The study in general showed that the more sophisticated technologies and strategies brought about greater benefits; and
- Scenarios tested with moderate queue control provided greater time savings benefits than those scenarios using aggressive queue control.

A similar strategy can be implemented along the congested ramps of I-95 in St. Lucie County. An integrated system with the SunGuide that can monitor congestion on the freeway and control the traffic entering the freeway should be developed in St. Lucie County.

4.7 INTELLIGENT FREIGHT TECHNOLOGIES AND THEIR BENEFITS

The Virtual Freight Network (VFN) is a regional freight-focused dynamic mobility application introduced by Districts 4 and 6 (South Florida) of the Florida Department of Transportation [10]. The VFN concept is designed with an objective of data sharing among the region's commercial vehicle operators, freight facilities, shippers/receivers, and existing public sector ITS infrastructure, in order to improve freight mobility and overall system performance in South Florida.

The VFN should integrate data from public (e.g., incidents, work zone, weather) and private-sector sources and make these data available to private-sector stakeholders in various formats. For motor carriers that currently use routing and dispatching software, the VFN data will be provided in a standardized electronic format that can be integrated directly into the firm's current software routing and dispatch software. The data should be posted to a secure FTP site every 30

seconds, from which it will be downloaded automatically by the motor carrier systems. As roadway conditions change, the motor carrier software will visually identify the firm's vehicles impacted by changing conditions and provide alternate routing to avoid the problem or at least limit the impact of the delay. For motor carriers that do not use routing and dispatch software, travel times for key freight corridors will be posted on variable message signs at the exit of intermodal facilities to facilitate real-time routing decisions.

Benefits

An integrated SunGuide system with intelligent freight technologies will help the private sector motor carriers to plan their routes more efficiently. This will encourage the trucks to take alternative routes bypassing the already congested routes in the county.

4.8 TRANSIT MONITORING SYSTEM

A transit monitoring system that can provide live updates of transit / school bus arrival times can be introduced in the county. This system should be accessible to public through internet and as a smart phone application. Information available on location of the transit and their accurate arrival times will reduce the wait times of the transit riders at the bus stops. As a result, the patronage for the public transportation system will increase and more pedestrians and bicyclists will choose the public transportation system.

4.8.1 SunGuide Automatic Vehicle Location

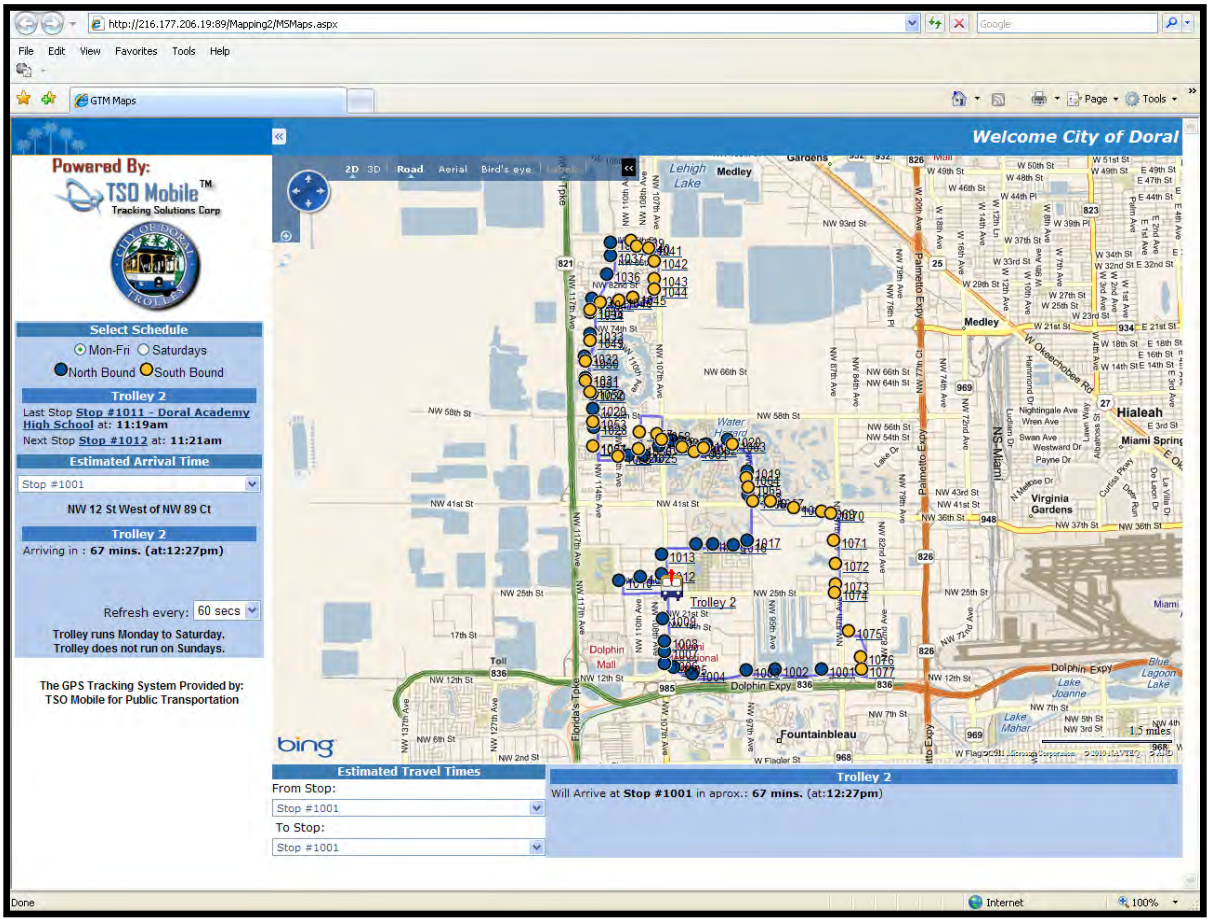
The concept of Automatic Vehicle Location (AVL) system for Road Rangers [(12)] developed by the SunGuide System can be used in monitoring the transit location in the St. Lucie County. An integrated SunGuide System with the transit/school bus location in the county will help public with overall travel information in the St. Lucie County. The AVL subsystem will acquire vehicle information containing position coordinates in XML format and displays vehicle positions using icons on the SunGuide maps. The system will update the vehicle position each time a new position is reported from the vehicle. Few such examples of the transit monitoring systems are presented below:

The real-time bus monitor system developed by the London Transit Commission allows public to get real-time information on the London transit bus service, anytime through their website [(13)]. The interactive maps developed using Virtual Earth and Google Maps allows people to select a route from a drop down menu, which displays the real-time location of all the buses on the selected route.

A similar element of real-time online transit information was developed by the City of Doral in Miami-Dade County. The *Doral Trolley Tracker* [(14)] provides real-time trolley information for a specific time point and provides an estimated time of transit arrival at each bus stop. This

information is available through a website and also through a customer center maintained by the City of Doral. **Figure 4** shows the real time location of *Trolley 2*, in the City of Doral.

Figure 4: City of Doral Trolley Tracker



Benefits

A transit monitoring system in the St. Lucie County will help public in planning their transit rides more efficiently. The transit monitoring system will also increase the patronage for the public transportation system and encourage pedestrians and bicyclists to take the public transportation system.

4.9 KEY FINDINGS & CONCLUSIONS

4.9.1 Key Findings

St. Lucie County has three maintaining agencies that manage the existing traffic signal system. The following sections explain the existing control system, staffing, communications infrastructure, etc for each maintaining agency:

4.9.1.1 St. Lucie County

Existing Traffic Control System

St. Lucie County currently has 46 signalized intersections and 27 Flashers / School Flashers operated by Econolite TS2 Controllers with Dial up communications to 28 Masters.

Most of the master locations are isolated, involving only one intersection. Five masters communicate to one to three local controllers. Zone 1 along US1 communicated to 8 local intersections. A Closed Loop System with central communication to master controller is used for monitoring local controllers. St. Lucie County currently has adopted the use of video detection, deploying Econolite Autoscope and Terra video detection. The deployed cameras used for vehicle signal detection have the added future benefit of utilization for Traffic Incident Management.

Central System

St. Lucie County operates its system in a small room at the County's traffic signal shop. The shop is located at St Lucie County Facility at 3071 Oleander Ave, Ft. Pierce, FL.

Existing Communications Infrastructure

Communication is via dial-up/twisted pair copper line communication using lease lines. Because of this communication bandwidth is limited, restricting the amount of data to be transferred between field devices and central.

Limitation to Existing Traffic Signal System

The system does not utilize a number of Regional Signal Coordination System elements including:

- Center to Center Communication;
- Ethernet base communications;
- System Database Management and Dissemination;
- CCTV Control and Display;
- DMS Control and Display;
- Traffic Responsive;
- Traffic Adaptive;
- Traffic Incident Management;
- Traveler Information;
- Work Zone Management; and
- Travel Time.

St. Lucie County's current system does provide communication to field components but is limited to the low bandwidth of dial-up/twisted pair copper lines communications. This will

hamper data transfer efforts needed for many elements of current ATMS systems especially the data feeds required for current Traffic Adaptive systems, Travel Time Systems, and CCTV Control and Display Subsystems. The current system does not share and exchange data with other agencies, negating the ability for regional traffic control and management. This restricts any capability of operating and managing regional traffic flow through sub-systems and regional boundaries.

The Traffic Operations Center (TOC) is small and has limited capabilities. The system is isolated and consists of a workstation with limited system timing functions and does not have the capabilities of performing incident management, traffic responsive or traffic adaptive functions.

Current County staffing assigned to the existing traffic system appears to be understaffed. The amount of effort needed to operate and maintain a current ATMS will exceed the current staffing restraints. Signals are widely distributed throughout the county. Installation of fiber optic cabling to isolated intersection may not be cost effective.

4.9.1.2 City of Ft. Pierce

Existing Traffic Control System

The City of Ft Pierce has 67 signalized intersections and 29 Flashers / School Flashers operated by Econolite TS2 Controllers.

The TOC operates its system out of City Hall with limited capability, similar to St. Lucie County's system

Staffing

Staffing is very limited consisting of one to two personnel

Existing Communications Infrastructure

Communication is via dial-up/twisted pair copper lines. Because of this communication bandwidth is limited between central, restricting the amount of data to be transferred between field devices and central.

Limitation to Existing Traffic Signal System

The system does not utilize a number of Regional Signal Coordination System elements including:

- Center to Center Communication;
- Ethernet base communications;

- System Database Management and Dissemination;
- CCTV Control and Display;
- DMS Control and Display;
- Traffic Responsive;
- Traffic Adaptive;
- Traffic Incident Management;
- Traveler Information;
- Work Zone Management; and
- Travel Time.

The City of Ft Pierce current system does provide communication to field components but is limited to the low bandwidth of dial-up/twisted pair copper lines communications. This will hamper data transfer efforts needed for many elements of current ATMS systems especially the data feeds required for current Traffic Adaptive systems, Travel Time Systems, and CCTV Control and Display Subsystems. The current system does not share and exchange data with other agencies, negating the ability for regional traffic control and management. This restricts any capability of operating and managing regional traffic flow through sub-systems and regional boundaries.

The TOC is small and has limited capabilities. The system is isolated and consists of a workstation with limited system timing functions and does not have the capabilities of performing incident management, traffic responsive or traffic adaptive functions. Current County staffing assigned to the existing traffic system is understaffed. The amount of effort needed to operate and maintain a current ATMS will exceed the current staffing restraints.

4.9.1.3 City of Port St. Lucie

Existing Traffic Control System

The City of Port St. Lucie has 71 signalized intersections and 18 Flashers / School Flashers operated by Naztec TS2 Controllers. The City of Port St Lucie has an up to date system with Naztec's ATMS.now, fiber communication infrastructure, Ethernet based communications and CCTV monitor and control system.

The TOC is located at the City's Traffic Operations Office with a backup facility at City Hall.

Staffing

The City of Port St. Lucie has 16 personnel working in the traffic section.

Limitation to Existing Traffic Signal System

The current system has a number of capabilities associated with TSM&O strategies, but the system does not utilize a number of Regional Signal Coordination System elements, which would be beneficial in providing positive safely and mobility outcomes to the traveling public including:

- Center to Center Communication;
- DMS Control and Display;
- Traffic Responsive;
- Traffic Adaptive;
- Traveler Information;
- Work Zone Management; and
- Travel Time.

4.9.2 Conclusions

A number of TSM&O elements should be explored for potential deployment in St. Lucie County. Elements to explore include but not limited to:

- Upgrading existing Arterial Management System to current systems including the deployment of traffic adaptive or traffic responsive systems;
- Deployment of a Regional Signal Coordination system with strong emphasis on cross jurisdiction coordination, data sharing and redundancy support between neighboring agencies;
- Incident Detection with CCTV monitoring and control, travel time systems with dissemination to the travelling public via website, 511 and/or DMS should also be explored;
- Intelligent freight technologies that can help the private sector motor carriers to plan their routes more efficiently;
- AVL System integrated with the SunGuide Systems to track the public transportation system and provide accurate information on the arrival and departure times of transit / school busses;
- Ramp metering integrated with the SunGuide to provide controlled access to freeways in the county. Ramp metering can be considered as a long-term strategy, as the current traffic in the county does not create considerable congestion along I-95;
- Road Ranger Service available to public for 24 hours a day continuous for 365 days of the year. This service can also be extended for major arterials in the St. Lucie County; and
- Deployment of travel time systems such as BlueTOAD systems, Sensys Networks and other latest technologically advanced systems.

5 VISIONING WORKSHOP

A number of project and visioning workshops with the project stakeholders were held during the preparation of the Master Plan. Attendees at these meetings included FRA and McMahon staff, C3TS staff, FDOT District 4 staff, St. Lucie County staff, City of Ft. Pierce staff, City of Port St. Lucie staff, Peter Buchwald with the St. Lucie TPO, and members of the Council on Aging of St. Lucie. Key issues generated from these meetings included:

- The city of Port St. Lucie had concerns because of their policy of not being able to share their information/data to the public. The City also explained issues with respect to their security policies that do not allow other agencies to connect to their system;
- All agencies had concerns about the possibility of signal coordination as their system is different from the other agencies in the County. City of PSL uses ATMS.now for the past 6 years with communication over fiber optic cable. Both City of PSL & City of Ft. Pierce uses Econolite systems for many years;
- All agencies expressed concern about coordinating traffic signals along US-1 as the signal spacing is too far for coordination;
- Getting the 3 maintaining agencies on the same technology, i.e. all using Econolite or Naztec controllers. The 3 agencies seemed to agree that by the time the modification of equipment would take place; technology would likely be completely different so choosing the common type now would be premature;
- It has been emphasized that funding through the TPO, including Federal and State funds could be available, but a common goal and benefit would need to be shown in order to obtain those funds from the TPO Board. The master plan will need to reflect one vision for the County and the TPO Board believes having a goal of consistency of equipment would help;
- The most important improvement to recommend at this time is to get the fiber network complete;
- Local roads can be included if the funding was state and federal, through the TPO. The consensus was that system-wide improvements to the network would benefit the arterials and therefore local roads as part of that network would qualify for the funding; and
- The vision for consolidating Operations and Maintenance duties for the Signal System and ATMSs in the St. Lucie County TPO area was agreed to in concept. The Master Plan should reflect a stepped approach to reaching this, starting by interconnecting the signals in the 3 jurisdictions via a fiber optic communications network. The milestones leading up to achieving the long term vision of one O&M entity for the St. Lucie County TPO area and activities/projects to achieving these milestones will be includes as recommendations in the final ATMS Master Plan. Modifications to existing policies, how to establish the one entity institutionally and the types of agreements needed will also be included in the plan.

All of these key issues and others were discussed and incorporated into the Master Plan as needed.

6 SYSTEM REQUIREMENTS

6.1 INTRODUCTION

6.1.1 Section Requirements

The purpose of this section is to provide the necessary information as *develop and recommend an ATMS that meets the needs and requirements of the St Lucie County Signal Maintaining Agency. As required by the Subtask this report supports the County's 2035 Regional Long Range Transportation Plan.* The Subtask System Requirements are to include the following items as a minimum:

All Traffic Signal System Components		
Communication Network	Communication Cabinets	Communication Controllers
Network Architecture	System Software	System Capabilities
ITS/ATMS Infrastructure	Potential ATMS/ITS Services	ATMS Infrastructure Evaluation Process
ATMS/ITS Standards/Deployment Issues	ITS/ATMS Infrastructure Analysis	ATMS and Traffic Signal System Integration
Integration with existing system	Integration with surrounding Traffic Signal System	

This section is also in consortium with **Section 4 (TSM&O),** which detailed section the Transportation Systems Management & Operations Applications & Strategies for the St. Lucie County TSM&O.

6.1.2 2035 Regional Long Range Transportation Plan

The ***2035 Regional Long Range Transportation Plan (RLRTP) Update,*** developed by Kimley Horn & Associates, Inc., references to St. Lucie County as follows: "For the St. Lucie TVC Area, increasing trip internalization using mixed use development patterns, implementing a connected traditional street network, and improving the connectivity efficiency to regional roadways such as I-95 are being studied to test the potential to alleviate the need for widening of roadways such as Indrio Road east of Emerson Avenue." This project complements the RLRTP by providing a means and method to establishing the connectivity between agencies for signal coordination.

6.1.3 St. Lucie County ATMS & RLRTP

One of the functions of this section is to illustrate the present vehicular transportation infrastructure in use by the following agencies: City of Port St. Lucie, City of Ft. Pierce and St. Lucie County. This section discusses how the present structure where practical, can be used in an effective manner to help in the deployment of an Advanced Traffic Management System that exceeds what is presently in service and provides a platform to meet the future needs of all of the agencies involved with this project. This section also discusses how to increase trip internalization using mixed use development patterns, implementing a connected traditional

street network, and improving the connectivity efficiency to regional roadways as part of the RLRTP.

This section is not presented in the exact order of the aforementioned list. It is structured in a logical manner to address all of the subject matter that is tasked. Because Intelligent Transportation Systems (ITS) encompass many transportation disciplines presented in the TSM&O, many of which are not typical of a local municipality ATMS, the presentation starts with ITS infrastructure. Doing this allows for a minor discussion of functions associated with ITS but are not part of an ATMS and for the most part County and City agencies.

6.1.4 ITS/ATMS RLRTP & TSM&O

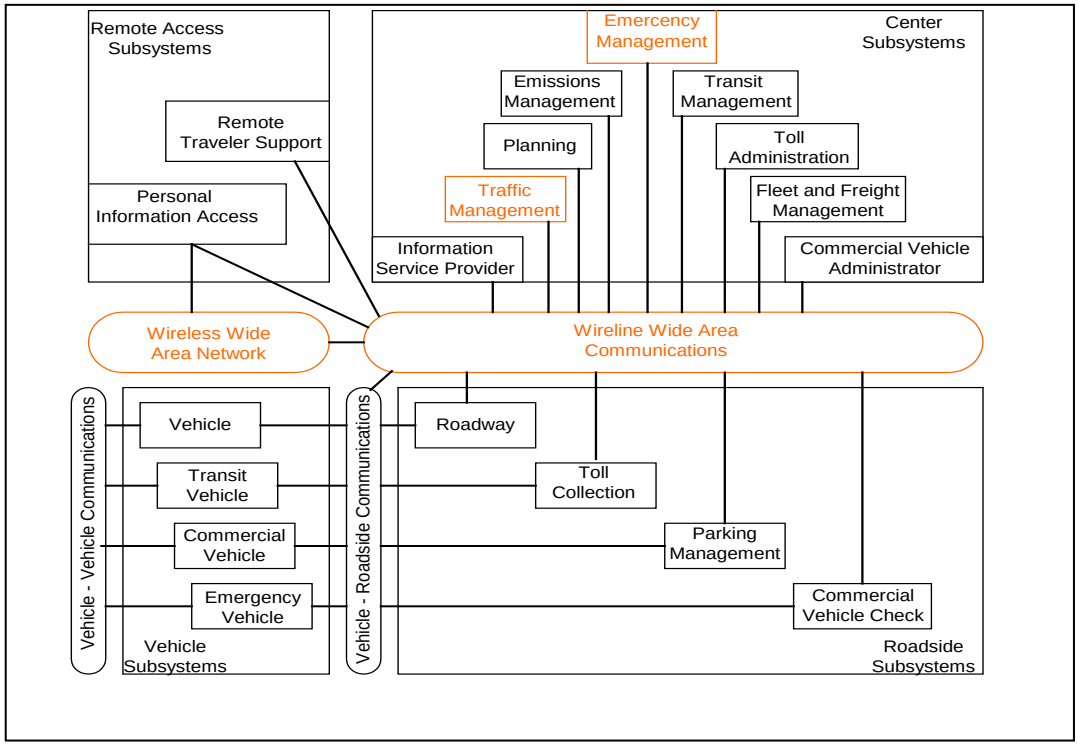
Various technologies and systems were investigated in order to recommend an Advanced Transportation Management System (ATMS) that meets the needs and requirements of the following St Lucie County Signal Maintaining Agencies: City of Port St. Lucie, City of Ft. Pierce and St. Lucie County; and what ITS functions could be incorporated as part of the TSM&O and RLRTP with the ATMS. Many of the issues in the TSM&O are usually a part of an ITS product not specifically concerned with urban traffic movements. With regard to the RLRTP and this Subtask, the primary mission is to provide recommendations regarding the best ATMS at a reasonable cost without disrupting the County and Cities existing infrastructure.

All the factors impacting ATMS design for St. Lucie County were examined to provide insight into what ITS capabilities can be useful to an urban traffic control system such as an ATMS. The approach of this plan is to optimize the performance of the existing infrastructure to maximize the available funds to provide a quality ATMS, and where practical, ITS functionality and data exchange. This, in turn, would improve the overall driving experience to the motoring public. Optimizing the infrastructure on the arterial roads using ATMS can reduce overall delays and travel times, due to traffic congestion, and various incidents having an impact on vehicle movements. In addition, the ATMS helps with a reduction to environmental pollution; improves safety, reduces travel delay, and travel time reliability.

6.2 ITS/ATMS CONSIDERATIONS FOR ST. LUCIE COUNTY

In addition to Advanced Transportation Management Systems, there are a number of other transportation disciplines that have been developed through various Intelligent Transportation Systems (ITS) implementations. An example of an ITS is Florida's SunGuide® system. This plan recommends incorporating only functions that are practical and within system funding constraints and **relevant** for an ATMS. A number of system functions are stated in the Transportation Systems Management and Operations (TSM&O) section. Some of the referenced functions are covered under ITS structure. Typically most of the current ITS modules provide system functions to collect data and control to Federal Highway and State Transportation Departments. The typical ITS functions and their interaction are presented in the associated **Figure 5**.

Figure 5: ITS Block Diagram



As illustrated in red in Figure 5, area of concern for this project consist of Traffic Management, Wide Area Communications, Emergency Management and Wireless Networks. Wide Area Communications is necessary to support all of the disciplines illustrated in the Figure. Traffic Management usually is the responsibility of municipal agencies, for example, St. Lucie County, and the cities of Fort Pierce and Port St. Lucie. For local agencies, Traffic Management is accomplished through ATMS. Where circumstances and budget constraints permit, an ATMS may be expanded to incorporate some of the modules of an ITS. The Florida Department of Transportation (FDOT) through its SunGuide® system supports many of the ITS functions. The SunGuide® system does not have an ATMS module to control traffic. The FDOT regularly gathers and shares information from the ATMS via center to center communication links.

6.2.1 TSM&O Functions Status and Considerations

6.2.1.1 Arterial Management Supported ATMS

The arterial management function deals with the transportation functions of moving people, vehicles and goods through non-highway areas. However, it does help the flow of traffic to and from ramps on interstate highways and turnpikes. The ATMS to be installed in St. Lucie County, the City of Fort Pierce in addition to the system installed in the city of Port St. Lucie provide the necessary functions to handle what is expected of Arterial Management. Each local agency has or will have considerable investment in specific ATMS components. Each agency will mantain their own system in the short term but in the long term the ATMS system should operate as one

system with one Transportation Management Center. The ATMS system shall support common time sync for coordination between signals.

6.2.1.2 Electronic Toll and Fare Collection Supported ITS Only

The fiber optic communication network could support the addition of systems to handle any toll facilities to be installed by the District or any of the municipal agencies. The Existing toll facilities are managed via Turnpike Enterprise and are limited to the Florida Turnpike in District 4. Networks can be linked and data shared via existing connection between District 4 and Turnpike Enterprise's existing fiber networks. This function is not supported by the ATMS.

6.2.1.3 Emergency Preparedness and Security Partially Supported ATMS

The FDOT Emergency Management Team is a vital element of the State Emergency Response Team (SERT). The SERT ensures that Florida is prepared to respond to emergencies, recover from them, and mitigate against their impacts. This team in consortium with District 4 and other participating agencies will coordinate the emergency efforts of the County. District 4 of the Florida Department of Transportation has an Emergency Management Office in Broward County. The main FDOT office for emergencies is located in Tallahassee. St. Lucie County has an officer responsible for emergency management. The city of Fort Pierce does not have an emergency management center at this time. Port St. Lucie has an emergency management center. The planned communication network could be used to link District 4 with St. Lucie County, the city of Fort Pierce and the city of Port St. Lucie. Alerts regarding emergency situations could be transmitted to the Traffic Operation Centers from District 4 or to each other over the communication network. Each responsible agency working together could develop timing plans based on emergency type that would go into effect via notice to the ATMS deployed systems of each agency. The notice to the ATMS could be automatically generated via specific commands from an authorized agency or manually generated via voice communication to an operator of the ATMS. Each of the emergency management managers with appropriate staff members should meet with the responsible traffic engineering staffs of each entity to discuss the routes the emergency management group prefers the public take with regard the emergency type and direction. Both the Centracs ATMS and the ATMS.now systems are compatible with regard to implementing emergency timing plans. It is to be discussed at a later date between the three agencies which system which be used when the ATMS is combined into one system and one Transportation Management Center. The proposed fiber optic cable plant will support any communication equipment expansion if emergency management centers are established in the future.

6.2.1.4 Electronic Toll and Fare Collection Supported ITS Only

At the present time none of the participating agencies in this project are responsible for toll collection. However, in Port St. Lucie a project known as the Crosstown Parkway is under construction. The Crosstown Parkway will be a 6-lane expressway stretching from Interstate-95 to U.S. 1, and will be capable of carrying 60,000 vehicles per day. The road will actually split

into 3 different access points. If this Parkway eventually becomes a toll road operated by the City of Port St. Lucie, the fiber optic cable plant will support the addition of the sort of equipment in use by FDOT and other Toll collection agencies throughout the state.

6.2.1.5 Freight Management and Commercial Vehicle Operations Supported ITS Only

There are no Commercial Vehicle systems presently in service throughout District 4. Commercial vehicle operations are usually operated and maintained by the FDOT. Systems of this type are presently being studied by District 4. When and if a system is put in place it will be managed by the District 4. If in order to deploy such a system requires the use of fiber being considered for this project sufficient strands should be available to support FDOT's needs.

6.2.1.6 HOV Lane Development Supported ITS Only

There are no planned High Occupancy Vehicle lanes in use in the area. The ATMS and the communication network should not be impacted with the addition of HOV lanes in the area. The communication network will handle the addition of CCTVs and other detection devices needed to support a HOV effort.

6.2.1.7 Regional Traffic Management Centers Supported ATMS

In order to provide communication paths among the Regional Traffic Management Centers including District 4, St. Lucie County, the City of Fort Pierce, and the City of Port St. Lucie it is FRA's opinion that Core Layer 3 Switches should be installed in each of the Traffic Operation Centers except for the Center at the Treasure Coast. The communication network Layer 3 switches can support the network structure without the need for field Hub sites. The Treasure Coast Center is already equipped with a switch capable of supporting the connections required for the St. Lucie County implementation. The switches to be installed should be operationally compatible with the existing Cisco L3 switch presently installed. Information exchange will be possible between all of the agencies involved.

6.2.1.8 Regional Signal Coordination Supported ATMS

Regional signal coordination will be possible through the use of time synchronization commands sent between all of the participating agencies. An important aspect of coordination is the offset timing function. This function provides the means of establishing throughput between intersections allowing for the establishment of a green band allowing vehicles to pass through multiple intersections without stopping. Each of the responsible agencies must meet to establish offset parameters at those intersections where crossing local boundaries occurs.

6.2.1.9 Road Weather Information System Supported By ITS

District 4 currently has a Road Weather Information System (RWIS) installed as part of their SunGuide ITS. The system software is a module that controls and monitors the field components of the RWIS deployed by District 4. The information gathered from the RWIS could be shared

with other St. Lucie County agencies if each of the agencies acquires specific software compatiblewith the D4's system.

6.2.1.10 Special Events Management Supported by ATMS

The presently installed ATMS.now system, along with the selected Centracs ATMS to be installed at a later date support Special Event programming. To handle special events the engineering staff of each agency, when made aware of the event, have to install timing parameters associated with the intersections where the event is being held.

6.2.1.11 Traffic Incident Management Typically ITS Support

Typical ATMS software does not support traffic incident detection. Traffic Incident detection requires the installation of special field equipment consisting of cameras and microwave vehicle detection devices. In addition to the field equipment very special software is required to analyze the data received from the field devices to determine if there is an incident. Incidents are more easily identified in highway situations rather than incidents in local traffic areas. Incident equipment and software is deployed in state ITS, District 4 for I-95 and the Florida Turnpike Enterprise for Florida's Turnpike.

To truly automatically have incident alerts trigger alarms and notify operators requires more field equipment and central software than is presently being planned to provide this function. In an urban environment there are situations whereby vehicle detection equipment can falsely imply an incident. Some of the normal situations that can be indicated as an incident are vehicles double parked, deliveries, passenger pickup, etc. However, with the addition of a significant number of surveillance CCTVs incidents can visually be determined by the system operators.

6.2.1.12 Traveler Information ITS Support

The Centracs ATMS software doesn't have the capability to support live interactive traffic data to the motoring public over internet facilities. The ATMS.now system in Port St. Lucie does have the capability. The Travel Time Information services involves collecting traffic information using various ITS technologies, and posting traffic reports onto the 511 Traveler Information System and Dynamic Message Signs (DMS) to help drivers learn about upcoming traffic delays, alternate route information and travel times. Although the traveler information system is not recommended in the County at this point of time, the following technology is recommended for the future development.

Bluetooth technology can be used as an advanced traffic monitoring system. This technology, when installed on roadways or at intersections can directly measures travel times using cost-effective, non-intrusive roadside technology. The technology detects anonymous MAC address of Bluetooth signals broadcasted from mobile devices in vehicles, such as phones, headsets and music players, and thereby punches the location and time stamp of the vehicles. This enables the central system to determine accurate travel times and average speeds along the existing road network. Bluetooth technology provides a secure interface for the clients to initiate services, view content, and manage permissions to access various levels of the data. The devices for this

technology are manufactured by the TrafficCast and can be a permanent or a portable device installed independently using a cellular data connection and a local power source or even a solar panel.

6.2.1.13 Work Zone Management ATMS Support

From a systems standpoint Timing plans can be developed to handle traffic for long term work zone management. Both the Centracs and ATMS.now systems support this function. In addition with the CCTV surveillance capability operators will be able to adjust the system according to the present viewed circumstance.

6.2.2 Conclusion TSM&O Capabilities

The present situation in St. Lucie County, the City of Fort Pierce and Port St. Lucie indicates an ATMS for St. Lucie County and the City of Fort Pierce is a Centracs software product while the city of Port St. Lucie will continue with its recently installed ATMS.now product. This plan proposes all three agencies work toward a future goal of one ATMS system for the entire County, to include all three maintain agencies, to have the ATMS system be supported by one Transportation Management Center and the implementation of a communication network that could support the aforementioned functions by other systems and agencies in the present and in future.

6.3 INVESTIGATIVE INITIATIVES

As an initial step in developing an ATMS Master Plan, the FRA team conducted interviews with key stake holders to discuss the existing ATMS infrastructure in the County. In addition to the infrastructure a questionnaire was developed and Work Shops were held to gather information from each stakeholder. Some of the Questionnaire topics included the following:

6.3.1 Investigative Questionnaire

Investigate Questionnaire

Existing Traffic Control System	Information on High Occupancy Vehicle (HOV) Lanes
Staff Resources	Deployment of Regional Signal Coordination
Communications Infrastructure	CCTV and DMS Control and Display Capability
Limitations to Traffic Control Systems	Feasibility of Multi Jurisdiction Signal Control Capability
Deployment of Electronic Toll and Fare Collection	Information on Traffic Responsive Capability
Deployment of Emergency Preparedness and Security Systems	Deployment of Road Weather Management
Information on Hurricane Evacuation Routes	Special Events Management
Information on Emergency Operation Center (EOC) if any	Deployment of Traffic Incident Management
CCTV sharing between EOC and existing Traffic Management Center if any	Deployment of Work Zone Management

Deployment of Freight Management and Commercial Vehicle Operations

Most of the topics listed in the **Investigative Questionnaire** are discussed in the previous Section as part of the TSM&O and the RLRTP.

6.3.2 Project Workshop

In order to identify common needs and recommendations of all the agencies, a workshop was organized on May 23rd 2011 at the Treasure Coast Operations Center with the County's signal maintaining agencies along with the metropolitan planning organization. The following agencies were present at the workshop to discuss various TSM&O elements along with the ATMS components required for the county:

City of Port St. Lucie	Council on Aging of St. Lucie
City of Ft. Pierce	Indian River County
St. Lucie County	St. Lucie Transportation Planning Organization

In addition to the information gathered from the Questionnaire and Work Shops the County's regional Long Range Transportation Plan (RLRTP) was taken into consideration and elements of the plan were part of the Questionnaire and Work Shop. The RLRTP includes major areas of interest with projects such as, US 1 Corridor Retrofit Project, US 1 and Old Dixie Highway in northern St. Lucie County.

6.3.3 Questionnaire and Work Shop Investigative Summary

It is FRA's opinion the major areas of concern expressed by the project partners are listed below. For information purposes various meeting minutes are provided in **Appendix B**.

6.3.3.1 St. Lucie County Interests

- ATMS real time traffic monitoring capabilities;
- Traffic Signal Coordination along US-1, Okeechobee Road;
- Fiber Optics along priority corridor;
    - SR-5 (U.S. 1),
    - Virginia Avenue,
    - Port St. Lucie Blvd,
    - BayShore Blvd,
    - Prima Vista Blvd,
    - Edwards Road, and
    - Bell Avenue, and
- Transit reliability.

6.3.3.2 City of Ft. Pierce Interests

- Update some signals and add fiber for communications and control;

- Update existing pull boxes to fiber optic size;
- Retiming for US-1 system corridor;
- Need coordination with County EOC Emergency Center;
- Need fiber backbone to implement central Econolite system and connection to Treasure coast TMC;
- Weather management for flooding, etc.;
- Traffic incident management; and
- Travel information system.

6.3.3.3 City of Port St. Lucie Interests

- Retain existing Naztec Systems;
- Inland security issues ; and
- Data sharing using a dedicated fiber to the TMC.

6.3.4 Investigative Conclusion

Both St. Lucie County and the City of Fort Pierce want an ATMS that is compatible with most of their existing infrastructure. The City of Port St. Lucie recently installed an ATMS and a fiber optic communication network that is meeting their present needs and should provide functions that they may want in the future. Other than specific roads the County and city of Fort Pierce are in agreement with regard to the ATMS and the communication network they prefer. The ATMS will provide most of the desired functions learned from the investigation. St. Lucie County with better transportation control should indirectly help improve transit reliability. For the City of Fort Pierce weather management for flooding, etc. can be improved by obtaining weather data from District 4 and their Roadway Weather Information System. Traffic incident detection on a surveillance basis should be operator observable through the use of the many CCTVs to be added to the City's infrastructure. The travel information system is not supported by the ATMS.

6.4 EXISTING SYSTEM INFRASTRUCTURE

The chart below is a snapshot look at the status of each organization involved with this project.

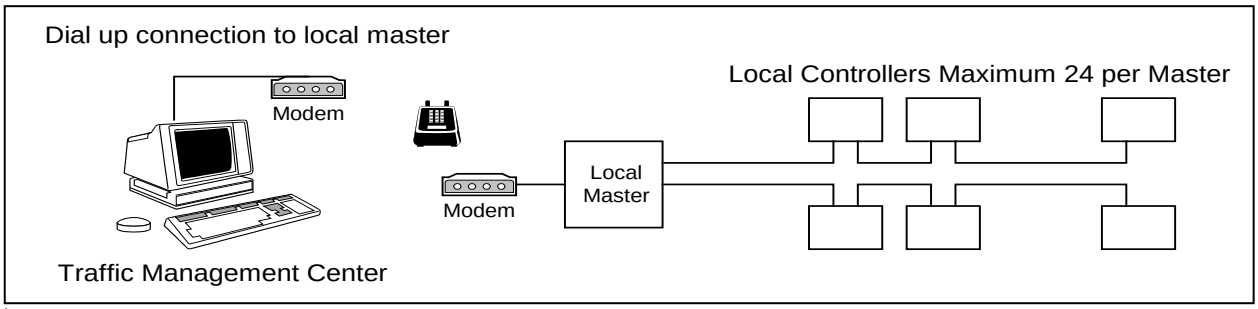
Organization Status		
St. Lucie County	**City of Fort Pierce**	**City of Port St. Lucie**
Econolite Closed Loop System	Econolite Closed Loop System	Naztec ATMS
51 Intersections Econolite Controllers	67 Intersections Econolite Controllers	71 Intersections Naztec Controllers
Dial up Telephone communications Some County owned copper lines	Dial up Telephone communications Minimum fiber installation approx. 3.5 miles	Fiber optic communication Network
6 staff members	2 Full time employees	12 staff members
TOC – room located in Traffic Signal Shop	TOC – Small room at City Hall	City's Traffic Operations Office

The following information is a more detailed look at what the existing infrastructure of each of the organizations.

6.4.1 St. Lucie County

St. Lucie County operates a system manufactured by Econolite Corporation. The system type in service is known as a Closed Loop system called ***Aries***. A Closed Loop system requires very little in the way of computerization and other management center type devices. The system data gathering points and transmission centers are located in the field. These devices are called Local

Figure 6: Closed Loop System Block Diagram



Masters. **See Figure 6**. Each field Local Master communicates and monitors a group of up to 24 intersections and transmits and receives data to the intersections and to a computer located in the County's signal control shop. Communication to and from the Traffic Signal Shop are over dial up telephone lines. The local master in a few situations communicates with the controllers over County owned copper wire connections. In many of the configurations the local master is connected to a single controller in which case no communication cable external to the cabinet is required.

6.4.1.1 Existing Intersection Control Equipment

Figure 7: Econolite TS2 Type 2 Controller

Currently there are 49 signalized intersections and 24 Flashers operated by the County. Forty one intersections presently use Econolite TS2 type 1 controllers while 7 intersections use Econolite TS2 type 2 units. The intersection at Old Dixie Hwy and Branch Rd. uses a Transyt TS2 Type 2 controller. The controllers are monitored by 28 local masters. Many of the master locations are connected to only one intersection and perform in an isolated manner meaning there is no coordination or communication with other intersections.

All of the controllers are detector actuated with some intersections using induction loops and other intersections using Econolite *Autoscope* and *Terra* video detection. At this time, there are 25 intersections with active video detection capability systems in service.

There is no surveillance video in service.

6.4.1.2 Communication Infrastructure

The present exchange of data between all County field devices with a local master is conducted via dial up communications using leased telephone lines. There is no meaningful County owned communication plant. Lease dial up telephone lines limit bandwidth restricting the amount of data to be transferred between field devices and central.

6.4.1.3 Closed Loop System

The Econolite ***Aries*** Closed Loop Control System is managed and monitored by a 32-bit windows based application. The software application is used to obtain intersection status, operator alerts and upload and download controller timing parameters. *Aries* can be used as a maintenance tool for a technician to interrogate an intersection controller remotely in order to perform observational troubleshooting by displaying real-time intersection graphics and controller programming. Aries can also retrieve the event logs from the master and controller.

6.4.1.4 Staffing

The County Traffic group consists of six full time employees and two contract employees. This staff is responsible for the maintenance, repair and operation of the existing traffic signals, overhead flashers and signal system. They are also responsible for design approvals, and the fabrication of regulations. Other responsibilities include: warning and guide signs, street signs and all County required specialty signs; the application of roadway thermoplastic stripping and guardrail repairs; conducting traffic counts and traffic operation studies, as well as maintaining the County's crash data base and Adopt-A-Road Program.

6.4.1.5 Traffic Operations Center

St. Lucie County personnel operate its system from a room devoted to this purpose at the County's traffic signal shop. The shop is located at a St Lucie County Facility at 3071 Oleander Ave, Ft. Pierce, FL.

6.4.2 City of Fort Pierce

The City of Fort Pierce as is the case with St. Lucie County operates an ***Aries*** Closed Loop system manufactured by Econolite. The Aries system is mentioned in the St. Lucie County present infrastructure description and **Figure 2**. The City is in the process of preparing to install a Centracs ATMS also manufactured by Econolite in the year of 2012. The City has 62 signalized intersections and 29 Flashers operated by Econolite TS2 Controllers. The City has a

limited amount of fiber optic cable installed. The City of Ft. Pierce operates its central system out of City Hall, similar to St. Lucie County's system. The Traffic Operations Center is a small single room containing a workstation and communications with dial-up capability.

6.4.2.1 Intersection Control Equipment

The City presently deploys two types of Econolite controllers. They are the ASC2 – 2100 and the ASC3 – 2100. The controllers are connected to the Aries Closed Loop System. Because there is fiber installed at the following locations there is a reasonable assumption that there are approximately 16, ASC 3 – 2100 intersections on US 1 between Avenue H and Edwards Rd. In addition there are approximately 6, ASC 3 -2100 intersections on SR 68 and 4 intersections on SR 615 from Orange Ave. to Avenue Q. It is assumed the remaining controllers are all ASC 2 – 2100.

All of the controllers are detector actuated with some intersections using induction loops and other intersections using Econolite *Autoscope* and *Terra* video detection.

There is no surveillance CCTVs presently video in service.

6.4.2.2 Communication Infrastructure

The City for the most part uses telephone dial-up networks to communicate with their traffic controllers. They have installed fiber optic cable on about 3.5 miles of highway on US 1. On US 1 the fiber extends from Avenue H to Edwards Road. Additional fiber is installed on SR 68. The installation runs east to west for approximately 1.5 miles from US 1 to North 25th St. Another leg runs north on 25th St. (SR 615) from Orange Ave. about 1.2 miles to Avenue Q.

6.4.2.3 Closed Loop System

The City of Fort Pierce deploys the same Aries system as does St. Lucie County.

6.4.2.4 Staff

The City of Fort Pierce presently has 2 full time employees responsible for all aspects of the Closed Loop system and intersection maintenance.

6.4.2.5 Traffic Operations Center

The City of Pierce houses the workstation and communication modems in a small room located in City Hall. FRA feels the staffs of St. Lucie County could be better served if an arrangement could be made to move their respective systems to the same facility with separate rooms to support each ATMS. Doing this would help alleviate some of the responsibilities of transportation management.

6.4.3 City of Port St. Lucie

6.4.3.1 Existing Traffic Control System

The City of Port St. Lucie has 71 signalized intersections and 18 Flashers controlled by Naztec TS2 Controllers and the ATMS.now system. The ATMS.now is a recently introduced ATMS product with many of the available features wanted in any relevant ATMS. Naztec's ATMS.now software is a mature, field-proven, reliable, and feature-rich application for full control of not only traffic controllers, but CCTV cameras, CMS displays, and field communications equipment. The system provides applications for traffic engineering, traffic operations, and traffic signal timing.

6.4.3.2 Staffing

The City of Port St. Lucie has 16 personnel working in the traffic section.

6.4.3.3 Intersection Control and Communication Cabinets

The City of Port St. Lucie deploys Naztec TS2 type controllers for all intersections under ATMS.now control. The controllers have an Ethernet interface and support communication over fiber optic cable through the use of a Managed Ethernet Switch. In order for the City to use their ATMS they must use Naztec controllers for any expansion or replacement. The NEMA cabinets are of sufficient size to provide space for the intersection and communication equipment.

6.4.3.4 Intersection Vehicle Detection

The City of Port of St. Lucie has a significant number of intersections with video detection.

6.4.3.5 Communication Infrastructure

The City of Port St Lucie has a fiber communication infrastructure; Ethernet based communications and CCTV surveillance and control system. Fiber communication routing is not available due to security concerns.

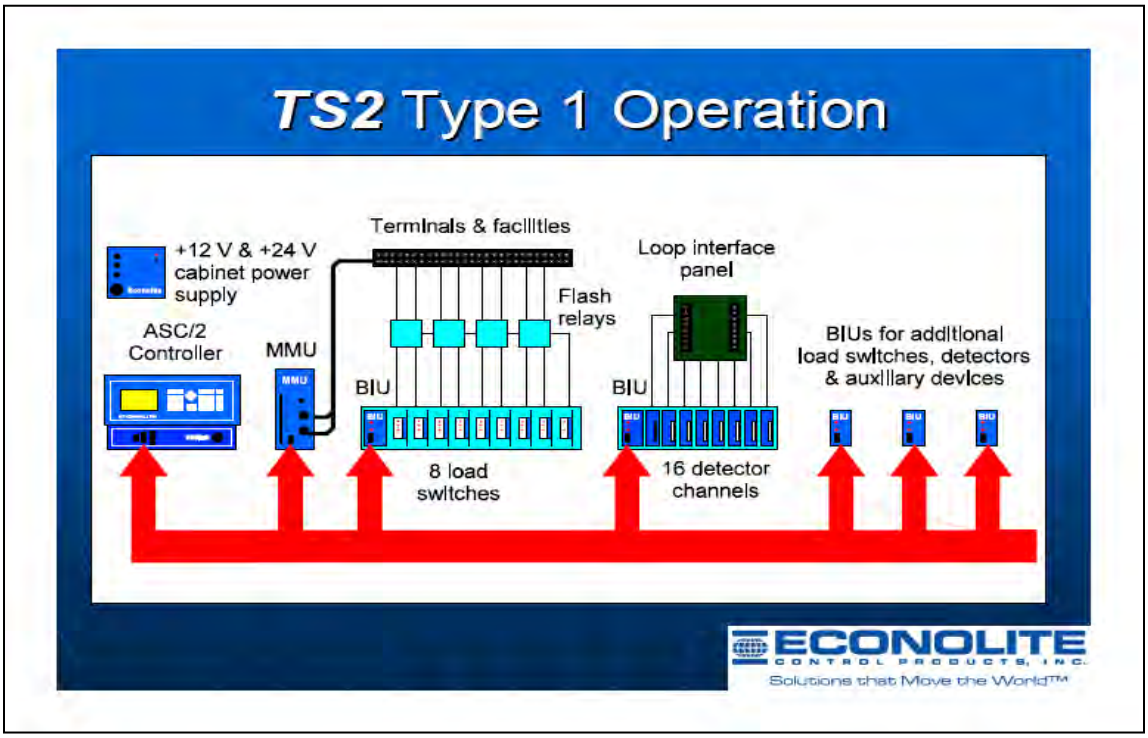
6.4.3.6 Traffic Operations Center

The TOC is located at the City's Traffic Operations Office with a backup facility at City Hall. City of Port St. Lucie Engineering Department is in a building located on Dwyer Ave.

6.5 CONCLUSIONS

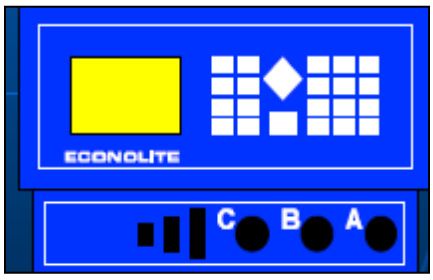
6.5.1 St. Lucie County

6.5.1.1 Intersection Controller and Communication Cabinets



The County presently has in place 41 ASC/3 TS2 type 1 controllers and the NEMA cabinets to completely support the TS 2 functions. There is a significant investment in this relatively new intersection control technology. With this in mind all effort should be made to incorporate this infrastructure into a compatible ATMS.

There are five TS2 Type 2 controllers in service. The only difference between the TS2 Type 1 and 2 controller device is the Type 2 supports the interconnect cabling from older type cabinets. Three of the connectors are called A,B,C and the third connector is called the D connector**.** The Type 2 supports both old and new cabinet structures. These 5 intersections can be brought under ATMS control with the same system as the other 41 locations.



The control equipment at the intersection of Weatherbee Rd. and US 1 should be removed and replaced with a new NEMA TS2 Type 1 installation.

The intersection at Old Dixie Highway and Harbor Branch Rd. contains a Transyt TS2 Type 2 controller. If the cabinet is in good condition and the County wishes to keep the enclosure the Transyt controller and possibly the MMU Malfunction Monitor Unit should be replaced with Econolite devices.

All of the ASC controller types will need an Ethernet module available from Econolite.

FRA recommends using a P44 NEMA cabinet for all new installations. The P44 cabinet is discussed later in this document.

6.5.1.2 Intersection Vehicle Detection

The present County infrastructure has 25 intersections that use video detection for the purpose of providing vehicle calls to the intersection controller. There are advantages to using this technology. It is understood that the County desires to use video detection at all of its intersections. Video detection equipment as part of the new infrastructure should be installed at the 26 intersections presently using induction loop technology.

6.5.1.3 Surveillance CCTV

As part of this project, the plan recommends the installation of a CCTV infrastructure at various locations throughout the County. This infrastructure will help County personnel to determine problems in the area and increase their ability to respond to the needs of the motoring public. Once a fiber optic communication network is available, 25 CCTVs with the necessary video support equipment should be installed. The distance between CCTV installations should be between 1 and 1.5 miles depending on the available mast arm locations.

6.5.1.4 Communication Infrastructure

FRA recommends the installation of a single mode fiber optic cable network throughout the St. Lucie County. With an understanding of what can be accomplished with an ATMS and other transportation disciplines and especially future bandwidth and expansion requirements the recommended single mode fiber count should at a minimum consist of 96-single mode fiber strands wrapped in 6 buffer tubes containing 12 fibers each.

Figure 8: US 1

The communication support equipment should be capable of a minimum 1 Gigabit Ethernet speeds and formats. The equipment should be supplied with sufficient FX and TX port density to accommodate the number of local rings recommended for the backbone communication device. These devices should have Routing capability, Multicast PIM Modes, IGMP, STP, RSTP, MSTP, SNMP, and VLAN protocols.

6.5.1.5 ATMS

In order to take advantage of the existing field infrastructure and the experience the County staff has with the ARIES closed loop system it is recommended that the County's system be upgraded to the ATMS product called Centracs available from Econolite. Centracs provides an integrated platform for traffic signal control, ITS field device monitoring and control, information management, graphical data display and uses advanced traffic algorithms. The software provides an intersection control and traffic management software platform. From this platform additional ITS applications can be integrated. This Centracs software allows various functions such as Center-to-Field Communications, Database Administration, Security to gain System Access, Database Management, Database Upload/Download, Maintenance and Malfunction Notification, System Analysis and Engineering Tools.

6.5.1.6 Traffic Operations Center

The location serving as the Operations Center is a very small area and isn't conducive to housing the new ATMS and the support equipment to be installed with the system. This plan recommends a space be provided at the facility of St. Lucie County Road Department Traffic Division.

6.5.2 City of Fort Pierce

6.5.2.1 Intersection Controller and Communication Cabinets

The City has ASC2 and ASC3 Econolite controllers in service. The controllers are both TS-2 compatible, however, the ASC2 controllers are not suitable for inclusion into the new ATMS. All of the ASC2 type controllers are not suitable for Ethernet communication speeds and formats. All of the ASC2 units will have to be replaced when the fiber optic communication network is deployed.

All of the ASC3 units should be purchased with the optional Ethernet module. In addition when the ASC2 controllers are replaced into the same cabinet it will also be necessary to replace the conflict monitor with a Memory Malfunction Unit (MMU). All of the controllers attached to the new ATMS will have to have an MMU device. Presently the City of Fort Pierce has a line **item 680-115** that calls for a **56K telemetry** modem to be provided with all new controller purchases. This line item must be changed to support the new communication network. All of the new controllers must be equipped an optional **Ethernet communication module**. This module is available from Econolite and be connected to all ASC3 controllers whether or not it is a Type 1 or Type 2 device.

NEMA P44 CABINET

Existing controller cabinets may be used if they are of sufficient size to house the additional communication equipment. High quality NEMA controller/communication cabinets designed and manufactured with materials that are rugged and will allow for rigid mounting, without any chance of flexing should be used in the City for

all new and replaced cabinets. The preferred type is a NEMA P44 type with the following dimensions:

Outside dimensions: 55" H x 44" W x 26" deep
Opening Dimensions: 53" H x 41" W
Mounting Pattern: 40.50" W x 18.50" D
Material: Aluminum (.125" thick)
Finish: Bare or Painted Mounting:
Base Mounted Locking System: 3-point locking system with Corbin #2 lock Door
Stops: Three position bar stop at bottom of door
Ventilation: Pleated fiber filter in door, fan with thermostatic control
Light: Incandescent or optional fluorescent, door switch activated

6.5.2.2 Intersection Vehicle Detection

The present City infrastructure has 23 intersections that use video detection for the purpose of providing vehicle calls to the intersection controller. There are advantages to using this technology. It is understood that the City desires to use video detection at all of its intersections. The present equipment is manufactured by Econolite and is known as Autoscope Terra. The *Autoscope Solo Terra* sensor is a color video detection and surveillance system that quickly installs. Terra Technology uses IP-based addressing with a unique Ethernet MAC address. It combines state-of-the-art advances in digital image signal processing, broadband communications, and System-on-Chip (SoC) processors to add versatility and boost performance.

6.5.2.3 Surveillance CCTV

At this time there are three CCTV devices installed for the purpose of transportation monitoring along US1. As part of this project, it is recommended that the installation of a CCTV infrastructure be implemented at various locations throughout the City of Fort Pierce to complement the City's existing CCTV cameras. This infrastructure will help City personnel to determine problems in the area and increase their ability to respond to the needs of the motoring public. Once a fiber optic communication network is available, 11 additional CCTVs with the necessary video support equipment would meet the needs of the City. The CCTVs could effectively provide the wanted video streams if mounted to existing mast arms. It is also recommended that a high-speed dome camera that has day/night functionality for quality images in low light conditions. The CCTV should provide direct network connection using H.264 and M-JPEG compression.

6.5.2.4 Communication Infrastructure

The presently installed fiber optic cable on about 3.5 miles of highway on US 1 should be extended. The fiber extension should be with the 96-single mode fiber in lieu of continuing the 48 count bundles. The same is the situation with the other two legs of the presently installed fiber. The communication support equipment should be the same for the City of Fort Pierce as

that used for St. Lucie County. For more information see Communication Infrastructure St. Lucie County.

6.5.2.5 Traffic Operations Center

FRA recommends the possibility of locating the City of Fort Pierce staff and new ATMS equipment to the St. Lucie County Road Department Traffic Division location.

6.5.2.6 ATMS

The present situation in the City of Pierce is the same as what exists in St. Lucie County. With this situation being the same and in order to take advantage of the existing field infrastructure and the experience the City staff has with the ARIES closed loop system it is recommended that the County's system be upgraded to the ATMS product called Centracs available from Econolite. Centracs provides an integrated platform for traffic signal control, ITS field device monitoring and control, information management, graphical data display and uses advanced traffic algorithms.

6.5.3 City of Port St. Lucie

6.5.3.1 Intersection Control Equipment

Since the City is satisfied with their existing ATMS and the field components presently in service, they should continue to use Naztec manufactured equipment. The controllers available from Econolite are not software compatible with the ATMS.now system.

6.5.3.2 Intersection Vehicle Detection

There are a significant number of intersections using video detection devices. The City's present specification calls for video detection equipment provided by Iteris. The model referenced is the Iteris Edge II and color camera model RZ4. Iteris provides cameras and video detection equipment compatible with the City's controllers and cabinets.

6.5.3.3 Communication Infrastructure

The City of Port St. Lucie has an extensive fiber optic communication network. At this time the City is unable to share its fiber or other information with other agencies due to security concerns. With this in mind the City should not be included in the plans for the fiber expansion planned for the rest of St. Lucie County agencies. However, consideration should be given to the possibility of installing a fiber connection to the City of Port St. Lucie from the County's TOC to share time information to sink all of the areas intersections. Doing this could preserve offset timing when crossing into all of the County's zones.

6.5.3.4 ATMS

The City of Port St. Lucie is satisfied with the operation and functionality of its ATMS.now system. This system has more functionality than the Centracs system and the City has a larger

staff than the other agencies involved with this project. With the larger staff good use can be made of the additional ATMS/ITS functions. Other than providing a communication path to the City's TOC no other system recommendations are forthcoming.

6.5.3.5 Summation City of Port St. Lucie

The City of Port St. Lucie presently has a modern ATMS product. Their personnel are satisfied with its overall operation and what they expect from the system in the future. To change to a Centracs ATMS would not be fiscally practical since all of the NEMA TS controllers in the field would have to be changed. At this time because of security issues they are not interested in sharing their fiber with other agencies. This plan proposes installing a fiber connection from the County TOCs to the City of Port St. Lucie TOC to share time sync information to maintain controller offsets to provide synchronization to motorists when crossing transportation boundaries. It is also recommended to keep the City's personnel abreast of the status of every phase of the project in case they change their mind in order to share in some of the benefits this project can bring to the entire area.

6.6 FUTURE SYSTEM AND COMPONENT CONSIDERATIONS ST. LUCIE COUNTY AND CITY OF FORT PIERCE

The purpose of this Section is to present for consideration the infrastructure required to implement an ATMS and communication network to meet the needs of the County and City.

6.6.1 ATMS Software Selection

Since a specific NEMA TS2 type 1 and 2 controller manufactured by Econolite is and will be deployed in the County's and City of Fort Pierce intersections consideration of an ATMS software compatible with the controllers should be examined. The only ATMS software compatible with the controller product is an Econolite product named Centracs. The Centracs software will support all of the functions necessary to control and support all of the available data from the Econolite ASC/3 controller.

6.6.2 Traffic Operation Center Equipment Considerations

6.6.2.1 Space and Furniture

Decisions must be made regarding the structure of County and City Operations Centers. Something to be pondered is locating both agencies in the same building. Once the location is selected the size of the rooms for each group should be determined based on the amount of equipment to be installed and the number of staff members each agency anticipates for the engineering and operation of the ATMS. The selected location can be structured to provide independence and **equal access**. The furniture should be selected for function, performance, and comfort.

6.6.2.2 Servers

It will be necessary to install Servers at each operation center. A single Server should suffice for each operation. The server must be configured with the necessary speed, memory and backup drives to allow it to function as the ATMS Server, CCTV server, and the Network/Web server.

6.6.2.3 Uninterruptible Power Source

There will be a need for Uninterruptible Power Sources (UPS) for all servers, workstations, layer 3 switches and other memory storage devices.

6.6.2.4 Database Management Software

Database management software is a necessity for the new ATMS. The software should be an industry standard relational database management product.

6.6.2.5 Network Hard Drive

It is necessary to provide a backup mechanism for each Server. This is usually accomplished through the use of network hard drive. The device selected must provide backup for all of the system data.

6.6.2.6 Core Layer 3 Switch

To support the communication network it will be necessary to install a Core Layer 3 Switch of sufficient capability in each of the Traffic Operation Centers (TOC) except for the Treasure Coast Traffic Incident Management Support Office (TIMSO). The TOC at the TIMSO uses a Cisco L3 device. Whatever Switch is selected for this project must be compatible with the Cisco unit.

6.6.2.7 Workstations

All of the ATMS functions are monitored and controlled through the use of workstations. Because traffic engineering functions require a number of different disciplines from maintenance, development of timing plans, intersection design CAD and Microstation functions, inventory, etc. Workstations with the capacity to handle all of the transportation functions must be specified. The total number of workstations must be determined. This determination will be based on the number of staff members each agency will use to support the ATMS functions.

6.6.2.8 Video Display

A decision on the size and the type of video display should be made on the basis of what each agency feels best suits their needs. A guide for the device would be FDOT Supplemental Specification 782-2. A Direct View LCD with a screen size of 52” (diagonally measured) or more should be considered.

6.6.2.9 Video Display Software

It will be necessary to select software for the display of the CCTV video data available from the various surveillance locations.

6.6.2.10 Video Display Controller

In order to provide the capability of multiple displays onto the Video Display device it is necessary to supply a Video Display Controller. The Controller should incorporate all of the visual data sources found in a control room environment and display them in moveable, scalable windows on a virtual display comprised of multiple output devices: monitors, LCD flat panels, plasma panels, projection cubes, or a rear projection system.

6.6.3 ATMS Components Field

6.6.3.1 Intersection Control Equipment and Cabinets

Due to present circumstances and each of the agencies satisfaction with the equipment in the field consideration should be given to continuing the use of the Econolite ASC/3 controller. In cases where existing cabinets are going to be retained and the connections to the signal heads and other cabinet devices is via A,B,C connectors a ASC/3 Type 2 controller could be used. In new replacements the TS2 Type 1 unit should be used.

Consideration should be given to the cabinets to be procured for this project. FRA thinks the cabinets meet, as a minimum, all applicable standards set forth by the NEMA TS2 requirements. High quality communication cabinets designed and manufactured with materials that are rugged and will allow for rigid mounting, without any chance of flexing will be used in the county. Consider a NEMA P44 type cabinet for this project.

6.6.3.2 Intersection Vehicle Detection

It is the desire of both agencies to use video detection at all of its intersections. Video detection equipment should be installed as the project funds permit. At this time it is FRA's opinion new procurements of detection equipment are compatible with the existing infrastructure. The present equipment is manufactured by Econolite and is known as Autoscope Solo Terra.

6.6.3.3 Surveillance Video

There is a need for surveillance video to be installed at both the County and City locations. It is estimated that about 35 CCTVs should be installed to provide the coverage needed to support the motoring public. As a minimum CCTVs should provide direct network connection using H.264 and M-JPEG compression.

6.6.4 Communication Infrastructure

6.6.4.1 Core Layer 3 Switch

It is FRA's opinion that Core Layer 3 Switches should be installed in each of the Traffic Operation Centers except for the TIMSO. The communication network Layer 3 switches can support the network structure without the need for field Hub sites. The TIMSO is already equipped with a switch capable of supporting the connections required for the St. Lucie County implementation. The switches to be installed should be operationally compatible with the existing Cisco L3 switch presently installed.

6.6.4.2 Managed Field Ethernet Switch

At every location to be connected to the fiber optic network a MFES will need to be deployed. Because of the environment around electronic equipment installed out in the open in a baking sun the MFES should have an operating temperature range of -40 to +85°C (-40 to +185°F) coupled with hazardous location certification (Class 1 Division 2). The field Ethernet switch should be compliant with FDOT Supplemental Specification 784-1.

6.6.4.3 ATMS Installation Phasing

The task that requires the most project time is the installation of the Fiber optic cable and the communication network. This is especially true with this project since much of the field equipment will be retained. It is FRA's opinion the project should be structured in phases. The phases should be decided upon based on funding, the current traffic conditions, existing land-use, roadway classification, access management, and future development. It is anticipated four phases of installation would be a reasonable approach to ATMS and communication network implementation.

6.6.5 Conclusions

The above mentioned **Future Considerations** takes into consideration the existing infrastructure in St. Lucie County and the City of Pierce and the County's LRTP. Based on the existing infrastructure and input from personnel from all of the participating agencies a number of issues and components are discussed regarding the implementation of an ATMS and the communication network. This document outlines what is necessary for the development and recommendation of an ATMS that meets the needs and requirements of the St Lucie County and City of Fort Pierce Signal Maintaining Agencies.

6.7 RECOMMENDATIONS ST. LUCIE COUNTY & CITY OF FORT PIERCE

6.7.1 ATMS Software

The ATMS software product at this time is recommended to be the Centracs software available from Econolite.

6.7.2 Intersection Controllers and Cabinets

It is also recommended to retain as much of the existing infrastructure as possible. To do this FRA feels new controllers be Econolite ASC3 Type 1 and Type 2 depending on the existing cabinet to be retained. All new cabinets should use ASC 3 Type 1 units. All new cabinets should be NEMA P44.

6.7.3 Intersection Vehicle Detection

It is recommended the agencies continue to use the same products for new installations presently in use, Autoscope Solo Terra

6.7.4 Communication Equipment Intersection

All of the new controllers should be ordered with an Ethernet interface module. For the existing controllers that do not support Ethernet module the unit must be replaced.

A Managed Fast Ethernet Switch (MFES) should be used for the fiber interface to the network and the cabinet components.

6.7.5 Traffic Operation Centers

A recommendation was made with regard to the City and County being housed at the same location with separate but equal access. This will be better defined after input from participating agency staffs and in the Implementation Plan.

An outline of the equipment items needed for the ATMS and communication network was provided. The detail of these items can be better defined after discussion and included in the Implementation Plan.

6.8 OPTIONAL TRANSPORTATION FUNCTIONS

There are a number of transportation software modules that can be part of an ATMS. These modules are sometimes standalone while others can be imbedded dependent upon the ATMS software. With this in mind the detail regarding the following functions will be discussed in detail in the Implementation Plan:

- Incident Management
- Transit Monitoring and Tracking Software
- Web Service Software and Traveler Information System
- Traffic Adaptive System

7 IMPLEMENTATION PLAN

The Implementation Plan for the Advanced Transportation Management System (ATMS) in St. Lucie County is the fourth sequential task and is presented based on the information provided in the previous tasks in addition to data developed for the implementation phase. The Implementation Plan presented is based on the installation of the Econolite Centracs system to support both St. Lucie County and the City of Fort Pierce. The Centracs system is recommended for this implementation because of the existing County and City Econolite infrastructure and the satisfaction of each agency with this infrastructure. Due to this present infrastructure Centracs is the most affordable ATMS solution, with this choice much of the intersection equipment can be retained and added too. This Implementation Plan is based on the Scope of Work requirements for the Plan development. Although the Centracs system is outlined in this report, it is understood that ITS technology is ever changing and a more efficient economical system may be available in the future when all three agencies are ready to consolidate into one unit. Thus the option of what system to use will be left open until such time the consolidation is complete. The plan development requirements are listed in the table below:

Implementation Plan Tasks

- System Design
- Impact on upcoming FDOT /County projects
- Compatibility with County's Long Range Transportation Plan
- Phasing of Implementation/ time frame/cost
- Resources needed per project phase of deployment
- Recommended procurement method
- Construction management procedures
- Operation and management
- Maintenance plan
- Operations and maintenance cost
- Personnel and budget resources
- Compatibility with Regional ATMS/ITS systems

7.1 SYSTEM DESIGN

All of the components supplied for this project shall conform to the requirements defined in the Test Plan for the subsystem and be governed by the following documents:

- Florida Standard Specifications for Road and Bridge Construction, 2010,
- Supplemental Specifications Section 603: Traffic Control Signal Equipment and Materials,
- Supplemental Specifications Section 608: Guaranties,
- Supplemental Specifications Section 611: Acceptance Procedures,
- Supplemental Specifications Section 780: Intelligent Transportation Systems General-Requirements;
- Supplemental Specifications Section 781: ITS Motorist Information Systems,
- Supplemental Specifications Section 782: Intelligent Transportation Systems-Video Equipment;
- Supplemental Specifications Section 783: Intelligent Transportation Systems-Fiber Optic Cable and Interconnect;
- Supplemental Specifications Section 784: Intelligent Transportation Systems-Network Device;
- Supplemental Specifications Section 785: Intelligent Transportation Systems–Infrastructure; and
- Supplemental Specifications Section 786: Intelligent Transportation Systems-Vehicle Detection and Data Collection.

Presently The City of Port St. Lucie has an ATMS product provided by Naztec, Inc. They are satisfied with their system and have no interest in changing their present ATMS. It is recommended that a Centracs system with multi-user licenses should be installed in the facility of St. Lucie County Road Department Traffic Division. The system would be structured so both the City of Fort Pierce and St. Lucie County would both have equal access. Equal Access refers to system capabilities. Regardless of system server location, each organization will have the ability to use all of the desired features of the Centracs system. The decision regarding the location of the multi-user components housing the software is based on the available support personnel at the St. Lucie County facility as St. Lucie County has more than double the staff of the City. Placing the system components in this manner should be beneficial to both staffs.

The Centracs ATMS along with a high speed communication network will provide the means of real time data for both organizations as if each had separate systems. Any selected ATMS or other system type depends on the quality and capabilities of the communication network on which the system is to function. For any single or multiple organizations to benefit from the full capabilities of the Centracs system the communication network must support the data and video speeds including the bandwidth required for the acquisition to and from all of the system components of that data. Because of the importance of this media the system, design presentation starts with the Communication Network.

7.1.1 Communication Network Overview

The communications network system and subsystems shall be an open-architecture, non-proprietary, real-time multimedia communications network, which is a digital fault-tolerant, redundant communication network. In order to provide County transportation information among willing agencies a single mode fiber optic cable (FON) network shall be capable of supporting at least a 10 Gigabit Ethernet Backbone Ring. The fiber is recommended to be connected to the following Linking Centers shown in **Figure 9**:

- St. Lucie County Traffic Operation Center
- City of Port St Lucie Traffic Operations Center
- Treasure Coast Traffic Incident Management Support Office (TIMSO)
- City of Ft Pierce Traffic Operations Center
- City of Port St. Lucie Engineering Dept. – Traffic Operations Office

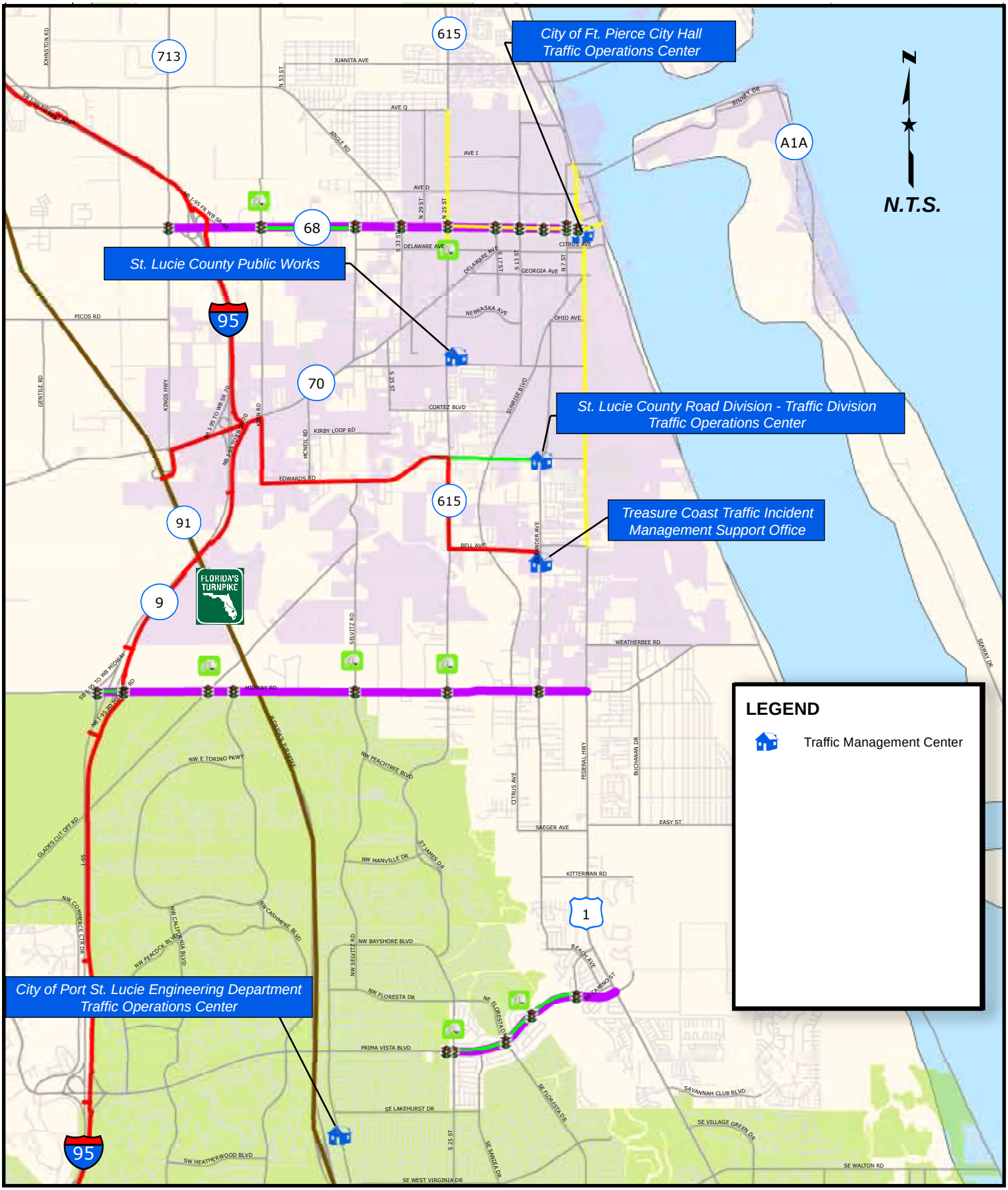
Full maps of the area are provided in Section 6. In **Figure 9** the fiber routing is shown from the City of Fort Pierce City Hall Traffic Management Center along Federal Highway to Virginia Avenue where the fiber branches west to St. Lucie County Public Works building. The fiber along Federal Highway continues south to Edwards Road where it again branches west to the St. Lucie County Road Department building. Continuing south on Federal Highway the fiber continues to Bell Avenue where the fiber again branches west to the Treasure Coast Operations Center. All of the fiber will be installed in underground conduit of PVC or the High Density Polyethylene type (HDPE).

The recommended method of connecting the City of Port St. Lucie Engineering Department building to the fiber ring is to connect the building to the fiber on the Turnpike is depicted in **Figure 9**. The fiber on the Turnpike is the property of the Turnpike. The connection would be accomplished through a conduit fiber run from an existing Turnpike hub north of the Ft Pierce Service Plaza to the City of Port St. Lucie Engineering Department Building located on Dwyer Ave, a distance of less than 1000ft. The District 4, N3C fiber is presently connected to the Turnpike Network at a splice vault located on the west side of the Turnpike south of SR 70. This connection is shown in the paragraph labeled Phase 1 in Section 6. Emanating from each of the operations centers fiber shall be routed to the respective intersections and other devices under their authority. The installation of devices shall be done on a priority basis established through the Priority Corridors.

7.1.1.1 Priority Corridors

The fiber optic communication network, on a priority basis, will be installed in St. Lucie County, the City of Ft. Pierce, and the City of Port St. Lucie. Priority corridors were identified in the County and Cities based on the current traffic conditions, existing land-use, roadway classification, access management, and future development. Originally there were seven priority corridors established in the County documents. It is recommended to combine the intersections

identified in the seven corridors into four priority phases. **Table 1** lists the priority corridors and the number of priority intersections within each maintaining agency. A detailed description of the Priority Phase implementation is presented in **Section 6 PROPOSED QUANTITIES FOR ATMS IMPLEMENTATION.**



St.Lucie County

ATMS MASTER PLAN

F.R. ALEMAN A Certified DBE/MBE Firm with the State of Florida	**Communication Network Connections**	**Figure 9**

Table 1: **Priority Phases**

Priority Phases		
MAINTAINING AGENCY	**CORRIDOR**	**PRIORITY PHASE**
St. Lucie County	US 1	Priority 1
	Prima Vista Blvd	Priority 2
	CR 712 (Midway Road)	Priority 2
	County Rd 615	Priority 3
	Orange Avenue	Priority 2
	Angle Road	Priority 4
	North Kings Highway	Priority 4
	Edwards Road/ County Rd 611	Priority 1
	SR 713/Turnpike Feeder Rd	Priority 4
	North Beach Causeway Dr	Priority 4
	SR 614 (Indrio Rd)	Priority 4
City of Ft. Pierce	South 33rd Street	Priority 4
	US 1	Priority 1
	SR 70/Virginia Avenue	Priority 1
	SR 615 (South 25th St.)	Priority 3
	Okeechobee Road	Priority 3
	South 13th Street	Priority 3
	South 7th Street	Priority 3
	CR 68 (Orange Avenue)	Priority 2
	Avenue D	Priority 3
	Avenue I	Priority 4
City of Port St. Lucie	US 1	
	SW Port St. Lucie Blvd	
	NW Bay Shore Blvd	
Number of Intersections Derived From Section 6 Quantities		**113**

7.1.2 Communication Network Components

7.1.2.1 Fiber Optic Cable

Due to present and future bandwidth and expansion requirements, the recommended single mode fiber count should at a minimum consist of 96-single mode fiber strands wrapped in eight buffer tubes containing 12 fibers each. 12-single mode drop cables shall be provided to each equipment cabinet.

7.1.2.2 Conduit

For the underground conduit it is recommended that High Density Polyethylene (HDPE) type be used. Each conduit should contain trace wire. To provide for future and present installations it is recommended that two 2-inch diameter conduit be used.

7.1.2.3 Fiber Optic Pull Boxes and Splice Boxes

Fiber optic pull boxes and splice boxes shall be installed and constructed per FDOT Design Standard Index 18204 and shall meet the specifications listed in *Section 783-3: Pull Boxes and Splice Boxes for Fiber Optic Cable* of the *FDOT Standard Specifications for Road and Bridge Construction.* All fiber optic pull boxes and splice boxes shall be chosen from the FDOT Approved Products List. All fiber optic pull boxes and splice boxes shall have text designating the appropriate maintaining agency permanently cast in their top surface. Fiber optic pull boxes shall be installed all building entrances, all 90 degree turn in the conduit system, and at all above ground locations. The maximum spacing between fiber pull boxes shall be 2,500 feet in rural areas with any continuous section of straight conduit if no fiber optic cable splice is required and 1,760 feet in metropolitan areas. Fiber optic splice boxes shall be installed at all locations shown in the approved construction plans.

7.1.2.4 Hubs

No field hubs are anticipated for this project. The proximity of the Operation Centers to each other and to the intersections under their control precludes the necessity of Hub equipment in the field. The necessary routers/switches can be housed at the respective Operations Center. Routers and or switches must be compatible with the network routers/switches located in the Treasure Coast Operations Center. 10 Gig Ethernet equipment shall be supplied with sufficient FX and TX port density to accommodate the number of local rings recommended for the backbone communication device. These devices should have Routing capability, Multicast PIM Modes, IGMP, STP, RSTP, MSTP, SNMP, and VLAN protocols.

7.1.2.5 Managed Field Ethernet Switches (MFES)

Industrial grade field-hardened Ethernet switches shall be used to provide connectivity from the field traffic controllers and ITS devices to the Backbone Network hub sites situated in the Operation Centers. Each MFES shall be required to provide additional management intelligence (Layers 2+), which is critical in supporting the reliability proprietary Layer 2 solution; typical of most current industrial Ethernet deployments. The Layer 2+ requirement shall provide architecture standardization, open connectivity (interoperability), bandwidth management, rate limiting, security filtering, and general integration management of an advanced Ethernet switching architecture.

7.1.2.6 Device Servers

At this time, Device Servers are not required for this project. If a specialty item that is not presently part of this project is desired at a later date, a Device Server may be added. The Device Server shall be environmentally hardened in accordance with NEMA TS 2 (latest edition) standard, serial data (EIA-232/422/485) conversion to Ethernet, and allow for the connection of a minimum of two serial devices to the Ethernet network.

7.1.2.7 Network Management Software

In addition to the network hardware, a software product to control and monitor the network is required. There are a number of network management software products available. Some of the available packages are SolarWinds and IPSwitch's WhatsUpgold network product.

SolarWinds provides powerful, simple and affordable network management software to more than 80,000 customers worldwide from Fortune 500 enterprises to small businesses. SolarWinds' products are downloadable, easy to use and maintain, and provide the power, scale, and flexibility needed to manage today's complex network environments. SolarWinds' growing online community, thwack, offers users problem-solving and technology-sharing for all of SolarWinds' products. This active user-community input is combined with decades of network management experience to deliver a wide range of solutions and tools to address the real-world needs of network professionals.

IPSwitch WhatsUp Gold network software provides detailed insight into exactly how network bandwidth and capacity are utilized and by whom. WhatsUp Gold not only highlights the overall utilization of the LAN, WAN, specific device, or interface, it also indicates which users, applications and protocols are consuming the bandwidth. For critical applications, WhatsUp Gold enables you to easily conduct traffic identification and analysis, as well as verify Quality of Service (QoS) through ToS, DSCP for the LAN/WAN, or new Top NBAR and CBQoS reports.

7.2 ATMS COMPONENTS TRAFFIC OPERATION CENTERS

7.2.1 Advanced Traffic Management System Software

Since a specific controller manufactured by Econolite is and will be deployed in the County's and City of Fort Pierce intersections the ATMS software recommended is also an Econolite product named Centracs. The Centracs software has the following features:

- Intuitive user interface
- Designed for scalability and efficiency
- Easy device configuration
- Intuitive Intersection graphics tools
- Flexible device hierarchy, groupings and jurisdictions
- User definable, programmable alert escalations
- User Interactive, GIS-based mapping
- Traffic Responsive, Section, and Coordination Monitoring
- NEMA & 170/2070 support in one system NEMA TS2 Type 1 is recommended
- Robust system scheduler
- User definable roles and privilege settings
- Traffic Adaptive Module

The Centracs software will support all of the functions necessary to control and support all of the available data from the ASC/3 controller. To support other functions such as Traffic Monitoring CCTVs, Video Incident Detection, Multipoint Video Distribution System (MVDS) and Dynamic Message Signs (DMS). COTS (Commercial Off-the Shelf) software shall be used to support the corresponding field devices. The computer and communication hardware supplied for this project will be of sufficient capability to support the COTS products. The components will also support SunGuide software modules if there is a desire by FDOT District 4, St. Lucie County and the City of Ft. Pierce to do so. SunGuide software does not have ATMS capability and is not considered appropriate for this project. Although the Centracs system is outlined in this report, it is understood that ITS technology is ever changing and a more efficient economical system may be available in the future when all three agencies are ready to consolidate into one unit. Thus the option of what system to use will be left open until such time the consolidation is complete.

7.2.2 Traffic Operations Center Room Size and Equipment

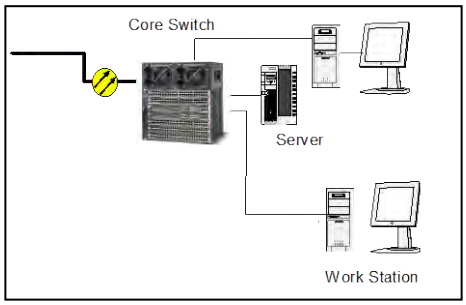
7.2.2.1 Recommended Minimum Size

Of the six St. Lucie County Traffic staff, it has two full time staff members and one part time staff members dedicated to traffic signal operations and maintenance. For these two full time and one part time staff members, a room of approximately 20 foot by 14 foot with the necessary separators to provide an environment suitable for housing equipment is recommended. The staff

of the City of Fort Pierce consists of two full time employees and one part time employee. To house the new equipment and to provide a quiet work area a room 9 foot by 12 foot is recommended.

7.2.2.2 Consoles - Furniture

Console type furniture consistent with the available floor space in each of the Traffic Operations Centers where new computer equipment shall be installed. The furniture shall support all of the components provided. Two sets of furniture shall be supplied to the St. Lucie County Road Department – Traffic Division; one set of furniture shall support the personnel of the City of Fort Pierce and one set shall support St. Lucie County personnel. It is anticipated four workstations will be needed. Two of the workstations will serve as clients. Furniture shall also be provided to the St. Lucie County Public Works facility. Furniture shall support five workstations as follows: two for the Traffic Management Center, two for Public Works personnel and one for Traffic personnel.



7.2.2.3 Servers

Servers shall be installed in each of the aforementioned Operational Centers. The servers provided for each location shall function as the ATMS Server, CCTV server, and the Network/Web server. These functions shall be handled by a single server. A powerful 2-socket 1U-rack server that is ideal for computer intense applications in space constrained data centers or High Performance Computer Cluster environments shall be provided. Minimum features of the Server shall include advanced processing performance, memory and I/O along with simplified systems management. The robust performance of Intel® Xeon® 5500 and 5600 series processors as well as the availability of up to four 3.5" (or optional 2.5") hard drives is recommended. The device shall support up to 128GB (16 DIMM slots2) 1GB/2GB/4GB/8GB DDR3 800MHz, 1066MHz or 1333MHz memory, up to 8TB SATA and SAS storage. The operating system shall be Microsoft® Windows Server® 2008 R2 Foundation SP1 or better.

7.2.2.4 UPS Traffic Operations Centers

Uninterruptible Power Sources (UPS) shall be provided for all servers, workstations, layer 3 switches and other memory storage devices. The UPS shall provide sufficient power for each of the Traffic Operation Center's components to have an orderly shutdown whenever there is a power outage. The UPS provided is dependent on the power consumption of the devices supplied for the project.

7.2.2.5 Database Management Software

Database management software shall be provided. The software shall be industry standard relational database management software such as Oracle® or Microsoft® SQL. Only one database product shall be required to operate the system. The software shall allow the data to be exported and manipulated by third party tools such as Microsoft® Access™ and Microsoft® Excel™.

In addition to the database management software, Asset management software such as Fibertrak should be considered. The consideration of such products will depend on staff interests and capabilities.

7.2.2.6 Network Hard Drive

A network hard drive shall be supplied at each location where there is a server installed. This device shall provide backup for all of the system data. It shall enable automatic data mirroring with a RAID 1 configuration using Government–grade hardware encryption technology and shall function as an FTP server for remote file access. The device shall have the following minimum characteristics:

Table 2: Network Hard Drive Specifications

Interface	Ethernet	Hot Swappable	User Serviceable
Memory Capacity	2TB	Network Protocols	Microsoft RALLY®, Bonjour, NFS; CIFS; HTTP; HTTPS; FTP
Drive Performance	SATA 11	File Sharing Protocols	NFS; CIFS; FTP; HTTPS
Ports	1 Gigabit Ethernet; 2 USB	Backup Management	Client system backup, Bare Metal Restore over network; Local backup (USB device to NAS, NAS to USB device); NAS to NAS backup
RAID Enabled	RAID 0,1, JBOD	Download Server	FTP;HTTP

7.2.2.7 Core Layer 3 Switch

Core Layer 3 Switches shall be installed in each of the Traffic Operation Centers except for the Center at the Treasure Coast Traffic Incident Management Support Office. The Treasure Coast Traffic Incident Management Support Office is already equipped with a switch capable of supporting the connections required for the St. Lucie County implementation. The switches to be installed shall be operationally compatible with the existing Cisco L3 switch presently installed. The Core Switch/Router will include:

- A distributed architecture;
- Support non-blocking and switch traffic at wire-speed operation
- A backplane with at least 256Gbps bandwidth
- Wire-speed Packet Filtering capabilities for Layers 2 through 4
- Packet switching rate >/= 96,000,000 packet per second (64-byte packet)
- Full range of Ethernet interface modules
- 1000BaseT, 100BaseT, 10/100BaseT
  - Minimum 12, 10/100/1000BaseT ports
  - Two 10 Gigabit Ethernet ports
  - Gigabit Ethernet interface ports (minimum number for MFES connections)
- Fully redundant configuration of management/control, server, and I/O modules
- Four levels of alarm (critical, major, minor, and informational)
- Flow-control (IEEE 802.1x)
- Power supply slots integrated into the chassis
- Fully redundant power supply units with load sharing
- Quality of Service (QoS) and de-queuing techniques
- MTBF of 25,000 hours

In addition to supplying and installing the equipment it shall be the responsibility of the provider to setup and integrate the switch. It is also required to design IP addressing schemes compatible with existing SunGuide TMC networks and the St. Lucie County implementation. In addition, all VLAN, routing protocols and security parameters require careful analysis, compatibility study and staged implementation and network integrations.

7.2.2.8 Workstation

A minimum of nine workstations shall be required to support the needs of this project. Because traffic engineering functions require a number of different disciplines from maintenance, development of timing plans, intersection design, CAD and Microstation functions, and inventory; all workstations supplied for this project shall meet or exceed at least these minimum requirements.

Table 3: Workstation Specifications

Item	Description
Processor	Quad Core Intel® Xeon® Processor E5603, 1.6GHz, 4M L3, 4.8GT/s
Operating System	Windows XP Pro 32 and 64 bit SP3
Monitor	22in HAS Wide Monitor, VGA/ DVI/ DP
Memory	4GB DDR3 SDRAM at 1333MHz
Hard Drive	500GB SATA hard drive (7200RPM)
Video Card	1GB ATI FirePro V4800, Triple MON, 2 DP & 1 DVI
Optical Drive	16X DVD+/-RW w/ Cyberlink PowerDVD™/Roxio Creator™, No Media

7.2.2.9 Video Display

A Video Display System shall be installed in each of the Traffic Management Centers. The video system shall comply with FDOT Supplemental Specification 782-2. The displays shall be permanently mounted. The Video Display System Monitors shall be Flat Panel LCD Display Type and shall comply with the following Specifications:

- **Type**: Direct View LCD Screen Size: 52” (diagonally measured),
- **Resolution**: 1,920 horizontal pixels x 1,080 vertical pixels,
- **Aspect Ratio**: 16:9 widescreen Viewing Angle: 170 Degrees horizontally and vertically ,
- **Contrast Ratio**: 3,000:1,
- **Response Time**: 4ms or less,
- **Tuner**: ATSC/NTSC/QAM Built-in digital tuner,
- **PIP**: Picture-in Picture capability is required,
- **Display Frequency**: 120 Hz, and
- **Inputs**: 1 PC input 1 Composite Video 1 S-Video 2 Component video, (Y/Pb/Pr) 4 HDMI, HDMI PC input format support 1 Ethernet 1 USB.

7.2.2.10 Video Display Software

Video data at the intersections is recorded and transformed to digital data. A local TCP/IP network enables access to this video data anywhere. The VIDOS software suite makes all this data available at a central location. VIDOS is part of the VIDOS Pro Suite software package. VIDOS and can be installed as a stand-alone program on a PC. However, as is the case with this

project, VIDOS shall be installed as a client working together with VIDOS Server or VRM Server. It is suggested a compression based H.265 be used.

7.2.2.11 Video Display Controller

In order to provide the capability of multiple displays onto the Video Display device it is necessary to supply a Video Display Controller. The wall processor shall incorporate all of the visual data sources found in a control room environment and display them in moveable, scalable windows on a virtual display. The virtual display shall be comprised of multiple output devices such as monitors, LCD flat panels, plasma panels, projection cubes, or of a rear projection system. Data sources supported can include local applications, remote network applications, remote network RGB streams, compressed network video streams, and directly connected video and analog RGB inputs. All data sources are accessed from an intuitive and consistent software interface providing complete control of the virtual display surface. At a minimum the video display controller shall meet following specifications:

Sample Video Controller

- **Processor** - Dual Intel Xeon (3.2 GHz)
- **System memory** - DDR2 400, Standard 1GB; Optional 2 or 3GB
- **Expansion slots** - 14 PCI 64-bit/66 MHz
- **Disk Storage** - Hard disk 320 GB, 7200 RPM, SATA; Optional second drive
- **Network Interface -** Ethernet Standard integrated dual 10/100/1000 Mbps RJ45 ports;
- **USB** Two front and two rear panel ports
- **Input Devices** 104-key keyboard; mouse with 2-buttons + wheel/button
- **Touch Panel Support** AMX or Crestron support built-in
- **Graphics Display Capabilities -** Graphics memory **16**MB SGRAM per channel
  Number of outputs 2 to 32
  Wall configuration Any rectangular array
  Resolution 640 x 480 to 1920 x 1080 pixels per output
  Color Depth 16/32 bits per pixel
  Cursor Hardware cursor; 64x64 pixels
  Output signal DVI-I connector (both analog and digital, DVI-I to HD15 adapters
- **Video Input -** Inputs 16 composite BNC and 8 S-Video mini-DIN
  Input format NTSC, PAL, SECAM
  Scaling and display Up to 10240 x 7680 pixel window size, multiple video windows per display channel

The software for the video controller shall be a client/server based system so the server resides on the processor directly accessing hardware functionality, whereas the client is installed on a

network accessible PC running Windows. The client and server communicate over a TCP/IP connection using an open, clear-text communications protocol.

7.2.3 ATMS Field Components

In order to provide housing for the field components a NEMA TS2 Type 1 cabinet shall be installed at all of the intersections requiring a change out. This cabinet in addition to the NEMA controller and its support items shall also provide housing and power connections for Managed Field Ethernet Switches, video detection equipment, video traffic monitoring equipment and video encoders. It may also be necessary to provide space and power connections for future optional components within a reasonable size. For optional systems and components that require larger space a separate cabinet shall be provided.

NEMA P44 CABINET

7.2.3.1 NEMA TS2 Cabinet

The controller cabinet will meet, as a minimum, all applicable standards set forth by the NEMA TS2 requirements. High quality communication cabinets designed and manufactured with materials that are rugged and will allow for rigid mounting without any chance of flexing, will be used in the county. The cabinet shall be a NEMA P44 type with the following dimensions:

- **Outside dimensions**: 55” H x 44” W x 26” deep
- **Opening Dimensions**: 53” H x 41” W
- **Mounting Pattern**: 40.50” W x 18.50” D
- **Material: Aluminum** (.125” thick)
- **Finish**: Bare or Painted Mounting:
- **Base Mounted Locking System**: 3-point locking system with Corbin #2 lock Door
- **Stops**: Three position bar stop at bottom of door
- **Ventilation**: Pleated fiber filter in door, fan with thermostatic control
- **Light:** Incandescent or optional fluorescent, door switch activated

7.2.3.2 Controller

The actuated traffic signal controller shall meet, as a minimum, all applicable sections of the NEMA Standards Publication for TS2 and NTCIP. The NEMA TS2/NTCIP Actuated controller manufactured by Econolite is recommended for the City of Ft. Pierce and St. Lucie County. Because of the existing City and County infrastructure the ASC/3 controller model with Ethernet capability shall be provided. The Econolite ASC/3 provides an updated hardware design that allows it to serve as the traffic control platform for present and future traffic management environments.

7.2.3.3 Managed Field Ethernet Switch

Field Ethernet switches shall be placed at all locations to be connected to the communication network. At a minimum, these locations include all signalized intersections included in the project. Field Ethernet switches shall be field hardened. Each field Ethernet switch shall communicate with a predetermined hub switch via fast Ethernet fiber optic cable connections. The field Ethernet switches shall meet the Minimum Technical Requirements of the design specification and be capable of handling expansion within the ATMS communication network. The Switch shall be a 9-port industrially hardened, fully managed, Ethernet switch specifically designed to operate reliably in electrically harsh and climatically demanding environments. The unit shall provide a high level of immunity to electromagnetic interference and heavy electrical surges typical of environments found in curb side traffic control cabinets. The MFES shall have an operating temperature range of -40 to +85°C (-40 to +185°F) coupled with hazardous location certification (Class 1 Division 2). The field Ethernet switch shall be compliant with FDOT Supplemental Specification 784-1. The unit shall have the following:

Ethernet Ports

- Up to 9 Ports: 6 Base 10/100BaseTX ports with option for 3 additional Fiber or Copper ports
- Industry standard fiber optical connectors: LC, SC, ST, MTRJ
- Multimode and Singlemode optical transceivers
- Long haul optics allow distances up to 90km

7.2.3.4 Intersection Video Detection

The present City of Ft. Pierce and St. Lucie County infrastructure has a number of intersections that use video detection for the purpose of providing vehicle calls to the intersection controller. It is the desire of both agencies to use video detection at all of its intersections. Video detection equipment shall be installed at every intersection on this project. The present equipment is manufactured by Econolite and is known as Autoscope Solo Terra. The *Autoscope Solo Terra* sensor provides timely, high-quality traffic information required for today's sophisticated traffic and Intelligent Transportation Systems (ITS). The *Autoscope Solo Terra* sensor is a color video detection and Traffic Monitoring system that quickly installs with "3-wires-only," reduces maintenance with ClearVision faceplate coating, and offers user-convenient Terra Technology. Terra Technology uses IP-based addressing with a unique Ethernet MAC address. It combines state-of-the-art advances in digital image signal processing, broadband communications, and System-on-Chip (SoC) processors to add versatility and boost performance.

Because of the video capability of the device it is recommended this video be transmitted to the Traffic Operations Center.

7.2.3.5 Traffic Monitoring Video CCTV Subsystem

A CCTV Traffic Monitoring system shall be installed throughout St. Lucie County and the City of Fort Pierce. CCTVs shall be installed at approximately 1 to 1.5 mile intervals. The cameras shall be mounted on existing mast arms. A high-speed dome camera shall be supplied and have day/night functionality for quality images in low light conditions. The CCTV shall provide direct network connection, using H.264 and M-JPEG compression and bandwidth throttling, to efficiently manage bandwidth and storage requirements while delivering outstanding image quality. No other video encoder shall be required.

7.2.3.6 Bluetooth Vehicle Detection System

The Bluetooth Travel-Time Origin and Destination system is an advanced traffic monitoring system. The road or intersection installed equipment directly measures travel times using cost-effective, non-intrusive roadside technology. Bluetooth Travel-Time Origin and Destination detects the anonymous MAC address of Bluetooth signals broadcasted from mobile devices in vehicles, such as phones, headsets and music players, and thereby punches the location and time stamp of the vehicles. This enables the central system to determine accurate travel times and average speeds along the existing road network. The devices provide a secure interface for the clients to initiate services, view content, and manage permissions to access various levels of the data. The devices manufactured by the TrafficCast can be a permanent or a portable device and can be installed independently using a cellular data connection and a local power source or even a solar panel. The system provides a user friendly interface and a secure interface to initiate services, view content, and manage permissions to access various levels of the data.

Bluetooth technology will help meet the requirements of the performance based planning and programming measures of the funding option MAP-21.

7.2.4 Conclusion

The presented ATMS components, software and communication network will provide St. Lucie County and the City of Fort Pierce with the necessary infrastructure and tools to monitor and control vehicular movement throughout their area of responsibility. The system has the capability to provide the respective staffs with the video and data information to respond as necessary to situations affecting traffic flow in their districts. The system is cost effective while providing the basis for present and future enhancements.

A communication link between the Traffic Operation Centers of St. Lucie County, the City of Fort Pierce and the City of Port St. Lucie should be installed to provide a means of time synching

all of the area systems to provide quality time and offset synchronization among all agencies. Additionally it will be possible to share video and data between authorizing agencies.

7.3 OPTIONAL SYSTEM CONSIDERATIONS

The aforementioned System Design outlines an ATMS and communication network that provides all of the functions and tools required by local government transportation departments. The System Design also provides for the connection and sharing of data with FDOT, St. Lucie County, the City of Fort Pierce, the City of Port St Lucie and any other agency wanting and authorized to share data. As presented in Task 4, a number of traffic control and ITS type functions are discussed and presented again below.

7.3.1 Incident Management Software

The non-recurrent traffic congestion is caused by traffic incidents, such as vehicle disablements, cargo spills and crashes. To automate the incident detection process additional field equipment and central software will be required. In an urban environment there are situations whereby vehicle detection equipment can falsely imply an incident. Some of the normal situations that can be indicated as an incident are vehicles double parked, deliveries, passenger pickup, etc. Incident Detection is more of a detectable function on turnpikes and interstate highways and more likely to be deployed by FDOT.

7.3.2 Transit Monitoring/Tracking Software

Community Transit, a division of Council on Aging of St. Lucie, Inc. (COASL), is the public transit provider for St. Lucie County. The present transportation structure is a fixed route service that provides service along specific routes with scheduled arrival times at predetermined bus stop areas. In addition transportation can be arranged as on demand service by providing Community Transit 24 hours notice to schedule passenger pick up. The company operates buses over 6 routes from 7 AM until 6 PM.

The present bus infrastructure doesn't have any communication network capability with respect to sharing the status of vehicles including location and passenger presence. It would be expensive to incorporate a system capable of providing information to the public and the governing agency. The cost to deploy such a system could be prohibitive when considering the bus transportation system operates only on week days on an eleven hour per day schedule. To procure a system of this sort would require the installation of components on each vehicle, field reception devices, more computers, software and staffing. A Transit Monitoring System is not recommended at this time for this particular ATMS.

The school system operates approximately 345 buses throughout the County and is under the control of Transportation St. Lucie County. Two compounds are used for bus housing. The North County Compound is located at 601 S. 29th St., Ft. Pierce FL 34947. The other is the South County Compound 325 Commerce Park Dr., Port St Lucie FL 32986.

7.3.3 Web Service Software and Traveler Information System

The Centracs ATMS software doesn't have the capability to support live interactive traffic data to the motoring public over internet facilities. The Travel Time Information services involves collecting traffic information using various ITS technologies, and posting traffic reports onto the 511 Traveler Information System and Dynamic Message Signs (DMS) to help drivers learn about upcoming traffic delays, alternate route information and travel times. Although the traveler information system is not recommended in the County at this point of time, the following technology is recommended for the future development.

7.3.4 Traffic Adaptive System

Econolite products provide an optional module to its Centracs system to provide Traffic Adaptive System functions. The module added to the system is called Centracs ACS Lite. To facilitate traffic adaptive operation significant detectorization is required. Advance detectors are usually required for traffic adaptive operation. The traffic adaptive functions are configured through the Centracs Graphical User Interface (GUI). There is minimal data entry because much of the configuration data is uploaded directly from the local controllers. After uploading the configuration data, the user configures links, detector configurations, and tuning parameters through the GUI. After the configuration is completed ACS Lite control is managed through the Centracs scheduler, providing maximum control over when ACS Lite is operational. As the system runs, the Centracs database is continually updated to provide status reports, allowing users to track the changes that ACS Lite makes to the splits and offsets. In addition, Centracs archives ACS Lite performance measures and decisions to a database for future analysis and retrieval.

The ACS Lite module is not recommended at this time since timing plan development and the use of Time of Day plans is still a necessity. The time of day plans are the basis of the adaptive timing as the plans are modified during adaptive control. The Econolite Adaptive Signal Control, combined with a highly functional signal timing system, is specifically designed to improve traffic flow. Adaptive Signal Control continuously adjusts and distributes green time to enhance traffic movements, and as a result, improves travel time reliability, reduces traffic congestion levels, and accommodates variable/unpredictable traffic demands. Furthermore, Adaptive Signal Control extends the effectiveness of signal timing strategies.

7.4 IMPACT ON UPCOMING PROJECTS AND COMPATIBILITY WITH COUNTY'S LRTP

The deployment of the ATMS will be compatible with the upcoming projects and the Long Range Transportation Plan (LRTP) developed for St. Lucie County. The ATMS recommended for St. Lucie County will be on par with the objectives and goals of the Long Range Transportation Plan. Some of the data available from the ATMS should help with the planning of some of the aspects of the LRTP.

7.4.1 Phasing of Implementation/Time Frame/Cost

Based on the initial interviews with St. Lucie County and the City of Ft. Pierce, areas of traffic congestion and the corridors for future development were identified in the St. Lucie County LRTP. Seven (7) major traffic congested corridors were identified as being most beneficial to be operating within an ATMS environment. The corridors were labeled sequentially as phases A through G, where A is considered the highest priority, then B and so forth. It is important to understand that the phasing of the priority corridors was not solely determined based upon each corridor's degree of traffic congestion within the region. After evaluating the 7 corridors, it is recommended to install the system and communication network online in 4 phases. The four phase recommendation is based on the fact that the design and operation of an ATMS is heavily dependent upon the need for real-time data transmission between the TOC, intersections and CCTV video feeds. Real-time data transmission requires greater bandwidth within the communications media than what has been required of legacy traffic control systems. The establishment of a fiber optic transportation related communications backbone, from a traffic management center (TMC) to ITS field devices, is the preferred method of communications within an ATMS. The fiber communications link can meet the bandwidth requirements posed by the transmission of real time data needs. As a result, this preferred choice of communications linkage typically influences the overall ATMS phasing of a project. This is due because the communications link is installed outward from the TMC to the entire traffic management system. The four phases are described in detail later in this document. A summary of the 4 phases is as follows:

- Phase 1 - 56 intersections and 17 CCTVs
  33 intersections in the City of Fort Pierce and 23 intersections in St. Lucie County
- Phase 2 - 23 intersections and 7 CCTVs
  15 intersections in St. Lucie County and 8 belong to the City of Fort Pierce.
- Phase 3 - 24 intersections and 5 CCTVs
  20 intersections in the City of Fort Pierce and 4 intersections in St. Lucie County
- Phase 4 - 10 intersections and 7 CCTVs
  3 in the City of Fort Pierce and 7 in St. Lucie County

7.4.2 Procurement Methods and Construction Management Procedures

A Design-Build procurement method is recommended for deploying the ATMS in St. Lucie County. Advantages of the Design-Build contracts are as follows:

- Single point of contact for design and construction
- Single source of responsibility
- Single source of project delivery
- Time efficiencies due to the single source model
- Cost efficiencies due to the single source model
- Increased accountability
- Flexibility in dealing with changes
- Efficient project feedback system
- More accurate communication

7.4.3 Operations and Maintenance Plan/Cost

The operations cost for St. Lucie County ATMS has been broken down into four contributing components: labor costs, utility costs, office space costs and maintenance.

7.4.3.1 Labor

To provide a budgetary assessment a suggested number of personnel is as follows:

- TMC Supervisor/Manager - 1
- TMC Operator(s) – 2

Based on previous studies and reports approximately $200,000.00 per year should cover salaries and benefits for the additional personnel.

In addition, costs for software licenses, equipment maintenance agreements and training must be considered. These funds would be part of the general operating budget and is estimated to be $100,000.00.

An estimate of $300,000.00 on a yearly basis for the County and City is projected.

7.4.3.2 Training

As noted above in **Section *7.4.3.1*** training is also part of this project. User manuals, technical manuals and special operator training materials shall be provided for all systems and components. Training shall be provided for system operators and all maintenance personnel.

7.4.3.3 Utilities

The utility costs will increase at the Traffic Operations Centers due to the addition of video displays, servers, layer 3 switches, and workstations. Field power costs will increase due to the additional communications, CCTVs and video detection equipment to be added.

7.4.3.4 Office Space

Since the TMC can be constructed within an existing County-owned facility, there shouldn't be any new additional space costs for the TMC's or ATMS utilization of that space.

7.4.3.5 Maintenance

A benefit of the ATMS should be the reduction of field maintenance costs. The reduction will be from the data regarding equipment status gathered by the ATMS thus reducing the number of field trips required to troubleshoot problems. Also the data available from the ATMS should help with the development of timing plans reducing the need of consultant time in the gathering of data.

7.4.4 Compatibility with Regional ATMS/ITS Systems

The City of Ft. Pierce is currently upgrading their existing system to Econolite Centracs ATMS system, which will be compatible with the existing Econolite System at Indian River County. St. Lucie County has a long history of using Econolite products. The county currently operates an Econolite Aries system and will also upgrade to Econolite Centracs system. St. Lucie County's ATMS system will be compatible with City of Ft. Pierce and Indian River County.

The City of Port St. Lucie currently has an existing Naztec ATMS now system. The software for the Naztec system is not compatible with the Centracs system. However, it should be possible to coordinate timing intersections crossing jurisdictional boundaries by using the same timing reference and providing offset and cycle length data for those particular intersections.

7.5 CROSS AGENCY COOPERATION

7.5.1 Introduction

Like many other cities and counties with the State of Florida and the United States of America, St. Lucie County, the city of Ft. Pierce and the city of Port St. Lucie are facing many challenges to creating and maintain their respective transportation and traffic systems. Public agencies responsible for operation and management of traffic signals have limited resources and staff redundancy to guarantee continuity over time. In many cases, the expertise of traffic signal operations is found in one or two people, who are difficult to replace. This is especially true in smaller agencies. By creating cross agency collaboration, the opportunity is there for pooling resources in technology, staff and funding that could provide a benefit for all parties involved and for the general public.

7.5.2 Establishing One Entity

There are seven essential keys to obtaining cross agency cooperation and establishing the one entity institutionally for an efficient transportation system:

1. **Participants:** St. Lucie County, City of Port St. Lucie and the City of Ft. Pierce.

2. **Leadership:** How leadership will be sustained over the long-term will need to be defined. Roles and responsibilities shall be clearly defined.

3. **Clarity of Roles and Responsibilities:** Participating agencies will need to have their roles and responsibilities clarified and documented.

4. **Resources:** How the collaborative effort will be staffed and funded needs to be well defined.

5. **Bridging Organizational Cultures:** The missions and organizational cultures should be combined to form one mission and organization. Common technology and terminology should be agreed on**.**

6. **Accountability and Outcomes:** Short term and long term goals shall be established and agreed upon by all agencies. Tracking and performance measures are required to monitor and measure progress and performance.

7. **Written Guidance and Agreement:** Each agency shall get approval from their elected officials. An inter-local agreement between the participating agencies documenting the collaboration regarding steps 1-6 will be required.

7.5.3 Strategies for Collaboration

The FHWA document *"Collaborative Advantage: Realizing the Tangible Benefits of Regional Transportation Operations Collaboration"* highlights 10 collaborative strategies and actions agencies commonly use in their efforts to improve transportation systems performance. These strategies and actions to realize benefits are:

- "Follow the Money": collaborative pursuit of funding.
- "Get Smart": sharing expertise and joint learning.
- "With One Voice": coordinating communications and giving a consistent message.
- "On the Same Page": developing common procedures, protocols, and plans.
- "Measuring Up": jointly measuring performance.
- "You Ought to Know": sharing transportation information.
- "Can You Hear Me Now?": developing tools for efficient communications.
- "Sharing the Wealth": sharing resources.
- "Building Economies of Scale": consolidating services.
- "All Together Now": performing joint operations.

Table 4: Collaborative Strategies and Benefits

Benefit Area	Typical Strategies & Actions	Illustrative Measure
Inputs/Resources • Funding • Training • Equipment • Standards • Personnel • Communications	• Follow the Money • Get Smart • Sharing the Wealth • Building Economies of Scale • All Together Now	• Reduction in cost for service or equipment • Reduction in staff time needed for service • Reduction in maintenance costs • Increase in funding • Increase in staff • Increase in use of partners' staff • Increase in use of partners' systems or equipment
Agency operations • Productivity • Service area • Operating hours • Services • Information • Protocols and procedure • Other	• Get Smart • With One Voice • On the Same Page • Measuring Up • You Ought to Know • Can You Hear Me Now? • All Together Now	• Decreased response time • Decreased clearance time • Increased quality and timeliness of traveler information • Improved accuracy of traffic signal timing • Improved coordination of traffic signals with neighboring jurisdictions • Increased coverage area for operations • New services offered • Decreased time to resolve stranded motorists' issues • Increased frequency of traffic light timing
Safety (Agency outcomes/results) • Crashes • Injuries • Fatalities • Damage • Other	• Get Smart • With One Voice • On the Same Page • Measuring Up • You Ought to Know • Can You Hear Me Now? • All Together Now	***(Following measures are from U.S. Department of Transportation's ITS Evaluation Guidelines.)*** • Reduction in the overall rate of crashes • Reduction in the rate of crashes resulting in fatalities • Reduction in the rate of crashes resulting in injuries
Mobility (Agency outcomes/results) • Delay • Travel time	• Get Smart • With One Voice • On the Same Page • Measuring Up • You Ought to Know • Can You Hear Me Now? • All Together Now	***(Following measures are from U.S. Department of Transportation's ITS Evaluation Guidelines.)*** • Reduction in delay • Reduction in transit time variability
Efficiency (Agency outcomes/results) • Throughput • Availability • Effective capacity	• Get Smart • With One Voice • On the Same Page • Measuring Up • You Ought to Know • Can You Hear Me Now? • All Together Now	***(Following measures are from U.S. Department of Transportation's ITS Evaluation Guidelines.)*** • Improvement in customer satisfaction • Increases in freeway and arterial throughput or effective capacity
Energy and Environment (Agency outcomes/results) • Delay • Travel time	• Get Smart • With One Voice • On the Same Page • Measuring Up • You Ought to Know • Can You Hear Me Now? • All Together Now	***(Following measures are from U.S. Department of Transportation's ITS Evaluation Guidelines.)*** • Decrease in emissions levels • Decrease in energy consumption

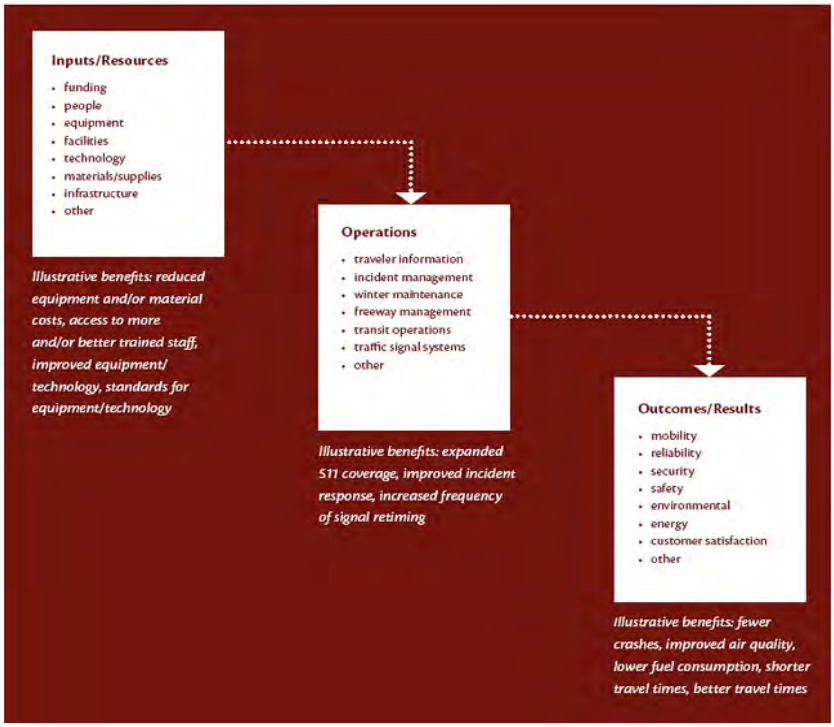
7.5.4 Benefits of One Entity

The vision of collaboration between the partner agencies to provide highly effective transportation services through the combined use of the partners' collective resources to maximize safety and mobility to the public. Regional collaboration offers significant benefits, and this report focuses on overcoming the barriers that hinder regional traffic signal operations programs. These barriers are not technological but rather institutional, organizational, and budgetary. Diminishing resources both hinder and necessitate the cohesiveness of traffic signal systems. However, specific examples of benefits include:

- Operating agencies increase access to funding by participating in joint funding applications.
- Agencies undertake larger, more technologically advanced projects by leveraging their expertise and resources with other agencies.
- Participating agencies help meet regional goals to reduce delay, fuel consumption, and emissions through coordinated initiatives, such as signal timing programs.

Figure 10 shows some of the potential benefit areas for collaboration of local governments for the day to day operations and maintenance of transportation systems.

Figure 10: Benefits of Local Government Collaboration



7.6 PROPOSED QUANTITIES FOR ATMS IMPLEMENTATION

Planning level cost estimates of the recommended ATMS components for the County are presented in this section. The preliminary estimates were developed through meetings with jurisdictional personnel and others involved with this project and from previously submitted task reports. From the information received, the team, based on its extensive design-build experience with both ATMS and ITS implementations, developed these estimates. The order the costs are presented in are Traffic Operation Centers and Field components.

7.6.1 Traffic Operation Centers

A planning level cost estimate for installing communication equipment servers, video displays and workstations, etc. as discussed above in **Section 7.3** was prepared for equipment installation at the three operation centers. The estimate also includes the connection of the fiber optic cable to the Treasure Coast Operations center. A breakdown of the costs is as follows:

- TMC construction and equipment upgrade - $306,958.00
- Design - $76,739.00
- Total Cost - $383,697.00

Typically the funding split for ITS/ATMS type projects ranges between 20-25 percent for design and 75-80 percent construction. The design fee is typical due to the "system engineering" and support requirements necessary for ITS/ATMS projects. To provide some latitude in the cost a 25% design fee was used.

7.6.2 Priority Phasing Costs

As explained in **Section 7.6.1** priority corridors were identified in the county based on the current traffic conditions, existing land-use, roadway classification, access management and future development. A plan was developed to compress the work involved in the original seven phase proposal into Four Phase Priorities plus the cost of Traffic Operation Center work. The Costs included are based on the equipment presented in **Section 7.3** of this document. In addition to the equipment items the anticipated construction costs are also included.

7.6.3 Phase 1

In Phase 1 of the project, 56 intersections were selected to be brought online with the new communications network and the Centracs ATMS. Additionally, this phase shall include 17 traffic monitoring cameras and video detection installation at those intersections where none presently exists. The 56 intersections consist of 33 intersections in the City of Fort Pierce and 23 intersections in St. Lucie County. The majority of the intersections are located on US 1. Please refer to Appendix A for complete maps of the four Phases.

Observing **Table 5** and **Figure 11,** for Phase 1 there are 31 locations on US 1 starting at Savanna Club Boulevard and ending at Kings Highway. There are an additional 5 intersections near US 1 that are also included in Phase 1. The remaining intersections are located on Edwards Boulevard (4), SR 615 (South 25th Street) (2), and SR 70 (Virginia Avenue/Okeechobee Road) (14).

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Phase 1 Corridor

Figure 11

Table 5: Phase 1 Corridor Intersections

	Roadway	Intersection	Maintaining Agency	Intersection Number	MP	CCTV
US 1 (Federal Highway)						
1	US 1	Savanna Club Boulevard	SLC	036	3.743	CCTV
2	US 1	Spanish Lakes Road	SLC	035	4.532	
3	US 1	Prima Vista Boulevard	SLC	103	5.051	CCTV
4	US 1	Rio Mar Drive	SLC	034	5.461	
5	US 1	Lake Vista Trail	SLC	067	5.720	
6	US 1	Kitterman Road	SLC	048	6.240	
7	US 1	Easy Street	SLC	042	6.804	CCTV
8	US 1	Ulrich Road	SLC	068	7.403	
9	US 1	Midway Road (CR 712)	SLC	003	8.255	CCTV
10	US 1	Wetherbee Road	SLC	050	8.753	
11	US 1	Farmers Market Road	FP	001	9.813	CCTV
12	US 1	Edwards Road (CR 611)	FP	002	10.752	CCTV
13	US 1	Emil Avenue	FP	003	10.873	
14	US 1	Gardenia Avenue	FP	004	11.462	
15	US 1	Virginia Avenue	FP	005	11.777	
16	US 1	Ohio Avenue	FP	006	12.253	
17	US 1	Parkway Drive	FP	007	12.431	
18	US 1	Sunrise Boulevard	FP	008	12.741	
19	US 1	Delaware Avenue	FP	009	13.015	
20	US 1	Citrus Avenue	FP	010	13.049	
21	US 1	Orange Avenue	FP	011	13.249	
22	US 1	Avenue A	FP	012	13.334	
23	US 1	Avenue C (Backus Ave)	FP	013	13.515	
24	US 1	Avenue D	FP	014	13.634	
25	US 1	Seaway Drive	FP	015	13.824	
26	US 1	Avenue H	FP	016	13.972	
27	US 1	SR A1A	SLC	020	14.937	CCTV
28	US 1	St. Lucie Boulevard	SLC	014	16.016	CCTV
29	US 1	SR 615 (North 25th Street)	SLC	032	17.032	CCTV
30	US 1	SR 614 (Indrio Road)	SLC	016	18.682	CCTV
31	US 1	SR 713 (Kings Highway)	SLC	017	21.292	CCTV
Intersections Near US 1						
32	North Beach Causeway	Old Dixie Highway	SLC	026	NA	
33	North Ocean Drive	Old Dixie Highway	SLC	019	NA	
34	North Ocean Boulevard	County Road 707	FP	043	NA	
35	Avenue D	North 7th Street	FP	069	NA	
36	Orange Avenue	County Road 707	FP	035	NA	
Edwards Road (CR 611)						
37	Edwards Road (CR 611)	Oleander Avenue	SLC	005	NA	

	Roadway	Intersection	Maintaining Agency	Intersection Number	MP	CCTV
Edwards Road (CR 611)						
38	Edwards Road (CR 611)	Sunrise Boulevard	SLC	006	NA	
39	Edwards Road (CR 611)	South 25th Street (CR 611)	SLC	007	NA	CCTV
40	Edwards Road	Selvitz Road	SLC	047	NA	
South 25th Street (CR 615)						
41	South 25th Street (SR 615)	Forrest Grove	SLC	065	NA	
42	South 25th Street (SR 615)	Bell Avenue	SLC	066	NA	CCTV
SR 70 (Virginia Avenue/Okeechobee Road)						
43	SR 70 (Okeechobee Road)	SR 713 (Kings Highway)	FP	034	20.523	CCTV
44	SR 70 (Okeechobee Road)	Crossroads Pkwy./Peters Rd.	FP	033	20.852	
45	SR 70 (Okeechobee Road)	I-95 SB Ramps	FP	032	21.091	
46	SR 70 (Okeechobee Road)	I-95 NB Ramps	FP	031	21.347	
47	SR 70 (Okeechobee Road)	South Jenkins Road	FP	030	21.853	CCTV
48	SR 70 (Okeechobee Road)	McNeil Road	FP	029	22.140	
49	SR 70 (Okeechobee Road)	West Mall Entrance	FP	028	22.453	CCTV
50	SR 70 (Okeechobee Road)	Central Mall Entrance	FP	027	22.500	
51	SR 70 (Virginia Avenue)	Okeechobee Road	FP	024	22.626	
52	SR 70 (Virginia Avenue)	South 35th Street	FP	023	23.101	
53	SR 70 (Virginia Avenue)	SR 615 (South 25th Street)	FP	022	23.723	CCTV
54	SR 70 (Virginia Avenue)	South 13th Street	FP	021	24.538	
55	SR 70 (Virginia Avenue)	Sunrise Boulevard	FP	018	24.693	
56	SR 70 (Virginia Avenue)	Oleander Avenue	FP	017	24.859	

As mentioned, there are 17 CCTVs to be installed in this phase. On US 1, 11 CCTVs shall be installed with the remaining 6 CCTVs being installed on SR 615 (South 25th Street) and Bell Avenue. (SLC 066); Okeechobee Road and West Mall Entrance (FP 028); Virginia Avenue and SR 615 (South 25th Street); (FP 022), Okeechobee and Jenkins Road (FP 030); SR 615 (South 25th Street) and Edwards Road (SLC 007); and Okeechobee Road and Kings Highway (FP 034).

7.6.3.1 Phase 1 Cost Estimate

The Total cost estimate for design and installation is $2,522,139.00. In addition to the cost of design and installation there is also a cost for Construction Engineering Inspection. For this phase the cost is projected to be approximately 10% of the cost estimate or $252,213.00. However, an allowance of 15% for contingency and 3% for inflation purposes is added to all costs which will increase the cost estimate to **$3,286,221.00.**

Table 6 shows an estimate of the cost for the field work to bring 56 intersections online with a new ATMS and fiber optic communication network. The costs are rounded off and determined using the data:

New Cabinets and Controllers - $20,091.00 per location. In the case of St. Lucie County only 2 of the 23 locations will need a complete cabinet upgrade. All of the locations will need network communication equipment and a controller Ethernet interface module. At this time new cabinets are not required for the City of Fort Pierce. Intersection upgrades using existing cabinets is approximately $7,000.00 per location for a controller, Ethernet interface module, and an MMU. In the City of Fort Pierce 10 intersections require this modification.

Video Detection Equipment - $6,798.00 x 4 = $27,192.00. Both agencies have existing video detection equipment. St. Lucie County needs 8 and the City of Fort Pierce 19 devices.

Traffic Monitoring CCTVs – $6,687.00 per CCTV

Cost of Fiber Components and installation – Pull Boxes $803.22 Splice Vaults $289.11 per 500 ft. plus fiber and installation 8.65 per foot. Fiber miles = 18.07

The cost of design is based on 20% of the total construction and equipment costs.

Table 6: Phase 1 Cost Estimate

	Agency			
	St Lucie County	City of Fort Pierce	City of Port St Lucie	Cost Totals
Total Intersections	23	33	0	
New ASC 3 Controllers (EA)	2	10	0	
Cost of New Intersection Equipment - Complete Cabinet and Equipment ($20,191.00) each	$40,182.00		$0.00	$ 40,182.00
New Controllers, Ethernet Interface Module, MMU, etc. in Existing Cabinet ($5,000.00) each		$70,000.00	0.00	$70,000.00
Intersection upgrade Ethernet module, MMU, etc. ($2,500.00) each	$52,500.00	$57,500.00	0.00	$110,000.00
Intersections with Existing Video Detection	15	14	0	
Intersections Requiring New Video Detection	8	19	0	
Cost of New Video Detection	$217,536.00	$516,648.00	$0.00	$734,184.00
New CCTV Traffic Monitoring Cameras (EA)	11	6	0	
Cost of New CCTV Traffic Monitoring Cameras	$73,562.00	$40,125.00		$113,687.00
New Fiber Optic Cabling & Conduit				$825,293.00
Cost of New Fiber Optic Splice Vaults & Pull Boxes				$208,437.00
	Cost of Design			$420,356.00
	Cost of Design and Installation			$2,522,139.00
	Cost of Construction Engineering			$252,213.00
	Contingency (15%)			$416,153.00
	Total Project Cost			$3,190,506.00
	Cost Adjusted for Inflation			$3,286,221.00

The cost estimate does not take into consideration the existing 6.2 miles of fiber presently installed in the City of Ft. Pierce. The cost could be reduced by $8.65 per foot for fiber and $1,092.33 per 500 feet if the City of Ft. Pierce fiber can be used in all cases. A cost reduction of approximately $354,683.43 could be realized.

7.6.4 Phase 2

Phase 2 involves the installation of 23 intersections and seven Traffic Monitoring CCTVs. Fifteen of the intersections belong to St. Lucie County and eight belong to the City of Fort Pierce. **Figure 12** and **Table 7** shows for the Phase 2 Corridor there are ten intersections located on Orange Avenue, one on South 7th Street, seven on CR 712 (Midway Road) and five on Prima Vista Boulevard. **Table 7** shows that there are two CCTV's proposed on Orange Avenue at the intersections of SR 615 (South 25th Street) and South 7th Street; three proposed on CR 712 (Midway Road) at the intersections of SR 615 (South 25th Street), Selvitz Road and Glades Cutoff Road; and two proposed on Prima Vista Boulevard at the intersections of Naranja Dive and Airosa Boulevard.

Table 7: Phase 2 Corridor Intersections

	Roadway	Intersection	Maintaining Agency	Intersection Number	MP	CCTV
CR 68 (Orange Avenue)						
1	CR 68 (Orange Avenue)	SR 713 (Kings Highway)	SLC	011	NA	
2	CR 68 (Orange Avenue)	South Jenkins Road	SLC	056	NA	
3	CR 68 (Orange Avenue)	Hartman Road	SLC	027	NA	
4	CR 68 (Orange Avenue)	33rd Street	FP	042	NA	
5	CR 68 (Orange Avenue)	SR 615 (South 25th Street)	FP	041	NA	CCTV
6	CR 68 (Orange Avenue)	South 17th Street	FP	040	NA	
7	CR 68 (Orange Avenue)	South 13th Street	FP	039	NA	
8	CR 68 (Orange Avenue)	South 10th Street	FP	038	NA	
9	CR 68 (Orange Avenue)	South 7th Street	FP	037	NA	CCTV
10	CR 68 (Orange Avenue)	South 5th Street	FP	036	NA	
South 7th Street						
11	7th Street	Avenue A	FP	058	NA	
CR 712 (Midway Road)						
12	CR 712 (Midway Road)	I-95 SB Ramps	SLC	045	NA	
13	CR 712 (Midway Road)	I-95 NB Ramps	SLC	057	NA	
14	CR 712 (Midway Road)	Glades Cutoff Rd (CR 709)	SLC	038	NA	CCTV
15	CR 712 (Midway Road)	Torino Parkway	SLC	053	NA	
16	CR 712 (Midway Road)	Selvitz Road	SLC	040	NA	CCTV
17	CR 712 (Midway Road)	SR 615 (South 25th Street)	SLC	022	NA	CCTV
18	CR 712 (Midway Road)	Oleander Avenue	SLC	004	NA	
Prima Vista Boulevard						
19	Prima Vista Boulevard	Fire Station	SLC	117	NA	
20	Prima Vista Boulevard	Airosa Boulevard	SLC	116	NA	CCTV
21	Prima Vista Boulevard	Floresta Boulevard	SLC	015	NA	
22	Prima Vista Boulevard	Naranja Drive	SLC	014	NA	CCTV
23	Prima Vista Boulevard	Rio Mar Drive	SLC	013	NA	

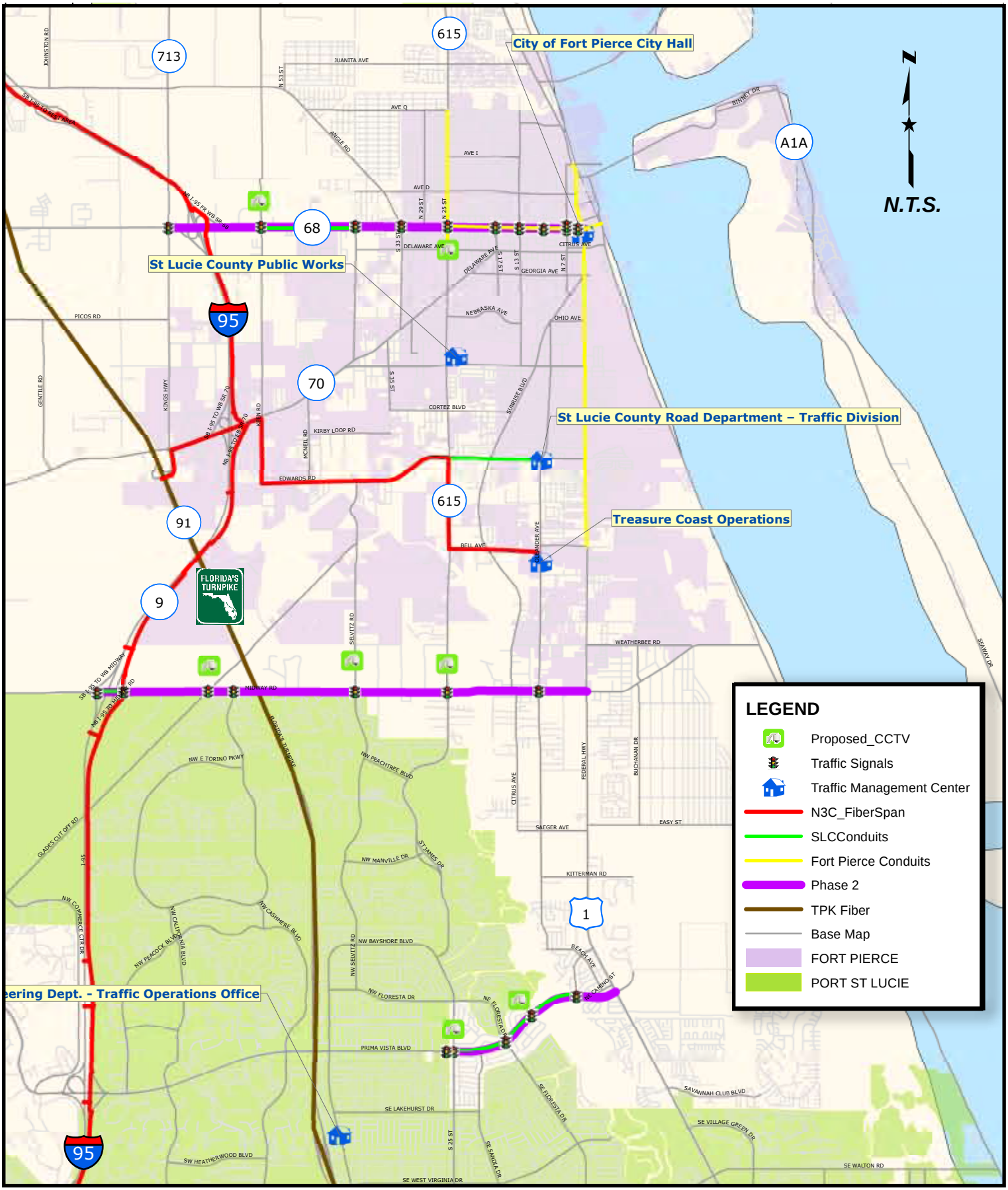
7.6.4.1 Phase 2 Cost Estimate

Table 8: Phase 2 Cost Estimate

	Agency			
	St Lucie County	City of Fort Pierce	City of Port St Lucie	Cost Totals
Total Intersections	15	8	0	
New ASC 3 Controllers (EA)	0	0	0	
Cost of New Intersection Equipment (EA)	$30,000.00	$16,000.00	$0.00	$46,000.00
Intersections with Existing Video Detection (PI)	5	3	0	
Intersections Requiring New Video Detection (PI)	10	5	0	
Cost of New Video Detection	$271,920.00	$135,960.00	$0.00	$407,880.00
New CCTV Traffic Monitoring Cameras (EA)	6	1	0	$ 46,812.00
Cost of New CCTV Traffic Monitoring Cameras	$73,562.00	$40,125.00		$ 113,687.00
New Fiber Optic Cabling & Conduit				$ 538,929. 00
Cost of New Fiber Splice Vaults & Pull Boxes				$ 136,113.00
	Cost of Design			$ 257,884.00
	Cost of Design and Installation			$1,547,307.00
	Cost of Construction Engineering Inspection			$154,730.00
	Contingency (15%)			$255,305.00
	Total Project Cost			$1,957,342.00
	Cost Adjusted for Inflation			$ 2,016,062.00

The cost analysis for Phase 2 shown in **Table 8** is the same as that for Phase 1 except for a cost of $2,000.00 is added to each intersection to allow for the purchase of Ethernet telemetry modules.

The fiber miles for this phase of the project are approximately 11.8.



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Phase 2 Corridor

Figure 12

7.6.5 Phase 3

Phase 3 involves the installation of 24 intersections and five Traffic Monitoring CCTVs. Four of the intersections belong to St. Lucie County and twenty belong to the City of Fort Pierce. **Figure 13** and **Table 9** shows for the Phase 3 Corridor there are ten intersections located on SR 615 (South 25th Street), three on Okeechobee Road, four on Delaware Avenue, three on Avenue D and one each on 17th Street, 13th Street, Georgia Avenue and Sunrise Boulevard. **Table 9** shows that there are four CCTV's proposed on SR 615 (South 25th Street) at the intersections of Okeechobee Road, Avenue D, Avenue Q and St. Lucie Boulevard; and one proposed on Delaware Avenue at 13th Street.

Table 9: Phase 3 Corridor Intersections

	Roadway	Intersection	Maintaining Agency	Intersection Number	MP	CCTV
SR 615 (South 25th Street)						
1	SR 615 (South 25th Street)	Ft Pierce Central	SLC	033	0.000	
2	SR 615 (South 25th Street)	Cortez Boulevard	SLC	069	0.496	
3	SR 615 (South 25th Street)	Okeechobee Road	FP	050	1.796	CCTV
4	SR 615 (South 25th Street)	Delaware Avenue	FP	051	2.244	
5	SR 615 (South 25th Street)	Avenue D	FP	052	2.874	CCTV
6	SR 615 (South 25th Street)	Avenue I	FP	053	3.255	
7	SR 615 (South 25th Street)	Avenue M	FP	054	3.505	
8	SR 615 (South 25th Street)	Avenue Q	FP	056	3.756	CCTV
9	SR 615 (South 25th Street)	Juniata Avenue	SLC	041	4.249	
10	SR 615 (South 25th Street)	St. Lucie Boulevard	SLC	021	5.016	CCTV
Okeechobee Road						
11	Okeechobee Road	33rd Street	FP	025	NA	
12	Okeechobee Road	Georgia Avenue	FP	058	NA	
13	Okeechobee Road	Hartman Road	FP	026	NA	
Delaware Avenue						
14	CR 712 (Midway Road)	7th Street	FP	057	NA	
15	CR 712 (Midway Road)	10th Street	FP	064	NA	
16	CR 712 (Midway Road)	13th Street	FP	065	NA	CCTV
17	CR 712 (Midway Road)	17th Street	FP	066	NA	
17th Street and 13th Street						
18	17th Street	Georgia Avenue	FP	061	NA	
19	17th Street	Nebraska Avenue	FP	075	NA	
Georgia Avenue and Sunrise Boulevard						
20	Georgia Avenue	7th Street	FP	059	NA	
21	Sunrise Boulevard	Parkway Drive	FP	079	NA	
Avenue D						
22	Avenue D	13th Street	FP	070	NA	
23	Avenue D	17th Street	FP	071	NA	
24	Avenue D	29th Street	FP	072	NA	

St.Lucie County

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FR ALEMAN A Certified DBE/MBE Firm with the State of Florida	**Phase 3 Corridor**	**Figure 13**

7.6.5.1 Phase 3 Cost Estimate

Table 10: Phase 3 Cost Estimate

	Agency			
	St Lucie County	City of Fort Pierce	City of Port St Lucie	Cost Totals
Total Intersections	4	20	0	
New ASC 3 Controllers (EA)	0	0	0	
Cost of New Intersection Equipment (EA)	$8,000.00	$40,000.00	$0.00	$48,000.00
Intersections with Existing Video Detection (PI)	2	4	0	
Intersections Requiring New Video Detection (PI)	2	16	0	
Cost of New Video Detection	$54,384.00	$ 435,072.00	$0.00	$489,456.00
New CCTV Traffic Monitoring Cameras (EA)	1	4	0	$ 46,812.00
Cost of New CCTV Traffic Monitoring Cameras	$6,687.50	$26,750.00		$33,437.00
New Fiber Optic Cabling & Conduit				$649,455.00
Cost of New Fiber Splice Vaults & Pull Boxes				$164,027.00
		Cost of Design		$286,237.00
		Cost of Design and Installation		$1,717,424.00
		CEI Cost		$171,742.00
		Contingency (15%)		$283,375.00
		Total Cost		$2,172,541.00
		Cost Adjusted for Inflation		$2,237,717.00

Table 10 shows all of the costs are similar to the other Phases. The fiber miles for this phase are approximately 14.22.

7.6.6 Phase 4

Phase 4 involves the modification of ten intersections, three of which belong to the City of Fort Pierce and seven which belong to St. Lucie County. In addition to the intersection modifications there are seven proposed Traffic Monitoring CCTV locations. **Figure 14** and **Table 11** shows for the Phase 4 Corridor there are four intersections located on SR 713 (North Kings Highway), one on SR 614 (Indori Road), one on Angle Road, one on Delaware Avenue, and one on 17th Street. Unlike the three previous corridors there are two intersections to bring under system control through the use of wireless point to multipoint techniques. The wireless intersections are: SR AIA and Atlantic Beach Boulevard (SLC 018) where there is a proposed Traffic Monitoring CCTV and SR A1A and Binney Dr. (FP 048). The transmitter/Receiver location is near Museum Point Park at the intersection of County Road 707 and Highway SR A1A.

Table 11 shows that there are five proposed CCTVs located on SR 713 (North Kings Highway), one of the CCTV's is a standalone device. The Stand alone CCTV location is proposed for

Orange Avenue. One CCTV location is proposed on Angle Road at Avenue Q and one location proposed on SR A1A at Atlantic Beach Boulevard.

Table 11: Phase 4 Corridor Intersections

	Roadway	Intersection	Maintaining Agency	Intersection Number	MP	CCTV
SR 713 (Kings Highway)						
1	SR 713 (Kings Highway)	Angle Road	SLC	012	3.896	CCTV
2	SR 713 (Kings Highway)	St. Lucie Boulevard	SLC	013	4.926	CCTV
3	SR 713 (Kings Highway)	SR 614 (Indrio Road)	SLC	015	7.488	CCTV
4	SR 713 (Kings Highway)	Winter Garden Parkway	SLC	010	8.219	CCTV
SR 614 (Indrio Road)						
5	SR 614 (Indrio Road)	Johnston Road	SLC	070	1.563	
Angle Road						
6	Angle Road	Avenue Q	FP	049	NA	CCTV
Delaware Avenue						
7	Delaware Avenue	33rd Street	FP	068	NA	
17th Street						
8	17th Street	Avenue I	FP	077	NA	
SR A1A						
9	SR A1A	Atlantic Beach Boulevard	SLC	018	2.526	CCTV
10	SR A1A	Binney Drive	FP	048	15.373	

7.6.6.1 Cost Estimate Phase 4

Table 12: Phase 4 Cost Estimate

	Agency			
	St Lucie County	City of Fort Pierce	City of Port St Lucie	Cost Totals
Total Intersections	7	3	0	
New ASC 3 Controllers (EA)	0	0	0	
Cost of New Intersection Equipment (EA)	$14,000.00	$6,000.00	$0.00	$20,000.00
Intersections with Existing Video Detection (PI)	3	0	0	
Intersections Requiring New Video Detection (PI)	4	3	0	
Cost of New Video Detection	$108,768.00	$81,576.00	$0.00	$190,344.00
New CCTV Traffic Monitoring Cameras (EA)	7	0	0	
Cost of New CCTV Traffic Monitoring Cameras	$46,812.50	$0		$ 46,812.00
New Fiber Optic Cabling & Conduit				$ 415,615.00
Cost of New Fiber Splice Vaults & Pull Boxes				$104,968.00
Cost of Wireless Communications	1	1	0	$10,000.00
			Cost of Design	$157,548.00
			Cost of Design and Installation	$973,646.00
			Cost of Construction Engineering Inspection	$97,364.00
			Contingency (15%)	$160,652.00
			Total Cost	$1,231,663.00
			Cost Adjusted for Inflation	$1,268,613.00

Table 12 shows the cost estimate for Phase 4. This cost estimate differs from the previous estimates because it includes the cost of installation for two intersections to be connected to the ATMS via wireless communications.

St.Lucie County

ATMS MASTER PLAN

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Phase 4 Corridor

Figure 14

7.6.7 Port St. Lucie

The City of Port St. Lucie has seven intersections and 3 demarcation points that will be part of the Master Plan. **Table 13** shows the seven intersections that need modifications to be added to the City of St. Lucie and proposed overall countywide ATMS system.

Table 13: Port St. Lucie Intersections

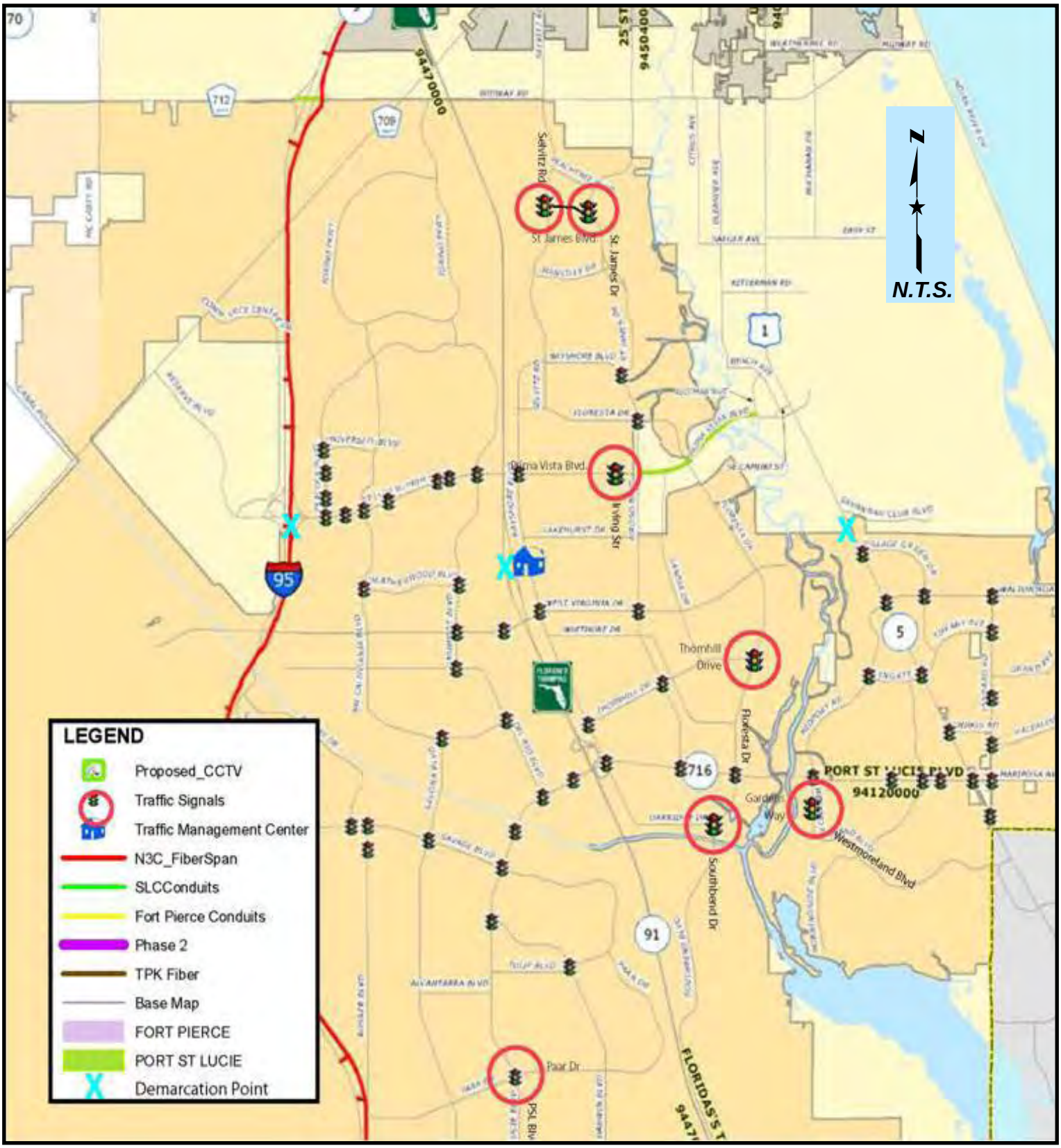
	Roadway	Intersection	Maintaining Agency	Intersection Number	MP	CCTV
Floresta Drive						
1	Floresta Drive	Thornhill Drive	PSL	NA	NA	
2	Floresta Drive	Southbend Drive	PSL	NA	NA	
Prima Vista Boulevard						
3	Prima Vista Blvd.	Irving Street	PSL	NA	NA	
Port St. Lucie Boulevard						
4	Port St. Lucie Boulevard	Paar Drive	PSL	NA	NA	
St. James Drive						
5	St. James Drive	St. James Blvd.	PSL	NA	NA	
St. James Blvd.						
6	St. James Blvd.	Selvitz Road	PSL	NA	NA	
Westmoreland Drive						
7	Westmoreland Drive	Gardens Way	PSL	NA	NA	

7.6.7.1 City of St. Lucie Cost Estimate

Table 14 shows the cost estimate for the City of St. Lucie intersections.

Table 14: Port St. Lucie Cost Estimate

	Agency			
	St Lucie County	City of Fort Pierce	City of Port St Lucie	Cost Totals
Total Intersections			7	$140,367.00
New ASC 3 Controllers (EA)	0	0	7	
Cost of New Intersection Equipment (EA)	$0.00	$0.00	$17,500	$17,500.00
Cost of New Video Detection	$0.00	$0.00	$0.00	
New CCTV Traffic Monitoring Cameras (EA)	0	0	0	
Cost of New CCTV Traffic Monitoring Cameras				
New Fiber Optic Cabling & Conduit				$276,800.00
Cost of New Fiber Splice Vaults & Pull Boxes				$71,001.45.00
			Cost of Design	$101,200.00
			Cost of Design and Installation	$506,000.00
			Cost of Construction Engineering Inspection	$60,720.00
			Contingency (15%)	$100,188.00
			Total Cost	$768,108.00
			Cost Adjusted for Inflation	$791,150.00



St.Lucie County

ATMS MASTER PLAN

F.R. ALEMAN A Certified DBE/MBE Firm with the State of Florida	*City of Port St. Lucie Intersections*	*Figure 15*

7.6.8 Primary Cost (s) Assessment

The team reviewed each of the primary corridors in extensive detail to determine the necessary ATMS upgrades needed. Efforts were taken to build off of the existing (limited) ITS infrastructure where possible. Using the county's ATMS GIS, a point-to-point (intersection to intersection) analysis was performed along each and every intersection of the primary corridors to be served by the ATMS. Specific ITS functionality and devices needed to support the ATMS were determined. Project bid price information used in the cost compilation is based on data obtained from St. Lucie County, Martin County, FDOT and other ATMS deployments. Based upon the above assessment(s) a cost estimate, by priority, for deploying an ATMS within the St. Lucie County region was determined and is presented below:

Table 15: Cost Estimate Totals

Cost Item	Expenditure
Traffic Operation Centers	$383,697.00
Phase 1	$3,286,221.00
Phase 2	$ 2,016,062.00
Phase 3	$ 2,237,717.00
Phase 4	$ 1,268,613.00
City of Port St. Lucie	$791,150.00
Total Project Cost	$9,983,460.00

When considering the total project cost of $9,983,460.00 for a fiber network communications network, upgraded intersection equipment and a real time ATMS product, the cost on an intersection basis of $81,196.00 for 120 intersections appears to be reasonable.

7.6.8.1 Operational and Maintenance Costs

In addition to the cost of design, equipment procurement, installation and construction there is also a cost to be considered by the County and City for additional staff that may be required for the operation and maintenance of the ATMS and its continued efficiency. A number of functions are typically performed and supported at the Traffic Management Centers. Some of those functions from previous studies are:

- Traffic monitoring
- Control of ITS devices
- Maintenance, repair and troubleshooting
- Dissemination of information
- Personnel management
- Data analysis
- Interface with media and public
- Plan, recommend, implement system and procedural upgrades
- Coordination with incident response agencies
- Coordination with other local and regional transportation agencies

The number of additional staff members is usually decided during the design phase and is based on the desired functions listed above. The two critical factors are the number of functions to be supported by the TMC and the workload associated with supporting each function. To provide a budgetary assessment a suggested number of personnel is as follows:

- TMC Supervisor/Manager - 1
- TMC Operator(s) – 2

Based on previous studies and reports approximately $200,000.00 per year should cover salaries and benefits for the additional personnel.

In addition, costs for software licenses, equipment maintenance agreements and training must be considered. These funds would be part of the general operating budget and is estimated to be $100,000.00.

An estimate of $300,000.00 on a yearly basis for the County and City is projected.

7.7 CONCLUSIONS

The investigative methods used to produce the suggestions presented in this Master Plan are based on years of systems experience on both design and design build projects. The recommended approach and component suggestions will provide St. Lucie County, the City of Fort Pierce, the City of Port St. Lucie and FDOT with a system and network conducive to a work environment compatible with the existing experience of the relative staffs and provide the means to enhance the progression of the motoring public through the area. It will also provide a gateway to future products and systems.

Typically there are two procurement methods used for the procurement of an ATMS project. One is where a qualified engineering firm develops a complete specification and plans for all aspects of the ATMS project. Once the design is completed the project is let for bid by qualified construction firms. The construction firm is bound by the design document and is responsible for the installation based only on the provided contract documents.

The second method calls for a specification that forms the basis of the desired ATMS with a set of plans to be further developed by others. Once the project documents are prepared a Request for Proposals by qualified Design/Build firms is sought. The Design/Build firms prepare designs based on the provided project documents for system implementation. FDOT District 4, St. Lucie County, the City of Fort Pierce and the City of Port St. Lucie evaluate the proposals for technical content and provide scores on the basis of the submitted proposals and plans. Soon after the proposals are evaluated each of the firms submits their costs to complete the project. The interested agencies then evaluate the total proposal package and award the project to the selected Design/Build team. The Design/Build team is responsible for the successful installation and operation of the total ATMS project.

It is our recommendation that the Design/Build method of procurement be used for this project. The Design/Build method of project implementation has been successfully completed on numerous projects within District 4 along with other FDOT Districts throughout the state.

8 FUNDING OPTIONS

F. R. Aleman & Associates, Inc. (FRA) has been retained by the Florida Department of Transportation, District 4, to develop a Master Plan for St. Lucie County's Advanced Traffic Management System (ATMS). The Master Plan work consists of 6 tasks to be completed in sequence. Five of the tasks: Inventory, Transportation Systems Management & Operations (TSM&O) Applications and Strategies, Visioning Workshop, System Requirements, and Implementation Plan have been completed or submitted to the District. The Implementation Plan for the Advanced Traffic Management System (ATMS) in St. Lucie County is the fifth sequential task was developed based on the information provided in the previous tasks in addition to data developed for the implementation phase. The Implementation Plan presented in Task 5 was based on the installation of the Econolite Centracs system to support both St. Lucie County and the City of Fort Pierce.

Based on the Implementation plan in Task 5; seven (7) major traffic congested corridors were identified as being most beneficial to be operating within an ATMS environment (See Task 5 Implementation Plan for exact locations). After evaluation of these seven corridors FRA Aleman recommended to bring the proposed ATMS system and communication network online in 4 phases. The four phase decision was based on the fact the design and operation of an ATMS is heavily dependent upon the need for real-time data transmission between the TOC, intersections and CCTV video feeds. Real-time data transmission requires greater bandwidth within the communications media than what has been required of legacy traffic control systems. The establishment of a fiber optic transportation related communications backbone, from a traffic management center (TMC) to ITS field devices, is the preferred method of communications within an ATMS. The fiber communications link can meet the bandwidth requirements posed by the transmission of real time data needs. As a result, this preferred choice of communications linkage typically influences the overall ATMS phasing of a project. This is due to the fact that the communications link is installed outward from the TMC to the entire traffic management system. The four phases consists of the following:

- Phase 1 - 56 intersections and 17 CCTVs with 33 intersections in the City of Fort Pierce and 23 intersections in St. Lucie County;
- Phase 2 - 23 intersections and 7 CCTVs with 15 Intersections in St. Lucie County and 8 belong to the City of Fort Pierce;
- Phase 3 - 24 intersections and 5 CCTVs with 20 intersections in the City of Fort Pierce and 4 intersections in St. Lucie County;
- Phase 4 - 10 intersections and 7 CCTVs with 3 in the City of Fort Pierce and 7 in St. Lucie County.

The FRA team reviewed each of the primary corridors in extensive detail to determine the necessary ATMS upgrades needed. Efforts were taken to build off of the existing (limited) ITS infrastructure where possible. Using the county's ATMS GIS, a point-to-point (intersection to intersection) analysis was performed along each and every intersection of the primary corridors

to be served by the ATMS. Specific ITS functionality and devices needed to support the ATMS were determined.

Project bid price information used in the cost compilation is based on data obtained from St. Lucie County, Martin County, FDOT and other ATMS deployments. Based upon the above assessment(s) a cost estimate, by priority, for deploying an ATMS within the St. Lucie County region was determined and is presented below:

Table 16: Cost Estimate by Priority

Cost Item	Design	Construction	Expenditure
Traffic Operation Centers	$76,739	$306,958	$383,697
Phase 1	$420,356	$2,101,783	$3,286,211
Phase 2	$257,884	$1,289,423	$2,016,062
Phase 3	$286,237	$1,431,505	$2,237,717
Phase 4	$157,548	$816,098	$1,268,613
Total Project Cost	$1,198,764	$5,945,767	$9,192,310
Expenditure includes additional 10% for CEI, 15% Contingency and 3% Inflation			
Total Yearly Recurring Operation and Maintenance Costs			$300,000

As outlined in the project implementation plan; in addition to the cost of design, equipment procurement, installation and construction there is also a cost to be considered by the County and City for additional staff that may be required for the operation and maintenance of the ATMS and its continued efficiency. A number of functions are typically performed and supported at the Traffic Management Centers. Some of those functions from previous studies are:

- Traffic monitoring
- Control of ITS devices
- Maintenance, repair and troubleshooting
- Dissemination of information
- Personnel management
- Data analysis
- Interface with media and public
- Plan, recommend, implement system and procedural upgrades
- Coordination with incident response agencies
- Coordination with other local and regional transportation agencies

The number of additional staff members is usually decided during the design phase and is based on the desired functions listed above. The two critical factors are the number of functions to be supported by the TMC and the workload associated with supporting each function. To provide a budgetary assessment the project implementation plan suggested one TMC Supervisor/Manager

and two TMC Operators. Based on previous studies and reports approximately $200,000.00 per year was estimated to cover salaries and benefits for the additional personnel. Also costs for software licenses, equipment maintenance agreements and training were considered. Typical training requirements include equipment training, software training, IMSA certification training and miscellaneous training at two intervals. These funds would be part of the general operating budget and were estimated to be $100,000.00. This resulted in a total estimate of $300,000.00 on a yearly basis to address the County and City's requirements.

The Subject of this Technical Memorandum is Task 6 and addresses Financing Options for the proposed ATMS infrastructure Master Plan. This Technical Memorandum is being prepared by Corzo Castella Carballo Thompson Salman, P.A. (C3TS) in coordination with FR Aleman, Inc. This task includes researching and documenting funding opportunities that can support the execution of the proposed Master Plan. This includes sponsored identification of programs by the following entities and others:

- US Department of Transportation;
- Florida Department of Transportation (Pushbutton Program);
- St Lucie County; and
- Federal Highway Administration.

8.1 FUNDING OPTIONS

The development of a uniform Advanced Traffic Management System (ATMS) within St. Lucie County is not practical given the existence of three maintaining agencies within the county boundaries. These three agencies consist of St. Lucie County, the City of Ft. Pierce and the City of Port St. Lucie. Each of these agencies have different Intelligent Transportation System (ITS) configurations and each agency has varying needs; although there are some overlaps in specific areas as outline in the technical memorandums which describe their respective systems and needs.

Establishing funding to meet these needs is particularly challenging for any particular public agency; let alone three distinct agencies given the fact that needs typically outweigh funding availability. For this reason several potential funding sources will need to be identified and a phased approach to funding coupled with prioritization of needs within the county limits is warranted. This is needed to ensure maximum benefit as funding becomes available.

8.1.1 Project Programming

The process of funding ITS projects began with the "Intelligent Transportation System Act of 1998," which defined the goals and statutes by which all agencies using "Title 23 Funds" shall follow when deploying ITS projects.

This formalized process began with the rulemaking process for the regulations contained in Title 23, Code of Federal Regulations, Part 940 which became effective on February 7, 2001. At the beginning of the process, FHWA, Florida Division, and FDOT began with the concept of an informal process until such time as the application of the regulation was understood better. Section 940.11 Project Implementation has seven requirements; the first requirement is that, **"All ITS projects funded with highway trust funds shall be based on a systems engineering analysis."** This requires the formal approval of the FDOT System Engineering Management Plan (SEMP). Once the SEMP is approved, the FHWA will require formal documentation (scale commensurate with the project) of all ITS projects. This process is used to demonstrate compliance with the regulations contained in Title 23, Code of Federal Regulations, Part 940. Projects that are not in compliance with Part 940 will not be eligible for reimbursement using Highway Trust Funds.

The identification of proposed projects will need to be identified in the appropriate local, county and state work programs. The **Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)** required that all projects appear in the local Metropolitan Planning Organization's Transportation Improvement Program (TIP) and the State's Transportation Improvement Program (STIP), if the project is to receive federal funding through Title 23 of the United States Code or the Federal Transportation Administration (FTA). The local MPO in St. Lucie County is designated as the St. Lucie Transportation Planning Organization (TPO). The TIP contains a priority list of projects to be carried out over a five year timeframe with the first three years consisting of higher urgencies and the later two years as

potential priority projects which may move forward or be delayed in the TIP dependent on need. The TIP is updated annually in Florida and must reflect cost feasible projects and indicate the sources of funds for project implementation. The local MPO assists the Florida Department of Transportation (FDOT) in qualifying the project to receive state, local or federal funding. The MPO also determines if the project fits into the County Long Range Transportation Plan (LRTP) and whether the project is in the current TIP or if an amendment is needed to include the project.

With Federal and State resources, the TIP and STIP funds are typically available for capital improvement projects requiring new or modified infrastructure. The deployment of traffic control centers and traffic signal systems will normally be funded through the TIP or STIP programs and are programmed within the State's LRTP. In Florida, FDOT's Congestion Management Program is a common funding source for ATMS type projects. Chapter 339.177 Florida Statues requires that the Florida Department of Transportation, in conjunction with the twenty-six Metropolitan Planning Organizations (MPO's) in the State of Florida; to develop and implement a traffic congestion management process for managing programs and systems.

The St. Lucie Transportation Planning Organization (TPO) is the countywide agency responsible for transportation planning in the incorporated and unincorporated areas of St. Lucie County. The TPO retained Kimley-Horn and Associates, Inc. to update its Congestion Management Process (CMP) and to identify and prioritize CMP projects for potential 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). Their report was completed in October of 2011. The CMP projects identified in the CMP Plan includes the prioritization of various forms of ITS and ATMS projects.

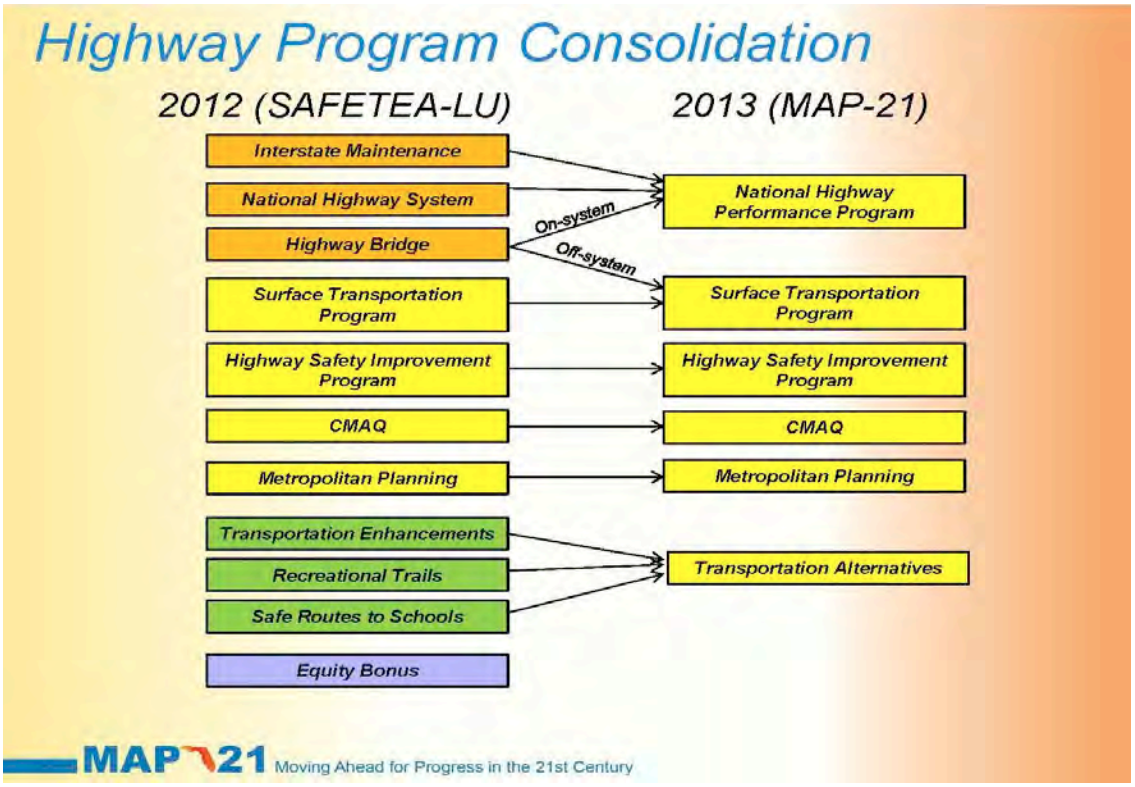
In working with District Four of the Florida Department of Transportation it is anticipated that approximately $300,000 per year of CMP Box Funds will be available for the St. Lucie TPO beginning in Fiscal Year 2014/2015. This funding could be utilized to assist the County in meeting some of its funding needs.

8.1.2 Funding Opportunities

Establishing Priority, phased implementation and procurement of elements of the ATMS system is dependant of the availability of potential funding sources from federal, state, local and private organizations for the design, implementation, operation and maintenance of said facilities. On August 10, 2005, the President signed into law the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). This multi-year (2005 through 2009) federal transportation legislation amended a number of provisions in Title 23, United States Code, and replaced the previous federal transportation act, TEA-21. SAFETEA-LU was under its ninth extension which was set to expire on June 30, 2012. In March of 2012 the United States Senate approved a transportation proposal called "Moving Ahead for Progress in the 21st Century (MAP-21) which would reauthorizes federal funds through September 30, 2013. MAP-

21 was proposed to reauthorize the Federal-aid highway program at the Congressional Budget Office's baseline level—equal to current funding levels plus inflation—for two fiscal years.

On July 6, 2012, President Obama signed into law P.L. 112-141, the Moving Ahead for Progress in the 21st Century Act (MAP-21). This provides for funding surface transportation programs at over $105 billion for fiscal years (FY) 2013 and 2014. MAP-21 is the first long-term highway authorization enacted since 2005. MAP-21 represents a milestone for the U.S. economy – it provides needed funds and, more importantly. It transforms the policy and programmatic framework for investments to guide the growth and development of the country's vital transportations infrastructure. MAP-21 consolidates the various programs under SAFETEA-LU into five core highway programs as seen below.



The consolidated Highway Program Structure includes:

- Five Core Highway Programs
  - National Highway Performance Program
  - Surface Transportation Program
  - Congestion Mitigation and Air Quality Program
  - Highway Safety Improvement Program
  - Metropolitan Planning Program
- Other Formula Funding Programs
  - Transportation Alternatives
  - Ferry Boats and Terminal Facilities

The new MAP-21 Policies utilize "Performance-based planning and programming measures to meet various national goals in the areas of:

- Safety
- Infrastructure Condition
- Congestion Reduction
- System Reliability
- Freight Movement and Economic Vitality
- Environmental Sustainability
- Reduced Project Delivery Delays

The performance measures are limited to pavement condition and performance of interstate and bridges on the National Highway System. These measures also address Highway Safety concerns particularly those of serious and fatal crash patterns. The Congestion Management and Air Quality (CMAQ) program focuses on traffic congestion and mobile source emissions; while the freight and transit performance measures address freight mobility and the state repair and safety of transit facilities.

The federal funding program under MAP-21 includes several programs which can serve as sources for the development and implementation of Intelligent Transportation Systems as stated above. Intelligent Transportation Systems programs are supported throughout the bill; however specific funding strategies are dependent on specific project requirements and prioritization of the portion allocated to the Florida Department of Transportation. **Table 17** reflects potential federal funding sources that can be utilized for specific elements of the ITS system. As indicated earlier MAP-21has more flexibilities in the use of funds, however FDOT has not established to date specific amounts it wished to reserve for ITS implementation.

Table 17: Florida Highway Funding Sources

PROGRAM	Millions of Dollars	
	FFY 2013	FFY 2014
National Highway Performance Program	$1,117	$1,126
Surface Transportation Program	$514	$518
Highway Safety Improvement Program	$123	$124
Congestion Mitigation and Air Quality Program	$14	$13
Metropolitan Planning Program	$20	$20
Transportation Alternatives	$49	$50
Total Apportionments	**$1,835**	**$1,851**

In all cases local funding matches are required which may extend from 20% to 50% of the cost of the proposed improvements. Other funding sources could include Transportation

Infrastructure Finance and Innovation Act (TIFIA), and the State Infrastructure Banks (SIBS). The last two programs (TIFIA and SIBS) consist of loan programs.

Transportation Infrastructure Financing and Innovation Act (TIFIA)

- Authorizes $750 million in 2013 and $1 billion in 2014
- Maximum share of project financing up from 33% to 49%
- Eliminates subjective eligibility criteria; simplified criteria should lead to more objective project selection
- Projects may be grouped to meet minimum thresholds
- Introduces "master credit agreement" concept
- Maximum amounts, general terms, conditions for future projects
- Locks in contingent commitment and improves project financial planning for projects secured by common security agreement

The previous SAFETEA-LU legislation had established a new State Infrastructure Bank (SIB) program which allows States to enter into cooperative agreements with the Secretary to establish infrastructure revolving funds eligible to be capitalized with Federal transportation funds authorized for corresponding fiscal years. This program gives States the capacity to increase the efficiency of their transportation investment and significantly leverage Federal resources by attracting non-Federal public and private investment.

In addition to federal funding ITS projects can also be funded through state agencies using state funds. In Florida transportation is funded through the "State Transportation Trust Fund". The sources for state funding of ITS elements include:

1. Appropriations passed by the state legislature.
2. Transportation Bond Funding.
3. Revenues generated by an ITS program. Under this scenario a section of state highway right-of-way would be leased for private use, such as the establishment of a communications corridor.
4. Transportation Regional Incentive Program (TRIP) funds created as part of the Growth Management Legislation enacted during the 2005 Legislative Session (SB 360). These funds may not exist under the new Growth Management act of 2011.

Other funding sources can include allocation of general funds from the respective agencies local government whether it consists of St. Lucie County, the City of Fort Pierce or the City of Port St. Lucie. In fact the City of Port St. Lucie has made significant investments in their current system over the years.

Potential local government funding sources that can be used to providing matching funds for state and federal programs are identified in the **"2012 Local Government Financial Information Handbook"** - October 2012 prepared by Florida Legislature's Office of Economic

and Demographic Research (EDR) with assistance provided by the Florida Department of Revenue's Office of Tax Research. This document references most of the revenue sources available to local governments. The estimates contained in this publication do not necessarily represent the actual disbursements that each local government will ultimately receive since economic conditions are subject to future change, but provide an approximate amount for the current fiscal year as identified below. The following funding sources are available for use:

Constitutional Fuel Tax (2 Cents) - Section 9(c), Article XII, Florida Constitution, Sections 206.41(1)(a), 206.45, 206.47, 336.023, and 336.024, Florida Statutes

Pursuant to constitutional authorization and statutory implementation, a state tax of 2 cents per gallon on motor fuel is levied. The first call on the tax proceeds is to meet the debt service requirements, if any, on local bond issues backed by the tax proceeds. The remaining balance, called the surplus funds, is also used, as necessary, to meet the debt service requirements on local bond issues backed by the surplus funds. Any remaining surplus funds are used for the acquisition, construction, and maintenance of roads.

Revenue Estimates for the Local Fiscal Year Ending September 30, 2013 are approximately $2,591,874 for St. Lucie County. The taxes credited to each county are first distributed to meet the debt service requirements, if any, of the Section 16, Art. IX, State Constitution of 1885, debt assumed or refunded by the State Board of Administration (SBA) payable from the tax. The remaining taxes credited to each county are surplus fuel tax funds which can be utilized for the acquisition, construction, and maintenance of roads. The term maintenance means periodic and routine maintenance, as defined in s. 334.03, F.S., and may include the construction and installation of traffic signals, sidewalks, bicycle paths, and landscaping. The funds may be used as matching funds for any federal, state, or private grant specifically related to these purposes.

County Fuel Tax (1 Cent) - Sections 206.41(1) and 206.60, Florida Statutes

The county fuel tax is levied on motor fuel at the rate of 1 cent per gallon. The proceeds are to be used by counties for transportation-related expenses, including the reduction of bonded indebtedness incurred for transportation purposes. It is the legislative intent that these proceeds be used for such purposes in order to reduce the burden of county ad valorem taxes. The proceeds are allocated to each county via the same distribution formula used for distributing the Constitutional Fuel Tax.

Revenue Estimates for the Local Fiscal Year Ending September 30, 2013 are approximately $1,133,587 for St. Lucie County. These tax revenues are to be used solely for the acquisition of rights-of-way; the construction, reconstruction, operation, maintenance, and repair of transportation facilities, roads, bridges, bicycle paths, and pedestrian pathways; or the reduction of bonded indebtedness incurred for road and bridge or other transportation purposes. In the event that the powers and duties related to transportation facilities, roads, bridges, bicycle

paths, and pedestrian pathways usually exercised by the county's governing body are performed by some other county board, that board shall receive the proceeds.

County Revenue Sharing Program - Sections 210.20(2), 212.20(6), and 218.20-.26, Florida Statutes

The Florida Revenue Sharing Act of 1972 was a major attempt by the Legislature to ensure a minimum level of revenue parity across units of local government. Provisions in the enacting legislation created the Revenue Sharing Trust Fund for Counties. Currently, the trust fund receives 2.9 percent of net cigarette tax collections and 2.044 percent of sales and use tax collections. An allocation formula serves as the basis for the distribution of these revenues to each county that meets the strict eligibility requirements. There are no use restrictions on these revenues other than some statutory limitations regarding funds that can be used as a pledge for indebtedness.

Revenue Estimates for the Local Fiscal Year Ending June 30, 2013 are approximately $ 3,502,018 for St. Lucie County.

Fuel Tax Refunds and Credits - Sections 206.41(4)(d)-(e), 206.625, and 206.874(4), Florida Statutes

Under separate authorizations, eligible counties, municipalities, and school districts may be entitled to refunds or credits on taxes paid on motor or diesel fuel. Generally, the refunded monies are to be used to fund the construction, reconstruction, and maintenance of roads. **There were no revenue estimates for these funds.**

Municipal Revenue Sharing Program - Sections 206.605(1), 206.879(1), 212.20(6), and 218.20-.26, Florida Statutes

The Florida Revenue Sharing Act of 1972 was a major attempt by the Legislature to ensure a minimum level of revenue parity across units of local government.1 Provisions in the enacting legislation created the Revenue Sharing Trust Fund for Municipalities. Currently, the trust fund receives 1.3409 percent of sales and use tax collections, 12.5 percent of the state alternative fuel user decal fee collections, and the net collections from the one-cent municipal fuel tax. An allocation formula serves as the basis for the distribution of these revenues to each municipality that meets strict eligibility requirements. Municipalities must use the funds derived from the one-cent municipal fuel tax for transportation-related expenditures. Additionally, there are statutory limitations on the use of the funds as a pledge for bonded indebtedness.

Revenue Estimates for the Local Fiscal Year Ending June 30, 2013 are approximately $1,154,613 for Fort Peirce and $3,255,586 for Port St. Lucie in St. Lucie County respectively.

Motor Fuel and Diesel Fuel Taxes - (Ninth-Cent and Local Option Fuel Taxes) - Sections 206.41(1)(d)-(e), 206.87(1)(b)-(c), 336.021, and 336.025, Florida Statutes

County governments are authorized to levy up to 12 cents of local option fuel taxes in the form of three separate levies. The first is a tax of 1 cent on every net gallon of motor and diesel fuel sold within a county. Known as the ninth-cent fuel tax, this tax may be authorized by an ordinance adopted by an extraordinary vote of the governing body or voter approval in a countywide referendum. Generally, the proceeds may be used to fund transportation expenditures. The second is a tax of 1 to 6 cents on every net gallon of motor and diesel fuel sold within a county. This tax may be authorized by an ordinance adopted by a majority vote of the governing body or voter approval in a countywide referendum. Generally, the proceeds may be used to fund transportation expenditures. The third tax is a 1 to 5 cents levy upon every net gallon of motor fuel sold within a county. Diesel fuel is not subject to this tax. This additional tax shall be levied by an ordinance adopted by a majority plus one vote of the membership of the governing body or voter approval in a countywide referendum. Proceeds received from this additional tax may be used for transportation expenditures needed to meet the requirements of the capital improvements element of an adopted local government comprehensive plan.

The Legislature has authorized the statewide equalization of local option tax rates on diesel fuel by requiring that the full 6 cents of the 1 to 6 cents fuel tax as well as the 1 cent ninth-cent fuel tax be levied on diesel fuel in every county even though the county government may not have imposed either tax on motor fuel or may not be levying the tax on motor fuel at the maximum rate.4 Consequently, 7 cents worth of local option tax revenue on diesel fuel are distributed to local governments, regardless of whether or not the county government is levying these two taxes on motor fuel at any rate.

Revenue Estimates for all portions under this program for the Local Fiscal Year Ending September 30, 2012 are approximately $ 13,978,593 for St. Lucie County.

The private sector is another potential source of funding for ITS projects. The concept of entering into a Private Public Partnership is becoming more prevalent as the availability of public funding becomes scarcer. Some agencies have been able to successfully lease the use of public right-of-way for private use in return for a fee or service. Private sector funding can be utilized to leverage federal / state funds through revenue sharing agreements where the public sector resources are enhanced by the private sector and sold. The proceeds from the sake of these enhanced resources would be the subject of a revenue sharing agreement. Private sector funds are also eligible for use as the state / public agencies match for federal funding in some cases.

Excerpts reflecting the above figures are included in Appendix I.

8.1.3 Operation & Maintenance:

As previously identified the development of an Arterial Traffic Management facility can be financed through the Florida Department of Transportation's Intelligent Transportation (ITS) Funds which are supported by federal funding through Surface Transportation Program funds. It is possible to obtain certain funding to support Operation & Maintenance needs; however these are typically associated with ITS start-up programs. Other funding sources would include local funding through county and city capital improvement programs.

8.2 CONCLUSION

A number of funding options and approaches have been provided in this section of the St. Lucie County Master Plan. It is recommended that FDOT, St. Lucie County, City of Port St. Lucie and the City of Ft. Pierce all work closely with the local Transportation Planning Organization (TPO) to further develop and finalize potential funding sources for the ST. Lucie County ATMS.

9 PERFORMANCE MEASURES

The purpose of performance measures is to establish a method to evaluate the communication network and the ATMS that may be installed in the future. This document identifies the possible performance measures and provides for the basis for the development of the materials required for a presentation workshop to be held in St. Lucie County. According to the National Cooperative Highway Research document **Performance Measures of Operational Effectiveness for Highway Segments and Systems,** *Synthesis of Highway Practice.* Program performance measurement, "is a process of assessing progress toward achieving predetermined goals, including information on the efficiency with which resources are transformed into goods and services (outputs), the quality of those outputs (how well they are delivered to clients and the extent to which clients are satisfied) and outcomes (the results of a program activity compared to its intended purpose), and the effectiveness of government operations in terms of their specific contributions to program objectives."

Performance measures demonstrate how well the transportation system is doing its job of meeting public goals and expectations of the transportation network. Some methods used to measure performance include tracking average speeds and crash rates. Many states and metropolitan areas monitor how close they are to achieving specific goals, such as accessibility to key regional population, employment, cultural, and recreational centers, the mobility of disadvantaged populations, levels of air quality, and the health of the economy, by using performance measures.

It is FRA's task to prepare and develop the performance measures for the aspect of transportation concerned with **mobility**. **Mobility** has been defined as the ease with which people and goods move throughout their community, state, and world. Mobility is valuable because it provides access to jobs, services and markets. Transportation's most essential function is to provide mobility for people and goods. By measuring the performance of mobility, we can better understand how the ATMS and the communication network affect the lives in the communities of St. Lucie County, the City of Fort Pierce, the City of Port St. Lucie and District 4 of the Florida Department of Transportation.

Many studies by the Federal Highway Administration and the Florida Department of Transportation regarding Performance Measures along with other transportation functions have been written. FRA to stay within the guidelines presented in these studies by both agencies prepared this document with all of the studies as this report's basis.

9.1 APPROACH TO ESTABLISHING MEASUREMENT CRITERIA

9.1.1 Florida State Criteria

With respect to Mobility there are two criteria methods to establish the performance measures. One criterion is the basis by which state responsible functions are used in the evaluation and the other is the areas that municipalities are responsible. However, regardless of the detail of the

measurements all transportation systems in the state of Florida should adhere to Florida's **mobility** performance measures described as follows:

- Quantity of travel - Reflects the magnitude of the use of a facility or service.
- Quality of travel - Describes travel conditions and the effects of congestion.
- Accessibility - Describes the ease with which people can connect to the multimodal transportation system.
- Utilization - Indicates whether or not a transportation system is properly sized and has the ability to accommodate growth.

The types of data and information to be collected and measured by FDOT are determined by a variety of sources, including the need to satisfy a legal mandate (law, rule, regulation, etc.) and to respond to internal and external customer requirements. In general, the decision on what is to be measured is made by the Executive Board with input from upper-level managers. Overall progress is monitored by the Department's five Key Performance Measures (KPMs). The five KPMs are:

1. Transportation System Safety
2. Customer and Market Focus
3. Production Performance
4. Transportation System Performance
5. Organizational Performance

The focus of this document is Transportation System Performance with special attention paid to the function of **Mobility**.

Some of the factors FDOT considers to determine mobility on state roads are listed in **Table 18** below:

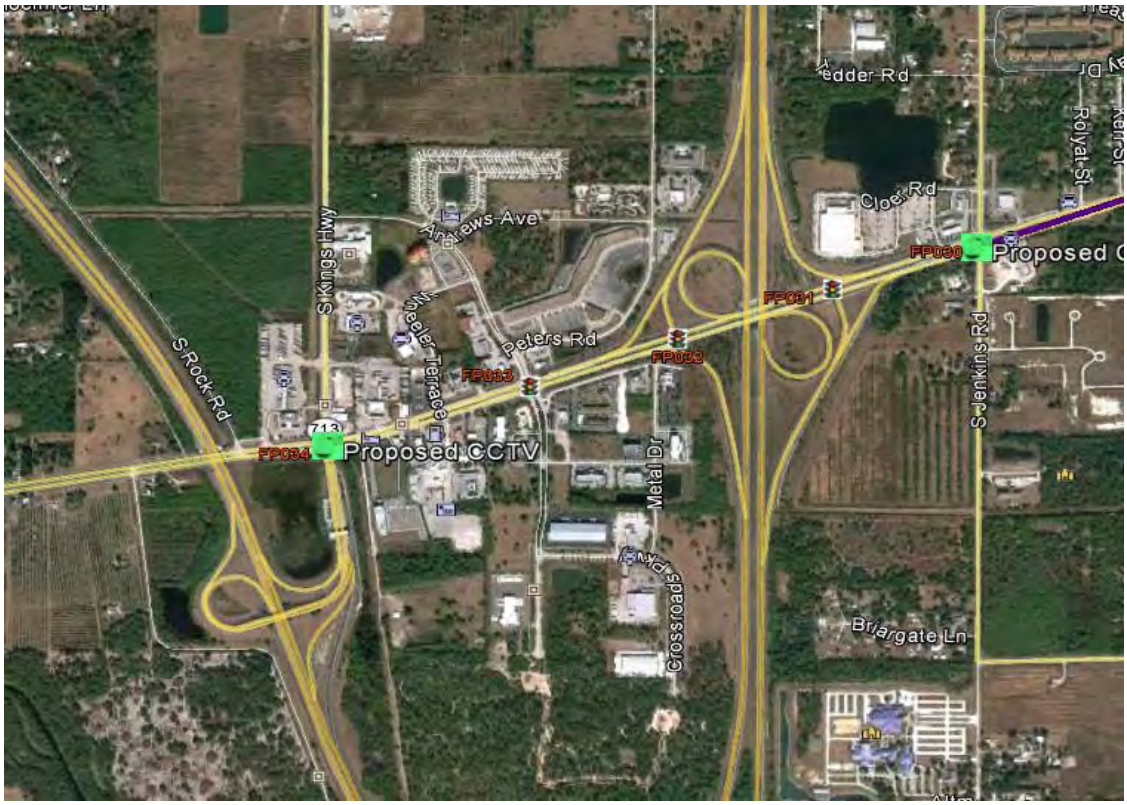
Table 18: Mobility Factors State Roads

HIGHWAY SEGMENT AND SYSTEM PERFORMANCE MEASURES	
Facility Type	Performance Measures
Basic freeway section	Density (passenger cars per hour per lane)
Weaving area	Density
Ramp junctions	Density
Freeway facilities	Average vehicle speed
Multilane highways	Density
Two-lane highways	Percent time delay
Signalized intersections	Average vehicle delay
Unsignalized intersections	Average vehicle delay
Arterials	Average vehicle speed

Due to the nature of this project our concentration with respect to FDOT is with regard to the **ramp** areas affected by the signal systems being deployed or already deployed in St. Lucie

County, the City of Fort Pierce and the City of Port St. Lucie. A special area of interest is along Okeechobee Road depicted in **Figure 16**. This area controls ingress and egress to both I-95 and the Florida Turnpike.

Figure 16: Ramps from Okeechobee Road



Other roads to I-95 are Orange Avenue, Midway Road, Prima Vista Blvd. Heading north another area of interest is along Orange Ave. where it provides access to I-95. As illustrated in **Table 18** the parameters affecting vehicle movement involving the ramps are: Density, Average Vehicle Speed, Percent Time Delay, Average Vehicle Delay, and Average Vehicle Speed.

The performance measures of concern for this project has to do with the affect vehicles have on the area's motoring public when entering the traffic flow from I-95 and the Turnpike onto the County and City streets. Also of interest is how quickly vehicles are able to get to the on ramps of both I-95 and the Turnpike through County and City streets.

According to the National Cooperative Highway Research Program:

- *Outcomes and outputs*—Performance measures should relate to outcomes describing cause-and-effect relationships that involve owners and users. Outcome measures relate to the quality of life, safety, environmental quality, and economic opportunities. Performance measures should also relate to output measures, which are indicators of the direct production of an organization, such as lane-miles constructed.

- *Mobility and accessibility*—Both mobility and accessibility should be considered. As part of this approach, the distribution of benefits to users and the potential to increase the demand for services should be studied.
- *Travel time as a key indicator*—A total trip travel time was recommended for use. It has the strongest fundamental link between user perception and the mobility provided.
- *Performance measures should be tied to project evaluation criteria*—Similar to the need to tie performance measures to the values, goals, and objectives of the users of the system, performance measures should relate to the criteria established in project evaluations.

Prior to the activation of the new ATMS data should be gathered on the present circumstance to help determine what improvements if any, should be made on vehicle throughput in the area. Once the new ATMS is implemented and the timing changes installed that are necessary for the desired improvements, data gathered from the Centracs system can be analyzed to verify the new goals are achieved. Data regarding the ramps should be available from the statistical data gathered by FDOT District 4.

To analyze the volume and speeds of vehicle movement in the area on the affected streets the system detector logs accumulated via the Aries Closed Loop system have to be reviewed to establish the parameters of interest. *Aries* provides a Log File Manager operation that can be accessed via a pull-down menu by which the following can be retrieved:

a. Event logs
b. Detector volume or occupancy reports
c. Detector volume or occupancy plots

9.1.2 County and City Criteria

Staying with the Mobility theme for our purpose we can describe mobility as the ability to satisfy the demand to move a person or good by the method selected by the person or the organization moving the good. Accessibility is an important factor when grading the performance measure of a system. Accessibility is measured by the ease persons via their own vehicle gets to and from his destination or by the ease of which a form of public transportation can be accessed and used to get to a destination. From the user perspective accessibility is:

- From a commuter's perspective, mobility is best described in terms of the time and expenses associated with the journey to work
- For transit users, the essential issues are the ability to reach a destination at the desired times with reasonable costs
- For the shipper, the essential issues are the time, money and reliability of delivery services

An ATMS configured and operated properly can have a positive effect on the mobility of the citizens and organizations operating in St. Lucie County.

The Florida DOT developed a framework for performance measurement designed to characterize mobility in a manner understandable to the general public and decision makers. The recommended mobility performance measures reflect mobility from the users' perspectives, based on the following:

- The quantity of the travel (number of persons served),
- The quality of travel (travelers' satisfaction with travel),
- The accessibility of travel (ability to reach the destination and mode choice), and
- The utilization of a facility or service (the quantity of operations with respect to capacity).

9.1.3 Performance Measures and Data Sources

The Florida Department of Transportation has compiled various parameters to help determine and evaluate performance measures. Many of the parameters established by the Department are relevant to major highway installations and ITS structures while some are neither available nor relevant to standard County and City usual traffic patterns and conditions. The Performance Measures listed in **Table 19** are from the table developed by FDOT and part of the NCHRP document.

Table 19: Performance Measure Criteria

Mobility Performance Measures	Data Requirements	Source
Quantity of Travel		
Person-miles traveled	Average annual daily traffic (AADT) Hourly K	Roadway characteristics inventory (RCI) Hourly k Estimated from telemetered traffic monitoring sites (TTMS) system raw data files grouped by LOS facility types
	Hourly volume	Hourly K * AADT
	Length	RCI
	Vehicle Occupancy	1990 National Transportation Survey county wide average journey to work
Truck miles traveled	AADT	RCI
	Hourly volume	Hourly K * AADT
	Length	RCI
	Percent trucks daily	RCI
	Percent trucks peak hour	Estimated TTMS system raw data files grouped by LOS facility types
Vehicle miles traveled	AADT	RCI
	Hourly volume	Hourly K * AADT
	Length	RCI
Person trips	Total person trips	Florida Standard (travel demand forecasting) Model output files
Quality of Travel		
Average speed	Average segment speed	Estimated using planning applications from 1994 Highway Capacity Manual adapted for Florida and extended for saturated conditions
	Person miles traveled	See above
Delay	Average segment speed	See above
	Free flow speed	Estimated using posted speed limits in RCI
Average travel time	Distance	RCI
	Speed	See above
Average trip time	Door to door trip travel time	Florida Standard (travel demand forecasting) Model output files
Reliability	Median travel times	Six week field studies
	Travel time distribution	Six week field studies
Maneuverability	Hourly volume	Hourly K * AADT
	Length	RCI
Accessibility		
Connectivity to intermodal facilities	Intermodal facilities of significance	Public transportation Office
	Intermodal connectors	Public transportation Office

Table 19: Performance Measure Criteria

Mobility Performance Measures	Data Requirements	Source
Dwelling unit proximity	System location Dwelling units	State highway system base map Statewide transportation planning from the 1990 Census
Employment proximity	System Location Employment Location	State highway system base map Statewide transportation planning from the 1990 Census
Industrial/warehouse facility proximity	System location Industrial warehouse facility location	Statewide transportation planning package from the 1990 Census
Percent miles bicycle accommodations	Miles of roadway with bicycle accommodations Total system miles	Florida DOT bicycle coordinator RCI
Utilization Percent system heavily congested	 Hourly volume Segments operating at LOS E or F Segment length System miles	 Hourly K * AADT Use of generalized LOS tables RCI RCI
Percent travel heavily congested	Hour volume Segments operating at LOS E or F Segment volume x length System VMT	Hourly k × AADT Use of generalized LOS tables See above See above
Vehicles per lane-mile	AADT Length Lane miles	RCI RCI RCI
Duration of Congestion	Hourly volume Hours of the day that segments operate at LOS E or F Lane miles	Hourly K * AADT Use of generalized LOS tables RCI (lanes) * RCI (length)

Notes: k = the ratio of volume in the analysis hour to AADT; VMT = vehicle-miles traveled.
RCI – Roadway Characteristics Inventory

For some parameters the basis of the data shown in the table are based on the Census of 1990. There is data available for parameters based on the 2010 Census. The 1990 Census is presented because it is part of the published Table data.

9.2 BEFORE AND AFTER PERFORMANCE MEASURE PARAMETERS

In order to establish the merits of a new ATMS and communication network it is necessary to perform ***Before*** and ***After*** studies on vehicle movements. The first step is to establish the current conditions using the performance measure criteria to be used on this project. According to the Florida Department of Transportation 2010 FIHS Roads on the Florida Intrastate Highway System in District 4 there are 568.4 Center line Miles, 2,895.2 Lane Miles and 33,702.6 Daily Vehicle Miles Traveled in Thousands.

Table 20: District 4 Miles and Miles Traveled 2010

County	Centerline Miles	Lane Miles	Daily Vehicle Miles Traveled, Thousands
Broward	168.8	1,006.7	15,617.4
Indian River	52.0	208.1	1104.9
Martin	68.4	277.9	2,369.5
Palm Beach	195.5	1,056.1	12,017.5
St. Lucie	83.6	346.4	2,593.4
District 4 Totals	**568.4**	**2,895.2**	**33,702.6**

This report includes data for roads in the Roadway Characteristics Inventory that are on the State Highway System and also are on the Florida Intrastate Highway System. Only Active roads are included. Proposed roads (status Pending) and ramps and frontage roads (status Active-Exclusive) are not included, even if they are classified as Belonging to the FIHS.

Table 21: Public Road Mileage & Miles Traveled

Centerline Miles				
St. Lucie County	**Rural**	**Small Urbanized**	**Large Urbanized**	**Totals**
Interstate	0	0	27.259	27.259
Turnpike & Freeways	14.512	0	20.447	34.959
Other Principle Arterial	19.778	14.208	29.586	112.409
Minor Arterials	14.208	5.145	144.470	163.823
Urban Major Collectors	29.586	6.813	131.144	167.543
Rural Minor Collectors	3.659	0	0	3.659
Locals	73.522	79.803	1,065.943	1,219.268
County Total	**155.265**	**95.545**	**1,478.110**	**1,728.920**

Table 22: Daily Vehicle Miles Traveled

St. Lucie County	Rural	Small Urbanized	Large Urbanized	Totals
Interstate	0	0	1,397,092	1,397,092
Turnpike & Freeways	391,780	0	666,130	1,057,911
Other Principle Arterial	106,786	39,710	1,968,594	2,115,090
Minor Arterials	44,271	26,025	1,029,470	1,099,766
Urban Major Collectors	26,609	41,688	607,049	675,347
Rural Minor Collectors	2,431	0	0	2,431
Locals	50,289	84,990	1,940,016	2,075,296

Table 22: Daily Vehicle Miles Traveled

St. Lucie County	Rural	Small Urbanized	Large Urbanized	Totals
County Total	622,166	192,414	7,608,351	8,422,931

Table 23: 2011 County & City Mileage Data Sept. 2010

City Roads			
City	**Paved**	**Unpaved**	**Total**
Fort Pierce	132.8	3.3	136.1
Port St. Lucie	887.4	0.0	887.4
St. Lucie Village	3.3	0.5	3.7
Total	**1,023.5**	**3.7**	**1,027.2**

9.2.1 Establishing Mobility Benefit Parameters

9.2.1.1 Before Study

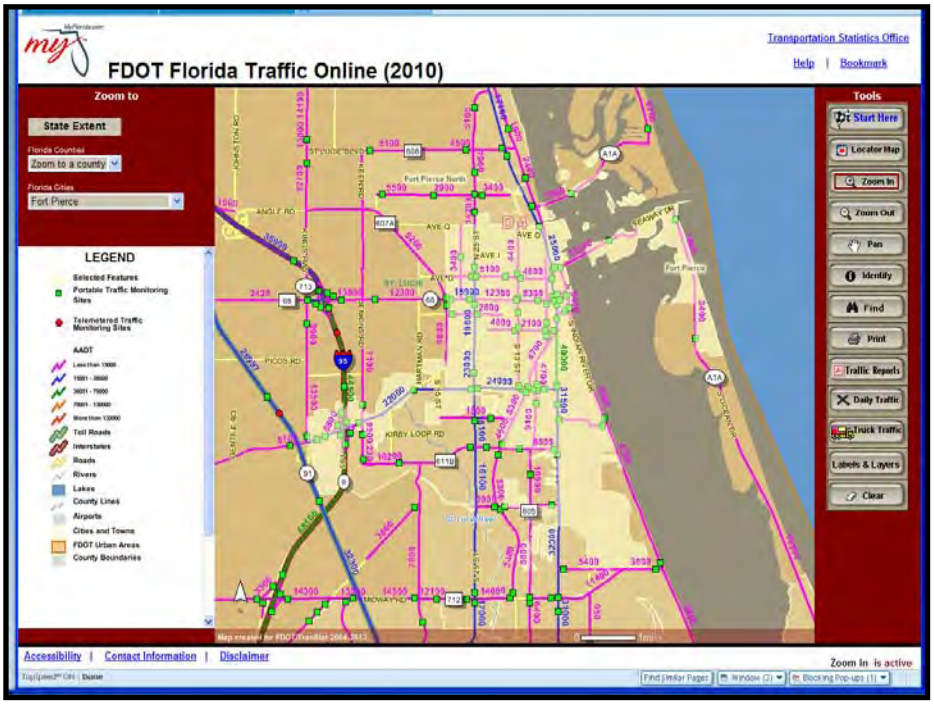
In order to establish the Mobility benefits of the ATMS and fiber optic communication network in St. Lucie County, the City of Fort Pierce, and the effect if any on the existing ATMS in Port St. Lucie the parameters of vehicle movement must be established prior to the activation of the new ATMS to provide the basis for the evaluation. Using the data illustrated in the above tables plus additional statistical data relevant to specific intersections such as: speed, volume, and occupancy the additional steps to be considered for the present conditions in the area for the establishment of the **Before** Study are as follows:

1) Investigate what historical statistical databases are available from FDOT and County and City traffic engineering departments.
2) Contact County and City traffic engineering group regarding recent traffic studies that may have been performed.
3) Check for status of detector reports if any, which may be available from the Aries Closed Loop System in order to establish some base parameters (Speed, Volume and Occupancy).
4) Gather all necessary data and prepare present status report.
5) If a report cannot be generated due to the lack of necessary statistical data it will be necessary to perform an AM, PM and Off Peak travel study on a selected weekday(s) approved by the Department, St. Lucie County and the City of Fort Pierce. As mentioned previously this *Before Study* will be conducted prior to implementation of the new system components. Additionally, the Before *Study* will be conducted prior to activating the new ATMS. Also, the *Before Study* will be completed based on the timing presently used at the intersections.

6) Working with each of the involved agencies select the corridors for which the evaluation study is to be done.
7) Workings with each of the agencies determine the number of days on which the study is to be conducted.

8) Prepare the **Before Study** report.

Figure 17: FDOT Online City of Ft. Pierce AADT

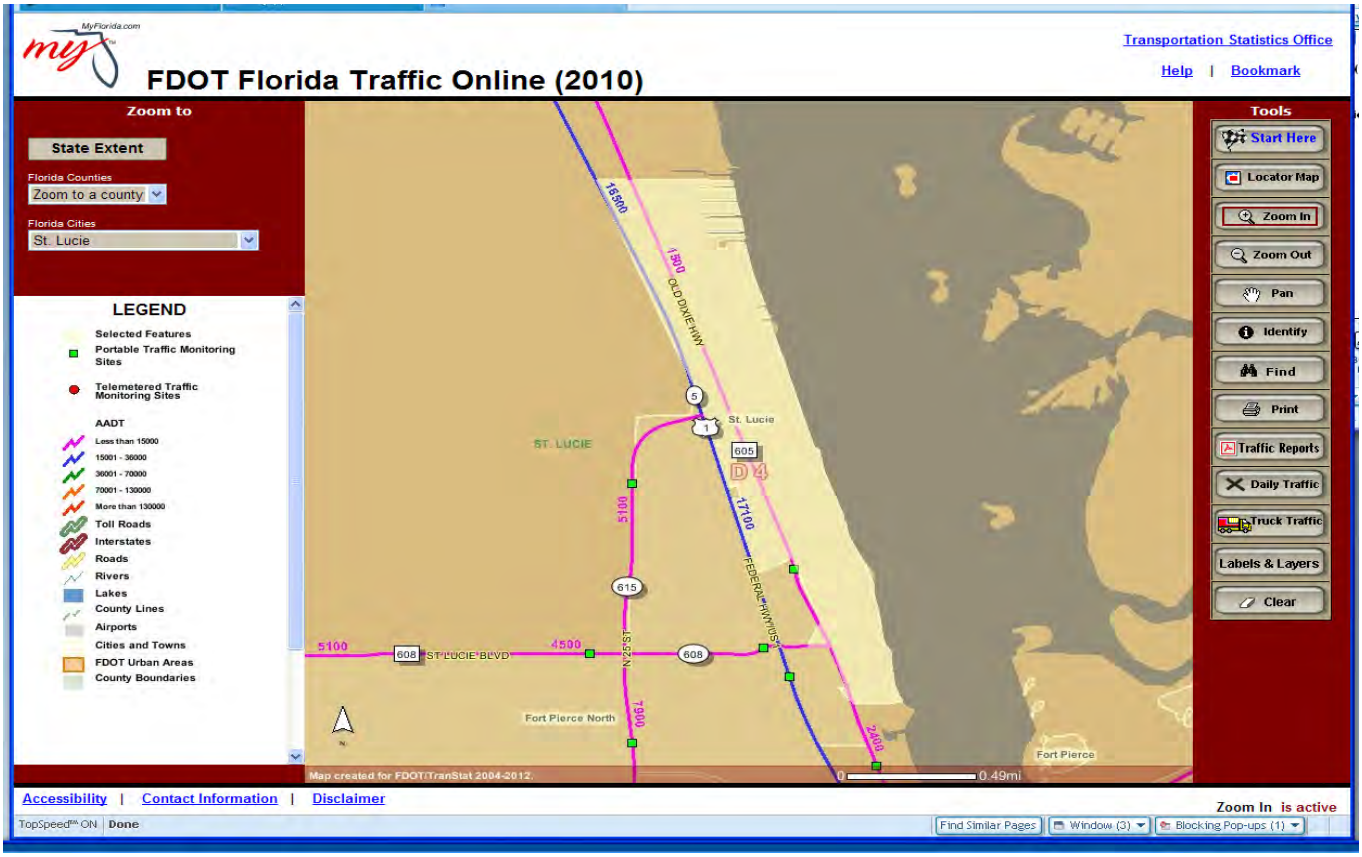


Performing the AM, PM, Peak study would yield as a minimum the type of data portrayed in **Table 24**. The speed parameter is not provided.

Table 24: Sample AM, PM Data

Corridor 1	
COUNTED BY: Anonymous	COUNTED BY: Anonymous
7:00:00 AM - 8:00:00 AM Lane 1	4:01:00 PM - 5:00:00 PM Lane 1
Total Vehicle Count: 40	Total Vehicle Count: 30
Delayed Vehicle Count: 40	Delayed Vehicle Count: 30
Through Vehicle Count: 0	Through Vehicle Count: 0
Average Stopped Time: 40.10	Average Stopped Time: 37.67
Maximum Stopped Time: 129	Maximum Stopped Time: 97
Minimum Seconds: for Delay: 0	Minimum Seconds: for Delay: 0
Average Queue: 0.45	Average Queue: 0.32
Queue Density: 1.52	Queue Density: 1.18
Maximum Queue: 5	Maximum Queue: 2
WB Left	WB Left

Figure 18: FDOT Online St. Lucie AADT



Both of the studies will be used to establish the relevant data listed in **Table 19** above. The studies will provide data on density (passenger cars per hour per lane), density, average vehicle speed, percent time delay, average vehicle delay and average vehicle speed.

Figure 19: St. Lucie County 2009 Online Counts

St Lucie County

Spring 2009 Traffic Counts

Count Station #	Roadway Name	Location	Count Date	ADT	AM Pk Hr Volume	AM Pk Hr Time	PM Pk Hr Volume	PM Pk Hr Time
0165	13TH ST.	NORTH OF AVE. D	02/24/09	4,677	369	8:00am	408	2:15pm
0523	13TH ST.	NORTH OF DELAWARE AVE.	03/03/09	5,989	425	8:15am	527	4:15pm
0525	13TH ST.	NORTH OF GEORGIA AVE.	03/03/09	6,626	445	8:15am	563	4:45pm
0521	13TH ST.	NORTH OF ORANGE AVE.	02/18/09	5,176	369	8:15am	468	4:45pm
0527	13TH ST.	NORTH OF VIRGINIA AVE.	03/03/09	7,502	486	9:00am	698	4:15pm
0159	25TH ST.	SOUTH OF EDWARDS RD	03/10/09	18,168	1,616	7:30am	1,584	4:45pm
0172	25TH ST.	SOUTH OF MIDWAY RD.	03/10/09	18,096	1,747	7:30am	1,672	4:45pm
0529	25TH ST.	SOUTH OF VIRGINIA AVE.	03/03/09	25,550	2,357	7:30am	2,249	4:30pm
0517	7TH ST.	SOUTH OF DELAWARE AVE.	03/03/09	2,596	199	10:00am	305	4:15pm
0519	7TH ST.	SOUTH OF GEORGIA AVE.	03/03/09	1,097	91	10:00am	155	4:45pm

9.2.1.2 After Study

Once the new ATMS is in place a similar study using the same corridors will be completed. Since the same timing plans will be used any noticeable improvements will come from the better timing synchronization between intersections due to the ATMS and constant communication to each of the intersections under ATMS control.

9.3 BEFORE-AND-AFTER PERFORMANCE OF TSM&O FUNCTIONS

9.3.1 Arterial Management Supported ATMS

The arterial management function deals with the transportation functions of moving people, vehicles and goods through non-highway areas. This system is used to manage traffic by employing various detection and control devices along arterial roadways.

Traffic Signal Operations and Maintenance can be evaluated by a before-and-after study approach using quantitative data such as, field surveys and automated TMC database. Quantitative data consist of travel time runs (travel time, frequency of stops, space mean speed, and overall delay), traffic flow rate, detector occupancy, cycle length, degree of saturation, and phase duration. The proposed Bluetooth technology travel time system to be deployed can provide these functions.

Traffic Adaptive signal control can also be evaluated using a before-and-after study approach using traffic data, surveys, logs and interviews. Various measures of effectiveness such as, volume per link, average travel time, average delay and number of stops per link can be used in comparing the adaptive signal control system to the original signal control system.

9.3.2 Regional Signal Coordination Supported ATMS

To quantify the benefits of the regional signal coordination, a before-and-after data analysis should be conducted along the coordinated arterials. The travel time on the coordinated arterial, the stopped delay on key approaches and crash rates should be selected as performance measures in evaluating the regional signal coordination. This before-and-after study will consist of the following major components:

- Collecting traffic data such as, traffic volume counts, travel time studies, intersection average delay studies, and crash history before-and-after implementing the regional signal coordination.
- Conducting a roadway and signal system inventory and evaluating the existing quality of traffic flow.
-

9.3.3 Road Weather Information System Supported By ITS

Road weather information system supported by ITS can be used for both road condition forecasting and weather forecasting. A study conducted by Federal Highway Administration (FHWA) "*Final Evaluation Report: Evaluation of the Idaho Transportation Department (ITD)*

Integrated Road Weather Information System" employed a before-and-after study approach. The study collected the pre-deployment data and analyzed for a period of 2 years. The post-deployment data was collected one year after the installation of road weather information systems in order to allow ITD maintenance personnel to be trained and to gain experiences with the integrated system.

This evaluation process with the before-and-after approach will consist of the following major components:

Interviews with TMC maintenance personnel and other personnel associated with the project.

Improvement in the crash rates at locations associated with the project.

Interviews with commercial vehicle operators

9.3.4 Traveler Information ITS Support

Providing traveler information to public using ITS support involves collecting traffic information using various ITS technologies, and posting traffic reports onto the 511 Traveler Information System and Dynamic Message Signs (DMS) to help drivers learn about upcoming traffic delays, alternate route information and travel times.

The traveler information through ITS support can be evaluated through field studies and surveys. A study conducted by *Rutherford. S, Assessing the Benefits of Traveler and Transportation Information Systems* provides the following procedures:

- Identify the travel times of two or more vehicles that travel between the same origin destination (O-D) pair at the same time, each vehicle with a different level or type of information (including none). The time it takes these vehicles to travel between each O-D pair can be evaluated to determine whether the vehicle with traveler information had a shorter travel time than the other driver(s).
- Surveys can be conducted that involve polling the public about a particular technology, including whether they know it exists, what they perceive it does for them, and how much they do or would be willing to pay for a certain technology.

9.3.5 Work Zone & Traffic Incident Management Support

Work Zone and Traffic Incident Management ITS Support can be evaluated through surveys of public perception, and through the measurement of impacts on crash frequency and incident response and clearance times.

Based on Federal Highway Administration document on "Common Measures and Metrics for Work Zone ITS Evaluations", the before-and-after study approach will require the following analysis along the study corridors:

Traffic queue analysis can be conducted by analyzing traffic data from system detectors along the work zone. The queue analysis should be conducted using detector spacing for time periods where speeds drop below 30 miles per hour.

Traffic volumes, travel times and crash rates can be analyzed for days with and without ITS support that experienced similar impacts from construction or incidents.

9.4 PERFORMANCE MEASURES WORKSHOP

Using data included in this document in addition to meetings with County and City agencies a presentation will be prepared to identify performance measures and finalize these measures in a workshop setting.

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Appendix A

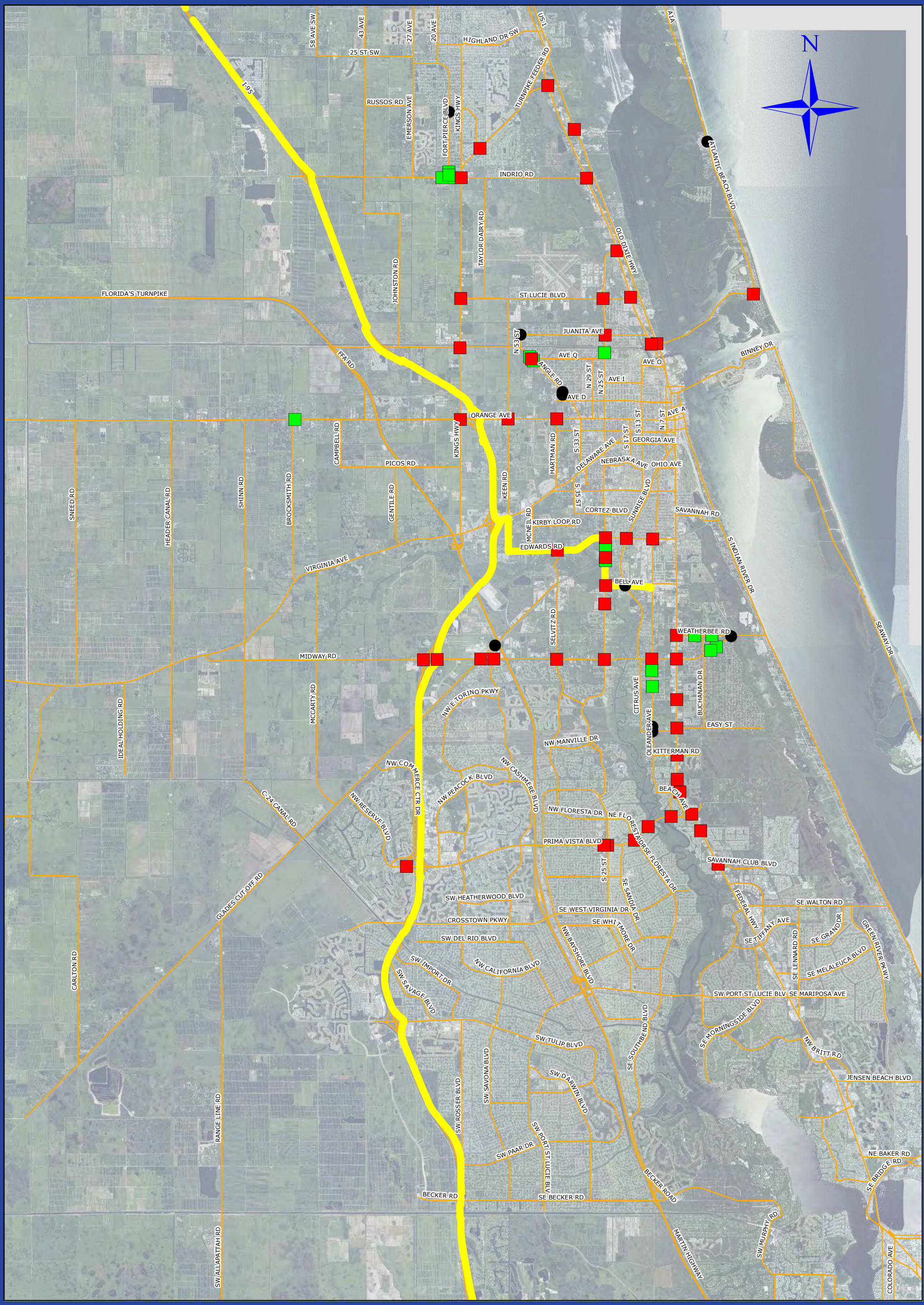
St. Lucie County Traffic Signals

Signal ID	Year Built	Category	Pre - emption	Location	On State Sys	Cabinet Type	Cabinet Size	Mfg Of Signal	Cab Loc	Intersection Type	Five Sect	Five Sect_1	Four Sect	Four Sect_1	Three Sect	Three Sec_1	Ped Sig	Ped Count down	Num Lum	Num Illum St	Num Static S
SLC001		School		S 25th St & Forest Grve Sch N	No																
SLC002		School		S 25th St & Forest Grve Sch S	No																
SLC003	2009	Signal	No	Midway Rd & US Highway 1	Yes	Econolite TS2-1	Type 6	ATS	NE	Mastarm	4	4			14	6	8	8	0	4	0
SLC004		Signal	No	Midway Rd & Oleander Ave	No	Econolite TS2-2	Type 6	Eagle,McCain	NE	Span Wire	2	2			2	2	8	0	4	0	4
SLC005		Signal	No	Oleander Ave & Edwards Rd	No	Econolite TS2-1	Type 6	Old Econolite	NW	Span Wire	2	2			2	2	4		2		4
SLC006		Signal	No	Sunrise Blvd & Edwards Rd	No	Econolite TS2-1	Type 6	LFE	NW	Span Wire	2	2			2	2	8		1		4
SLC007		Signal	No	S 25th St & Edwards Rd	Yes	Econolite TS2-1	Type 6	Eagle/Old E	SE	Mastarm	4	2			3	2		8	1	4	
SLC008		School		Indrio Rd & LWP Sch	No																
SLC009		School		Indrio Rd & LWP Sch	No																
SLC010		Signal	No	Winter Garden Pkwy & Kings Hwy	Yes	Econolite TS2-1	Type 6	Econolite	NE	Mastarm	1	2			2	3	8		2	4	
SLC011		Signal	No	Orange Ave & Kings Hwy	Yes	Econolite TS2-1	Type 6	Econolite	SE	Mastarm	2	2			2	2	2			4	
SLC012		Signal	No	Angle Rd & Kings Hwy	Yes	Econolite TS2-2	Type 6	Eagle	NW	Mastarm	0	0	2	0	2	4	8		1	4	
SLC013		Signal	No	St Lucie Blvd & Kings Hwy	Yes	Econolite TS2-2	Type 6	Eagle	SW	Mastarm	1				6	4	0		1	2	
SLC014		Signal	No	St Lucie Blvd & US Highway 1	Yes	Econolite TS2-1	Type 6	Econolite/Eagle	SE	Mastarm					6	4		6			4
SLC015		Signal	No	Indrio Rd & Kings Hwy	Yes	Econolite TS2-1	Type 6	Econolite/Eagle	SW	Mastarm	4				2	2		8	1		4
SLC016		Signal	No	Indrio Rd & US Highway 1	Yes	Econolite TS2-1	Type 6	Old Econolite	NE	Mastarm	2				2	4	6		2	4	
SLC017		Signal	No	Kings Hwy & US Highway 1	Yes	Econolite TS2-1	Type 6	CH	NE	Mastarm	0	0			4	2	2	0	2	3	0
SLC018		Signal	No	A1A & Atlantic Beach Blvd	Yes	Econolite TS2-1	Type 6	Eagle	NE	Mastarm					4	4		8	4	8	
SLC019		Signal	Yes	Old Dixie Hwy & A1A	Yes	Econolite TS2-1	Type 6	Econolite	NW	Mastarm	4					4	8			4	
SLC020		Signal	No	A1A & US Highway 1	Yes	Econolite TS2-1	Type 6	Econolite	NE	Mastarm	2				2	6		6		4	
SLC021		Signal	No	St Lucie Blvd & N 25th St	Yes	Econolite TS2-1	Type 6	WM	SE	Mastarm		2			6	2	8				4
SLC022		Signal	No	Midway Rd & S 25th St	Yes	Econolite TS2-1	Type 6	WM	SW	Mastarm	4	2			4	2	8	0	4	4	0
SLC023		Flasher		N 39th St & Metzger Rd	No																
SLC024		School		Orange Av & Cyclone Dr- Bap Ch	No																
SLC025		Flasher		N A1A & Brynmar Access Rd	No																
SLC026		Signal	No	Old Dixie Hwy & Harbor Branch	No	Transyt TS2-2	Type 4	Eagle	SW	Span Wire	2				2	4	2				3
SLC027		Signal	No	Hartman Rd & Orange Ave	Yes	Econolite TS2-1	Type 6	4 Old E/2 ICC	SW	Mastarm	2				2	2	4			3	
SLC028		Flasher		Glades Cut Off Rd & Landfill	No																
SLC029		Flasher		Sunrise Blvd & Bell Ave	No																
SLC030		School		Angle Rd & N 50th St -N	No																
SLC031		School		Angle Rd & Westwood High Sch	No																
SLC032		Signal	No	US Hwy 1 & N 25th St	Yes	Econolite TS2-1	Type 6	WM	SW	Mastarm					6	3	4				3
SLC033		Signal	No	S 25th St & Ft Pierce Central	No	Econolite TS2-1	Type 6	WM	SW	Mastarm	1	0			5	2	2	4	0	0	3
SLC034	2009	Signal	No	Rio Mar Dr & US Highway 1	Yes	Econolite TS2-1	Type 6	WM	NE	Mastarm	2	0			6	4	8	8	1	0	4
SLC035		Signal	No	US Highway 1 & Spanish Lakes	Yes	Econolite TS2-1	Type 6	McCain	SE	Mastarm	2				6	7		8			4
SLC036		Signal	No	US Highway 1 & Savanna Club	Yes	Econolite TS2-1	Type 6	McCain	SE	Mastarm	2	2			6	6		8			6
SLC037		School		Ft Pierce Blvd & LWP Sch - N	No																
SLC038		Signal	Yes	Midway Rd & Glades Cut Off Rd	No	Econolite TS2-1	Type 6	ICC	NW	Mastarm	2	0			2	14	4		5	4	
SLC039		Flasher		Midway Rd & Weatherbee Rd	No																
SLC040		Signal	No	Midway Rd & Selvitz Rd	No	Econolite TS2-1	Type 6	5 Eagle 2 Old E	SE	Span Wire	2				2	2	No		1		4
SLC041		Signal	No	N 25th St & Juanita Ave	Yes	Econolite TS2-1	Type 6	WM	SE	Mastarm	2				6	2	8				4
SLC042	2009	Signal	No	US Highway 1 & Easy St	Yes	Econolite TS2-1	Type 6	WM	NE	Mastarm	2	0			8	4	6	6	2	4	0
SLC043		Flasher		Angle Rd & 39th St	No																
SLC044		School		Oleander Ave & White City Sch	No																

Signal ID	Year Built	Category	Pre - emption	Location	On State Sys	Cabinet Type	Cabinet Size	Mfg Of Signal	Cab Loc	Intersection Type	Five Sect	Five Sect_1	Four Sect	Four Sect_1	Three Sect	Three Sec_1	Ped Sig	Ped Count down	Num Lum	Num Illum St	Num Static S
SLC045		Signal	No	I-95 & Midway Rd SB Exit	Yes	Econolite TS2-1	Type 6	McCain		Mastarm		1				5			2	1	
SLC046		School		N 25th St & Avenue S	No																
SLC047		Signal	No	Edwards Rd & Selvitz Rd	No	Econolite TS2-1	Type 6	Eagle	N	Mastarm		1			2	3	No		1		3
SLC048		Signal		US Highway 1 & Kitterman Rd	Yes	Econolite TS2-1	Type 6	ATS	NE	Mastarm	2	0			8	4	8	8	0	4	0
SLC049	2009	Signal	No	Angle Rd & Avenue Q	No	Econolite TS2-1	Type 6	McCain	SW	Mastarm	0	0	0	0	8	4		4			
SLC050		Signal	No	Wetherbee Rd & US Highway 1	Yes	Econolite	Type 6	Old Econolite	SE	Span Wire	2	2			2	2	8				4
SLC051		Flasher		Juanita Ave & N 53rd St	No																
SLC052		School		Ft Pierce Blvd & LWP Sch - S	No																
SLC053		Signal	No	Torino Pkwy & Midway Rd	No	Econolite TS2-1	Type 6	Old Econolite	NW	Mastarm	2	2			2	2			2	4	
SLC054		School		Oleander Ave & White City Sch	No																
SLC055		Flasher		Ft Pierce Blvd & Holopaw Ave	No																
SLC056		Signal	No	Jenkins Rd & Orange Ave	Yes	Econolite TS2-1	Type 6	Econolite	NW	Mastarm	2	2			2	2	8			4	
SLC057		Signal		I-95 & Midway Rd NB Exit	Yes	Econolite TS2-1	Type 6	Old Econolite	NW	Mastarm		1			2	3	0	0	0	2	0
SLC059		Flasher		Oleander Ave & Coral Ave	No																
SLC060		Flasher		Oleander Ave & Seager Ave	No																
SLC061		School		Midway Rd & Weatherbee Sch - E	No																
SLC062		School		Midway Rd & Weatherbee Sch - W	No																
SLC063		School		Weatherbee Rd & WeatherbeeSchE	No																
SLC064		School		Weatherbee Rd & WeatherbeeSchW	No																
SLC065	2008	Signal	No	S 25th St & Forest Grove	No	Econolite TS2-1	Type 6	McCain	NE	Mastarm	2	0			4	2	4	0	0	3	0
SLC066	2008	Signal	No	S 25th St & Bell Ave	No	Econolite TS2-1	Type 6	McCain	SW	Mastarm	0	0			4	2	4	4	0	3	0
SLC067	2009	Signal	No	US Highway 1 & Lake Vista Trl	Yes	Econolite TS2-1	Type 6	McCain	NE	Mastarm	2	0			8	4	6	6	3	0	4
SLC068	2009	Signal	No	US Highway 1 & Ulrich Rd	Yes	Econolite TS2-1	Type 6	McCain	NE	Mastarm	0				8	2	6	2	2	0	3
SLC103		Signal	No	Prima Vista Blvd & US Hwy 1	Yes	Econolite TS2-1	Type 6	WM	SW	Mastarm	1	2			7	6		8			4
SLC113		Signal	No	Rio Mar Dr & Prima Vista Blvd	No	Econolite TS2-2	Type 6	Eagle	NE	Span Wire	2	1			3	2	8		4		4
SLC114		Signal	No	Naranja Dr & Prima Vista Blvd	No	Econolite TS2-2	Type 5	Eagle	NE	Span Wire	2	2			2	2	8		1		4
SLC115		Signal	No	Floresta Blvd & Prima Vista	No	Econolite TS2-1	Type 6	Eagle	NE	Span Wire	2	2			2	2	8		3		4
SLC116		Signal	Yes	Prima Vista Blvd & Airoso Blvd	No	Econolite TS2-1	Type 6	Eagle	NE	Span Wire	2	2			2	2	8		3		4
SLC117		Signal	No	Prima Vista Blvd & Fire Sta	Yes	Runs w/ SLC116									4	4					
SLCtemp		Signal	No	I-95 SB ramp & SLW Blvd	Yes												0	0			0

Appendix B

GIS Maps



Legend

Traffic Signals

- Flasher
- School
- Signal

Base Map

Fiber Conduit

0 0.5 1 2 Miles

St. Lucie County Atms Master Plan

FINAL DRAFT

Indian River County

Martin County

Atlantic Ocean

N

I-95

FLORIDA'S TURNPIKE

SLC055 SLC017 SLC025 SLC037 SLC010 SLC026 SLC052 SLC016 SLC009 SLC008 SLC015 SLC032 SLC013 SLC021 SLC014 SLC018 SLC012 SLC051 SLC041 SLC046 SLC030 SLC019 SLC020 SLC049 SLC031 SLC043 SLC024 SLC011 SLC056 SLC023 SLC027 SLC007 SLC001 SLC006 SLC005 SLC047 SLC065 SLC002 SLC029 SLC063 SLC066 SLC064 SLC039 SLC033 SLC050 SLC028 SLC040 SLC022 SLC004 SLC061 SLC045 SLC057 SLC038 SLC053 SLC044 SLC003 SLC062 SLC068 SLC042 SLC059 SLC060 SLC048 SLC067 SLC034 SLC113 SLC103 SLC035 SLCtemp SLC114 SLC117 SLC116 SLC115 SLC036

HIGHLAND DR SW
25 ST SW
FORT PIERCE BLVD
RUSSOS RD
INDRIO RD
ANGLE RD
AVE Q
AVE I
AVE D
ORANGE AVE
PICOS RD
VIRGINIA AVE
MIDWAY RD
ST LUCIE BLVD
EASY ST
GEORGIA AVE
NW MANVILLE DR
NW FLORESTA DR
PRIMA VISTA BLVD
SW HEATHERWOOD BLVD
CROSSTOWN PKWY
SW DEL RIO BLVD
SW TULIP BLVD
SW PAAR DR
BECKER RD
SE BECKER RD
SE WALTON RD
SW PORT ST LUCIE BLV
SE MARIPOSA AVE
NE BAKER RD
JENSEN BEACH BLVD
NW BRITT RD
SE MORNINGSIDE BLVD
SW MURPHY RD
COLORADO AVE

58 AVE SW
43 AVE
27 AVE
20 AVE
US 1
A1A
TURNPIKE FEEDER RD
EMERSON AVE
ATLANTIC BEACH BLVD
OLD DIXIE HWY
JOHNSTON RD
TAYLOR DAIRY RD
FFA RD
BINNEY DR
CAMPBELL RD
KINGS HWY
KEEN RD
S 33 ST
S 31 ST
N 25 ST
S 17 ST
S 13 ST
N 7 ST
AVE A
SUNRISE BLVD
S INDIAN RIVER DR
SEAWAY DR
SNEED RD
HEADER CANAL RD
SHINN RD
BROCKSMITH RD
GENTILE RD
SELVITZ RD
MCCARTY RD
IDEAL HOLDING RD
C-24 CANAL RD
NW E TORINO PKWY
NW COMMERCE CTR DR
NW PEACOCK BLVD
NW CASHMERE BLVD
NW RESERVE BLVD
OLEANDER AVE
S 25 ST
SE SANDIA DR
NW CALIFORNIA BLVD
NW BAYSHORE BLVD
SE FLORESTA DR
SE WHITMORE DR
FEDERAL HWY
SE LENNARD RD
SE GRAND DR
SE MELALEUCA BLVD
GREEN RIVER PKWY
SW IMPORT DR
SW SAVAGE BLVD
SW ROSSER BLVD
SW SAVONA BLVD
SW DARWIN BLVD
SW PORT ST LUCIE BLV
SE SOUTHBEND BLVD
BECKER ROAD
MARTIN HIGHWAY
SW ALLAPATT

Legend

Traffic Signals

- Flasher
- School
- Signal

Base Map

Fiber Conduit

0 0.5 1 2 Miles

St. Lucie County

FIGURE 1: ST. LUCIE TRAFFIC SIGNAL SYSTEM

FINAL DRAFT

Indian River County

Atlantic Ocean

St. Lucie County
North East

Matrin County

SLC055
SLC017
SLC025
SLC026
SLC037
SLC010
SLC016
SLC052
SLC009
SLC008
SLC015
SLC032
SLC013
SLC021
SLC014
SLC018
SLC051
SLC012
SLC041
SLC046
SLC030
SLC019
SLC020
SLC049
SLC031
SLC043
SLC024
SLC011
SLC056
SLC023
SLC027
SLC007
SLC001
SLC005
SLC006
SLC047
SLC065
SLC002
SLC029
SLC063
SLC066
SLC064
SLC039
SLC033
SLC050
SLC028
SLC004
SLC022
SLC040
SLC045
SLC057
SLC038
SLC053
SLC044
SLC003
SLC062
SLC068
SLC054
SLC042
SLC059

N

RUSSOS RD
FORT PIERCE BLVD
25 ST SW
JOHNSTON RD
EMERSON AVE
KINGS HWY
TURNPIKE FEEDER RD
INDRIO RD
NB I-95 TO WB SR-614
OLD DIXIE HWY
ATLANTIC BEACH BLVD
ST LUCIE BLVD
ANGLE RD
SB I-95 TO REST AREA
I-95
NB I-95 FR WB SR-68
AVE Q
AVE I
AVE D
ORANGE AVE
CAMPBELL RD
HARTMAN RD
S 33 ST
S 31 ST
DELAWARE AVE
KEEN RD
SB I-95 TO WB SR-70
NB I-95 TO EB SR-70
MCNEIL RD
KIRBY LOOP RD
EDWARDS RD
BELL AVE
FLORIDA'S TURNPIKE
SELVITZ RD
S 25 ST
BUCHANAN DR
MIDWAY RD
NW SELVITZ RD
NW PEACHTREE BLVD
GLADES CUT OFF RD
NW E TORINO PKWY
MCCARTY RD
BINNEY DR
S INDIAN RIVER DR
SUNRISE BL
FEDERAL
N 25 ST
S 17 ST
GEORG
NEBRASKA A
I95

Legend

Traffic Signals

- Flasher
- School
- Signal

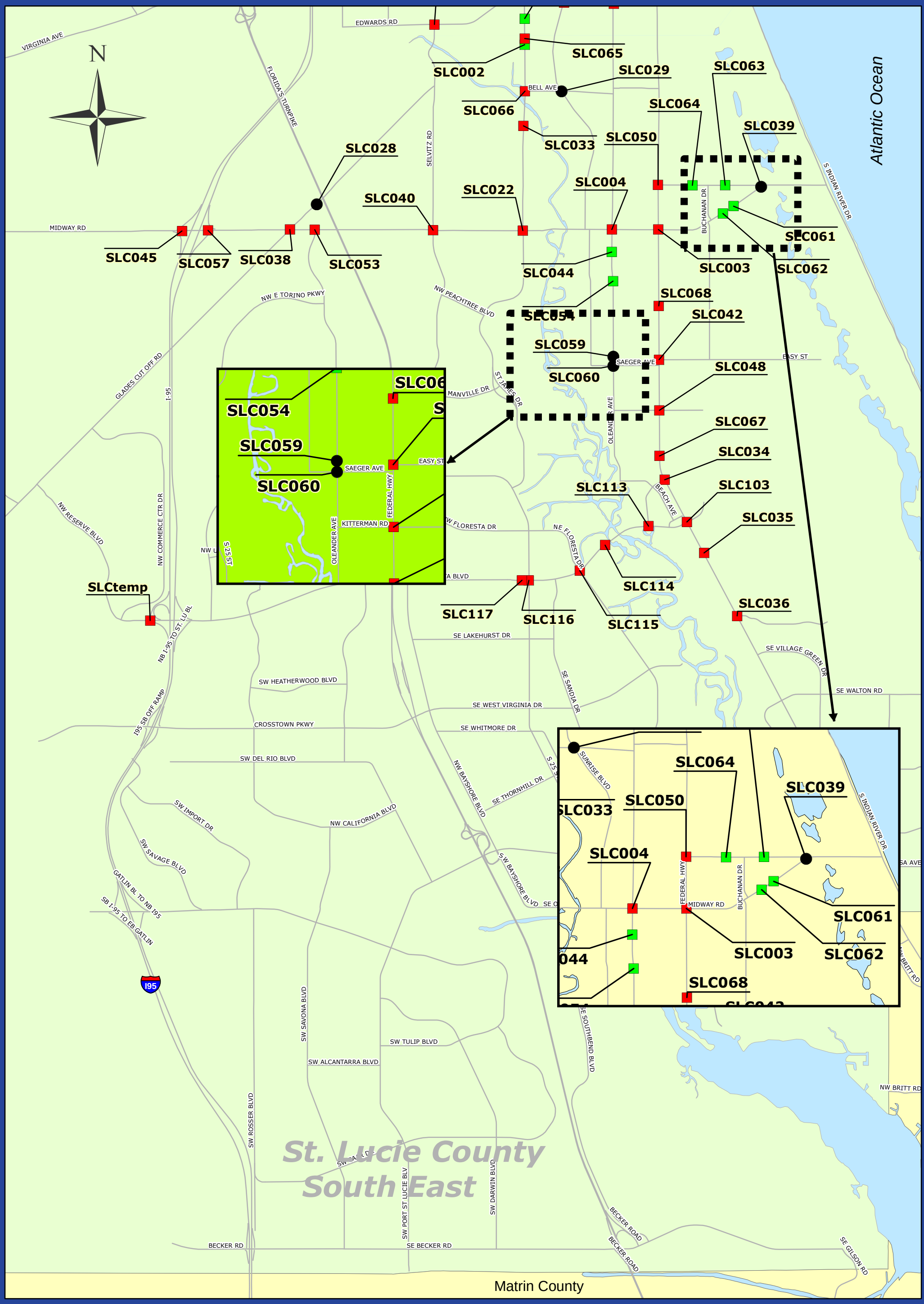
Base Map

Fiber Conduit

0 0.3 0.6 1.2 Miles

St. Lucie County Atms Master Plan

FINAL DRAFT



Legend

Traffic Signals — Base Map

- Flasher
- School
- Signal

0 0.3 0.6 1.2 Miles

St. Lucie County Atms Master Plan

FINAL DRAFT

Appendix C

Visioning Workshops Minutes and Attendance

F.R. ALEMAN
& Associates, Inc.
CONSULTING ENGINEERS & SURVEYORS

ST. LUCIE COUNTY ATMS MASTER PLAN
FM: 427372-1-32-01

TSM&O WORKSHOP – ST. LUCIE COUNTY (TASK 2-SUBTASK 3)

Date: 05-23-2011

Time: 10:00 AM-12:00 PM

Location: The Treasure Coast Operations Center, 3601 Oleander Avenue,
Ft. Pierce, Florida 34982

Attendees: Melissa Ackert (FDOT, Conference Call), Erik Spillmann (FRA), Trent Ebersole (McMahon), Robert Carballo (C3TS), Vamshi Mudumba (FRA), Jesse Quirion (City of PSL), Nick Dibenedetto (City of PSL), Ed Seissiger (City of Ft. Pierce), Peter Buchwald (St. Lucie TPO), Marianne Arbore (COASL), Corine C. Williams (SLC), Ann M. Amandro (SLC), Richie R. Marino (SLC), John Ankeny (IRC).

City of PSL-City of Port St Lucie
SLC-St. Lucie County
COASL-Council on Aging of St. Lucie

Meeting Topics:

Erik Spillmann started the workshop with a presentation on the "*TSM&O Applications & Strategies for St Lucie County*" and opened up a discussion for ideas and recommendations from the agencies.

Ed Seissiger raised discussion on the funding for the project. Robert Carballo and Erik Spillmann explained that the intent of the workshop is to develop a master plan with prioritized projects that can help us in developing cost estimate and future funding options. Erik also explained that the objective of the workshop is to gather information from the agencies that can be utilized in the development of the ATMS Master Plan.

City of PSL raised concerns about the possibility of signal coordination as their system is different from the other agencies in the County. City of PSL uses ATMS.now for the past 6 years with communication over fiber optic cable. Both City of PSL & City of Ft. Pierce uses Econolite systems for many years. Also, the agencies expressed concern about coordinating traffic signals along US-1 as the signal spacing is too far for coordination.

Erik Spillmann and Peter Buchwald explained that the project limits can also be extended to off system roads as long as the traffic on the off system roads impact the on system roads.

City of PSL explained their policy of not being able to share their information/data to the public. The City also explained issues with respect to their Homeland Security that does not allow other agencies to connect to their system.

Erik Spillmann discussed about sharing the City of PSL information through the FDOT fiber along I-95. This will eliminate the city's homeland security issues with the other agencies.

Erik Spillmann explained the other components of the TSM&O elements such as BlueTOAD for Travel Times, Traffic Adaptive Systems for real time signal operation, SunGuide Traffic Management Center, Incident and Emergency Management Programs, Intelligent Freight Technologies, Transit Monitoring Systems, etc.

- Erik explained the function of the BlueTOAD system in providing travel times to public. BlueTOAD detects anonymous MAC address of Bluetooth signals broadcasted from mobile devices in vehicles, such as phones, headsets and music players, and thereby punches the location and time stamp of the vehicles. This enables to determine accurate travel times and average speeds along the existing road network. This information can be provided to public using internet, smart phone applications, 511 system, etc. St. Lucie County expressed their concern about the elderly people, who cannot use the internet and smart phone applications to get the travel time systems.

- The functions of the Traffic Adaptive Systems were discussed to provide real-time access to the traffic control system operation for the signal network. Erik Spillmann mentioned about various adaptive systems such as, Synchro Green, SCOOT, etc.

- Erik discussed about a SunGuide Traffic Management Center for the county with the real-time information from the agencies. Eric discussed about the possibility of operating all the agencies from one location. City of PSL expressed their concern about moving their workshop along with their traffic control system.

- Incident management programs such as Road Ranger Service Patrols, Traffic Incident Management Team, etc were discussed. Melissa Ackert explained the existing Road Ranger Service Patrols in the County.

- The benefits of Transit Monitoring Systems were discussed. The transit monitoring systems will encourage more pedestrians and bicyclists in planning their transit rides.

Erik Spillmann explained the benefits of providing the real time traffic data to public such as: less travel times and delays, efficient route planning, more patronage to public transit, etc.

Peter Buchwald talked about prioritizing the TSM&O projects as a next step to the workshop. Such projects include but not limited to:

1. Traffic Signal Coordination along US-1, Okeechobee Road,
2. Fiber Optics along priority corridors,

3. Transit reliability,
4. Identifying locations that need improvement.

Conclusion:

In conclusion, Erik Spillmann discussed various alternatives that can be implemented as a part of the master plan. Erik explained that this can be achieved only with a close coordination between the agencies. A 2nd workshop will be organized with the agencies, to discuss the alternatives/list of projects and their benefits to the public more in detail.

Meeting Adjourned at 12:00 PM

ST. LUCIE COUNTY ATMS MASTER PLAN VISIONING WORKSHOP SIGN-IN SHEET

Meeting Date: May 23, 2011 | **Place/Room: FDOT D4 TC Ops Operations Crew Bldg Room 3**

Name	Title	Company	Phone	E-Mail
Trent Eberside	Regional Ops Mgr	McMahon	561-840-8650	trent.eberside@mcmtrans.com
Jesse Quirion	Manager, Traffic Ops	City of PSL	772-344-4360	JQuirion@cityofPSL.com
NICK DIBENEDETTO	PROJECT COORDINATOR	CITY OF PSL	772-871-5015	NDIBENEDETTO@CITY OF PSL.COM
Ed Seissiger	Project Coordinator	City Ft Pierce	772 460 2200	ESEISSIGER@City-Ft Pierce.com
Peter Buchwald	Executive Director	St. Lucie TPO	772-462-1593	buchwaldp@stlucieco.org
MARIANNE ARBORE	TRANSIT DIRECTOR	COASL	772-345-8228	marbore@COASL.COM
VAMSHI MUDUMBA	Traffic Engineer	FRA	305-591-8777	VAMSHI.MUDUMBA@FR-ACEMAN.COM
Melissa Ackert by telecon	FDOT Proj Manager	FDOT	954-777-4156	MELISSA.ACKERT@DOT.STATE.FL.US
ERIK SPILLMANN	PROJ MANAGER	FRA	407-894-5651	ERIK.SPILLMANN@FR-ACEMAN.COM.

ST. LUCIE COUNTY ATMS MASTER PLAN VISIONING WORKSHOP SIGN-IN SHEET

Meeting Date: May 23, 2011 | **Place/Room: FDOT D4 TC Ops Operations Crew Bldg Room 3**

Name	Title	Company	Phone	E-Mail
Ann M Amandeo	Traffic Ops. Supervisor	SLC	462.2848	Amandeo4@co.st-lucie.fl.us
Richie R Marino	N/B Traffic	SLC	828-9119	marinor@stlucieco.org
John Aukeny	Signal Coordinator	IRC	772 226-1563	jaukeny@ircgov.com

ST. LUCIE COUNTY ATMS MASTER PLAN VISIONING WORKSHOP SIGN-IN SHEET

Meeting Date: May 23, 2011 | **Place/Room: FDOT D4 TC Ops Operations Crew Bldg Room 3**

Name	Title	Company	Phone	E-Mail
Robert Carballo	President	C3TS	305-445-2900	carballo@C3TS.com
Corine C. Williams	Transit coord	St Lucie Comm + Svcs	772-462-2092	Williams-c@stlucieco.org

F.R. ALEMAN
& Associates, Inc.
CONSULTING ENGINEERS & SURVEYORS

ST. LUCIE COUNTY ATMS MASTER PLAN
FM: 427372-1-32-01

Master Plan Review Workshop
AGENDA

Date: Tuesday, July 31, 2012
Time: 10:00 a.m. to 12:00 noon
Location: The Treasure Coast Operations Center, 3601 Oleander Avenue, Ft. Pierce, Florida 34982

Meeting Objective: The purpose of the workshop is for the Department to provide an update on the status of the project and to provide an opportunity for any additional input that you may have. Handouts will be sent prior to the workshop.

Meeting Topics:

15 min. 1) Introductions and Brief Overview of Project

45 min. 2) Summary of Draft Findings and Recommendations

2.1 Draft System Requirements & Implementation Plan
- a. Communication Network Fiber Ethernet
- b. Interconnect between Regional Agencies
- c. Time Sync
- d. Advanced Traffic Management System Software
- e. New Traffic Operations Center Location
- f. Video Subsystem
- g. ATMS Controller
- h. Intersection Video Detection
- i. Optional System Considerations
  - Incident Management Software
  - Transit Monitoring/Tracking Software
  - Web Service Software and Traveler Information System
  - Bluetooth Vehicle Detection System
  - Traffic Adaptive System
- j. Impact On Upcoming Projects
- k. Compatibility with County's LRTP
- l. Phasing of Implementation / Time Frame
- m. Procurement Methods and Construction Management Procedures

n. Operations and Maintenance Plan
o. Compatibility with other Regional ATMS/ITS Systems
- City of Port St Lucie
- FDOT Sunguide
- Indian River County

2.2 Funding Options
2.3 Stakeholder Feedback

60 min. 3) Discussion on Remaining Tasks

3.1 Performance Measures
Travel - time: Bluetooth Vehicle Detection

3.2 SEMP (System Engineering Master Plan)
a. ITS Standards
- Compliant with Southeast Florida Regional ITS Architecture
- Compliant with Stakeholders Specifications
  - FDOT
  - St. Lucie County
  - City of Fort Pierce
  - City of Port ST. Lucie

b. Testing Procedures

3.3 Concept of Operations

McMAHON ASSOCIATES, INC.
5500 Village Boulevard | Suite 103 | West Palm Beach, FL 33407
p 561-840-8650 | f 561-840-8590
www.mcmtrans.com

MEETING MINUTES

Date: July 31, 2012

Project: **St. Lucie County ATMS Master Plan**
Visioning Workshop No. 2
McMahon Project No.

Lead Agency: Florida Department of Transportation

Location: FDOT, Treasure Coast Operations Center

Attendees: see attached sign-in list

Minutes Prepared By: R. Trent Ebersole, P.E.

The purpose of this workshop was to update the three signal maintaining agencies located within St. Lucie County including, the City of Ft. Pierce, the City of Port St. Lucie, and the County of St. Lucie, on the progress of the Master Plan efforts and to obtain their input on preliminary recommendations. The presentation was led by Erik Spillman of F.R. Aleman & Associates, Inc., FDOT's consultant on the project. Melissa Ackert, the FDOT project manager, also provided information during the workshop. The discussion topics included:

1. Introductions (see attached sign-in list).

2. Mr. Spillman provided a 4-sheet handout representing preliminary Master Plan results in the form of four (4) phases of system implementation.

   a) Mr. Spillman provided some background information on the master plan project. He pointed out that the City of Port St. Lucie has a "Robust System" using Naztec technology and fiber optics backbone. The system purposely has not been identified in the Master Plan due to City of Port St. Lucie security concerns.
   b) The County and the City of Ft. Pierce have also made significant investments, both based on Econolite systems.
   c) The preliminary recommendation would be for each jurisdiction to maintain their respective systems and connect the signal coordination as appropriate through the use of a universal clock. This recommendation is based in part on the opinion that the cost to change the technology of one or more jurisdictions would outweigh the benefits. In addition to syncing coordination using a universal clock, recommendations would include:

i. Data Sharing: possibly including traffic volumes, travel times, occupancy, video, surveillance, timing development
ii. Linking to the FDOT system via the Turnpike fiber optics. (Turnpike agreement/buffering to share information with District 4.

The discussion mentioned multicast routing and video sharing potentially including local jurisdiction access to the FDOT video feed.

3. Melissa Ackert offered information regarding FDOT efforts that might benefit the local jurisdictions including traffic information phone apps, and expanding 511 to include key "off-system" roadways. This discussion expanded with Daniel Holbrook requesting more information about the phone apps and any news/email blasts that FDOT might have available so that the City can make residents more aware of them. Ms. Ackert also discussed the possibility of "centralizing" the Traffic Management Center (TMC) locations of some or all of the jurisdictions. A potential location could be the FDOT Treasure Coast Traffic Operations Center. Future discussions should include the potential staffing options such as City, County and possibly even FDOT staff.

4. Peter Buchwald, St. Lucie TPO, discussed the benefit for jurisdictions to bring planned improvements to the attention of TPO so that the TPO can help obtain any matching funds (Federal) increasing the improvement funds for the entire County. He asked for the decision regarding making the signal technology for each jurisdiction compatible saying if the funding is available, the benefit to cost conclusion may change. He also suggested the fiber optics security policies with the City of Port St. Lucie be revisited in case the policies are determined to be outdated. During this discussion Ed Seissiger mentioned the pending rollout of a $245,000 Syntrax system. Even with that cost, Mr. Buchwald continued that magnitudes of that funding could potentially be available. Mr. Buchwald also mentioned that the TPO maintains a traffic count database. The funding discussion also included the need for a "SEMP" to obtain federal funding.

5. There was a discussion about signal spacing and how it is part of the determination of whether signals should be coordinated with Gene Snedeker of St. Lucie County indicating the distance between signals crossing jurisdictional lines is probably too great. It was discussed that future coordination should not be precluded because signals could be added reducing the spacing.

6. Adaptive signal systems and blue tooth travel time data collection technology was discussed. Ms. Ackert indicated that she believes real time data collection is an important part of the master plan and the blue tooth technology would be an important part of that.

7. Mr. Snedeker inquired about a wireless system for data sharing and Mr. Spillman indicated the data sharing would be too intensive for wireless.

   a) The question was asked what the cost of implementation phase 1 would be. This phase

includes additional fiber optics, controller upgrades, and cameras. Mr. Spillman indicated the cost estimate is $3.3million

b) There was a discussion of what "Recording Data" means. It was generally agreed that video would not be recorded.

Action items include:

1. Revisit fiber security policies and the benefit/cost of aligning signal technologies if TPO funding is available.
2. Include more details on the implementation maps such as all recommendation, quantities, and cost estimates.
3. Include summary of discussion from workshops (feedback from jurisdictions) in the final report.
4. Provide a more detailed breakdown of cost estimates.
5. Make sure that the preliminary recommendation and cost estimate information is sent out to all workshop participants.
6. Participants are to provide feedback on preliminary recommendations and this workshop within 3 weeks.
7. Have at least 2 more workshops.
8. Next workshop is tentatively scheduled for September after receipt of feedback. Topics will include:
    a. Implementation details
    b. Funding options
    c. Performance measures

ST. LUCIE COUNTY ATMS MASTER PLAN
VISIONING WORKSHOP NO. 2
JULY 31, 2012
SIGN-IN LIST

Name	**Representing**
Trent Ebersole	McMahon Associates, Inc.
Melissa Ackert	FDOT
Gene Snedeker	St. Lucie County
Neelam Fatima	St. Lucie County TPO
Michael Brillhat	St. Lucie County
Daniel Holbrook	City of Port St. Lucie
Denise Burton	City of Port St. Lucie
Tracy N. Phelps	F.R. Aleman Associates
Erik Spillmann	F.R. Aleman Associates
Peter Buchwald	St. Lucie County TPO
Ed Seissiger	City of Fort Pierce

F.R. ALEMAN
and Associates, Inc.
CONSULTING ENGINEERS & SURVEYORS

ST. LUCIE COUNTY ATMS MASTER PLAN
FM: 427372-1-32-01

Master Plan Review Workshop
AGENDA

Date: Wednesday, September 26, 2012

Time: 10:00 a.m. to 12:00 noon

Location: The Transportation Planning Organization, 2300 Virginia Avenue, Ft. Pierce, Florida 34982 – 2nd Floor "Code Conference Room "

Meeting Objective: The purpose of the workshop is for the Department to provide an update on the status of the project, discuss comments on the implementation plan and to provide an opportunity for any additional input that you may have. Handouts will be sent prior to the workshop.

Meeting Topics:

15 min. 1) Introductions and Brief Overview of Project

45 min. 2) Summary and Discussion of Draft Findings and Recommendations

2.1 Draft System Requirements & Implementation Plan

a. Communication Network Fiber Ethernet
b. Interconnect between Regional Agencies
c. Time Sync
d. Advanced Traffic Management System Software
e. New Traffic Operations Center Location
f. Video Subsystem
g. ATMS Controller
h. Intersection Video Detection
i. Optional System Considerations

- Incident Management Software
- Transit Monitoring/Tracking Software
- Web Service Software and Traveler Information System
- Bluetooth Vehicle Detection System
- Traffic Adaptive System

j. Impact On Upcoming Projects
k. Compatibility with County's LRTP
l. Phasing of Implementation / Time Frame
m. Procurement Methods and Construction Management Procedures
n. Operations and Maintenance Plan
o. Compatibility with other Regional ATMS/ITS Systems
    - City of Port St Lucie
    - FDOT Sunguide
    - Indian River County

2.2 Funding Options

2.3 Stakeholder Feedback

60 min. 3) Discussion on Remaining Tasks

3.1 Performance Measures

- Travel - time: Bluetooth Vehicle Detection

3.2 SEMP (System Engineering Master Plan)

a. ITS Standards
- Compliant with Southeast Florida Regional ITS Architecture
- Compliant with Stakeholders Specifications
    - FDOT
    - St. Lucie County
    - City of Fort Pierce
    - City of Port ST. Lucie

b. Testing Procedures

3.3 Concept of Operations

McMAHON ASSOCIATES, INC.
5500 Village Boulevard | Suite 103 | West Palm Beach, FL 33407
p 561-840-8650 | f 561-840-8590
www.mcmtrans.com

MEETING MINUTES

Date: September 26, 2012

Project: **St. Lucie County ATMS Master Plan**
Visioning Workshop No. 3
McMahon Project No.

Lead Agency: Florida Department of Transportation

Location: St. Lucie TPO

Attendees: see attached sign-in list

Minutes Prepared By: R. Trent Ebersole, P.E.

The purpose of this workshop was intended as a follow up to Workshop #2, including a discussion of comments provided by the 3 signal maintaining agencies and the TPO. Action items from the Workshop 2 were on the agenda. The discussion topics included:

1. Introductions (see attached sign-in list).

2. Mr. Spillman provided 5 figures, including the Communications Network Connections and Phase 1 through 4 Corridor Improvements. Comments from Workshop #2 were addressed in these revised figures.

3. A majority of the workshop was spent discussing the topics of potentially consolidating traffic management centers into 2 or 1 location. These discussions included how many and what agency or agencies would monitor the signal systems. In the scenario of 1 entity operating and maintaining the 3 existing signal systems or ATMSs in St. Lucie County would be operated and maintained (O&M) by 1 entity. The budget for the 1 entity would be made through agreements in which the 3 existing jurisdictions would compensate the 1 O&M entity to operate and maintain the ATMS and/or signal system in their jurisdiction.

4. A detailed discussion was also had regarding whether the master plan should include getting the 3 maintaining agencies on the same technology, i.e. all using Econolite or Naztec controllers.

    a. The agencies stated they like their respective equipment and saw no reason to buy new equipment in the short term. The systems can be interconnected and communicate with

the proper software without changing the hardware. Furthermore, the 3 agencies seemed to agree that by the time the modification of equipment would take place, technology would likely be completely different so choosing the common type now would be premature.

b. Peter Buchwald emphasized that funding through the TPO including Federal and State funds could be available, but a common goal and benefit would need to be shown in order to obtain those funds from the TPO Board. The master plan will need to reflect 1 vision for the County and he believes having a goal of consistency of equipment would help.

c. The vision for consolidating Operations and Maintenance duties for the Signal System and ATMSs in the St. Lucie County TPO area was agreed to in concept. The Master Plan should reflect a stepped approach to reaching this, starting by interconnecting the signals in the 3 jurisdictions via a fiber optic communications network. The milestones leading up to achieving the long term vision of 1 O&M entity for the St. Lucie County TPO area and activities/projects to achieving these milestones will be includes as recommendations in the final ATMS Master Plan. Modifications to existing policies, how to establish the 1 entity institutionally and the types of agreements needed will also be included in the plan.

5. It was discussed again that the most important improvement to recommend at this time is to get the fiber network complete.

6. There was discussion regarding whether local roads could be included if the funding was state and federal, through the TPO. The concensus was that system-wide improvements to the network would benefit the arterials and therefore local roads as part of that network would qualify for the funding.

7. On a more technical topic, there was a discussion of whether the copper interconnect conduit can be reused when the fiber is brought through.

Action items include:

1. Schedule a follow up meeting to go over the vision and milestones to reach this vision.
2. Update the Master Plan to reflect the refined vision
3. Revise plan to incorporate local road signals into the plan.

McMAHON ASSOCIATES, INC.
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www.mcmtrans.com

MEETING MINUTES

Date: November 5, 2012

Project: **St. Lucie County ATMS Master Plan**
Visioning Workshop No. 4
McMahon Project No. N10251.01

Lead Agency: Florida Department of Transportation

Location: FDOT Treasure Coast Operations Center
3601 Oleander Avenue
Ft. Pierce, FL 34982

Attendees: Melissa Ackert (via video conference)
Erik Spillman, F.R. Aleman
Tracy Phelps, F.R. Aleman
Trent Ebersole, McMahon
Don Pauley, St. Lucie County
Gene Snedeker, St. Lucie County
Ed Seissiger, City of Ft. Pierce
Peter Buchwald, St. Lucie TPO

Minutes Prepared By: R. Trent Ebersole, P.E.

The purpose of this workshop was to provide an update on the status of the project, discuss comments on the implementation plan, and provide the opportunity for additional input from the maintaining agencies. The discussion topics included:

1. Erik Spillman provided an update on the status of action items from the September 26 workshop #3. The update indicated that the previous comments have been incorporated into the implementation plan. The idea of having consistent technology among the 3 maintaining agencies and consolidation of operations to a single management center continued to generate concerns regarding timing and details. However, the plan remains to include these items as a long-term improvement understanding that at some point there will be a need to upgrade the technology in each jurisdiction which could create an opportunity for implementation without significant additional burden.

2. Discussions continued regarding the expansion of the plan to include signals that are off the

state system to facilitate full integration and provide incentive for TPO funding.

3. Erik Spillman went through a presentation of the current version of the implementation plan, including changes that have been made. Specific comments were made:

    a. On slide 8, regarding the identification of "number of intersections" along major corridors
    b. Slide 16, Prima Vista becomes St. Lucie West Boulevard in the vicinity of I-95
    c. Slide 16, City of Port St. Lucie improvements might need to be in an earlier phase
    d. Slide 17, should read Traffic Operation Center, not Centers.
    e. Slide 17, the total cost for Traffic Operation Center is a cost per center

Action Items:

1. Finalize the Master Plan in December.
2. Partner with Peter Buchwald to present to the TCC and TPO Board in January or February.
3. Prepare final deliverable as a single report.

ST. LUCIE COUNTY ATMS MASTER PLAN
VISIONING WORKSHOP NO. 3
September 26, 2012
SIGN-IN LIST

Name	**Representing**
Trent Ebersole	McMahon Associates, Inc.
Tracy N. Phelps	F.R. Aleman Associates
Melissa Ackert	FDOT
Gene Snedeker	St. Lucie County
Jack Andrews	City of Ft. Pierce
Denise Burton	City of Port St. Lucie
Ed Seissiger	City of Ft. Pierce
Neelam Fatima	St. Lucie County TPO
Peter Buchwald	St. Lucie County TPO
Erik Spillmann	F.R. Aleman Associates

Appendix D

Existing ATMS Infrastructure GIS Inventory

Traffic Signals - St.Lucie County

Prepared by

R. ALEMAN & Associates, Inc.
CONSULTING ENGINEERS & SURVEYORS

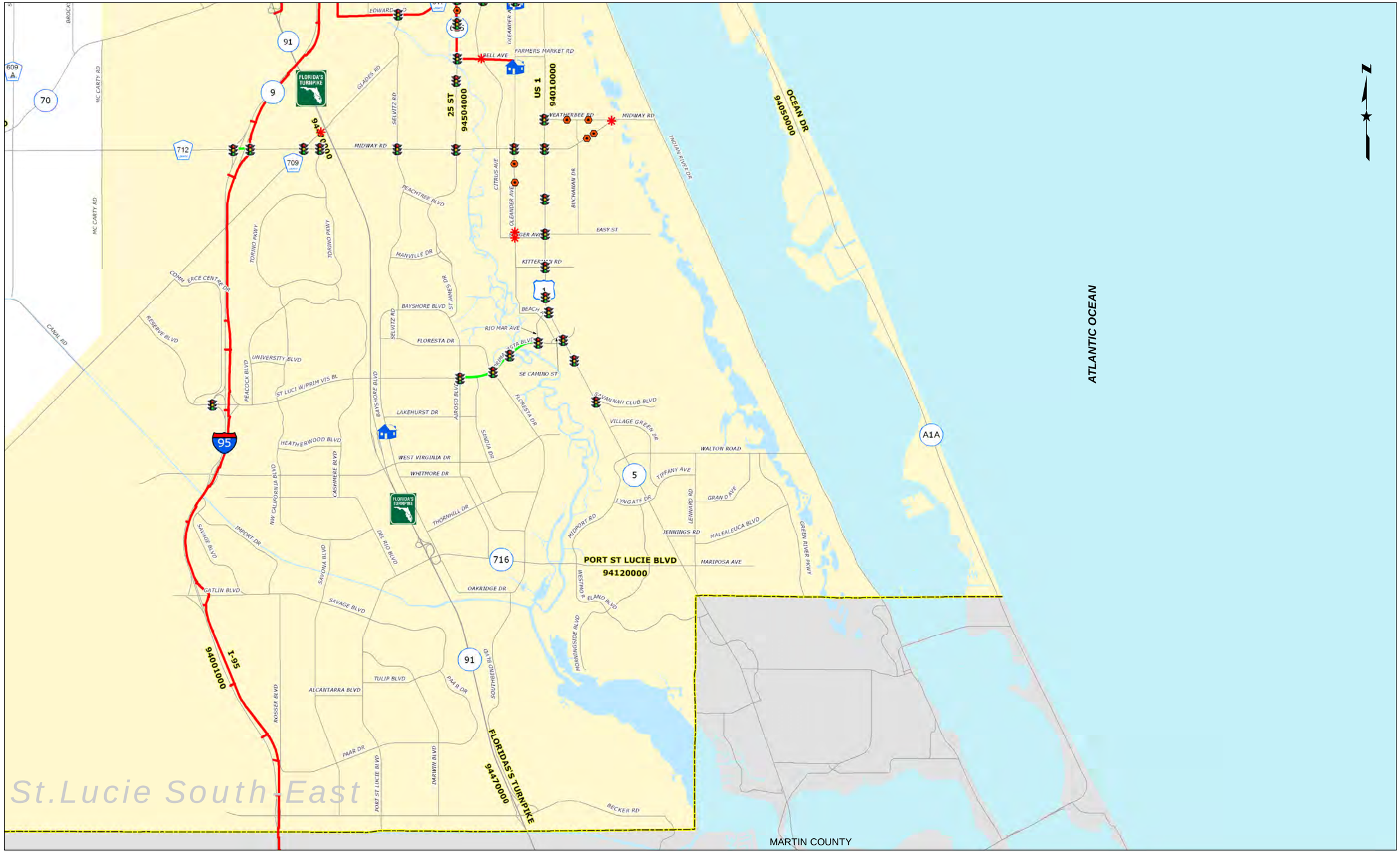
ATMS MASTER PLAN

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

FINAL DRAFT

ATMS MASTER PLAN

St.Lucie County



LEGEND

- Flasher
- School
- Signal
- N3C_FiberSpan
- Basemap
- Traffic Management Center
- SLCConduits

0 0.5 1 2 Miles

Map Production Date: 08/31/11
This data is accurate up to date of production.
For further details please reference the general disclaimer found in the front of document.

FINAL DRAFT

ATMS MASTER PLAN

St.Lucie County

INDIAN RIVER COUNTY

St.Lucie North-West

INDRIO RD 94004000

KINGS HWY 94003000

EMERSON AVE 94009000

US 1 94010000

ATLANTIC BEACH BLVD 94060000

ST LUCIE BLVD 94006000

FLORIDA'S TURNPIKE 94470000

I-95 94001000

ORANGE AVE 94070000

INDIAN RIVER DR 94100000

VIRGINIA AVE 94030000

25 ST 94504000

OKEECHOBEE RD 94030000

RUSSOS RD · JOHNSTON RD · FORT PIERCE BLVD · N KINGS HWY · TAYLOR DAIRY RD · IMMOKOLEE RD · JUANITA AVE · N 53RD ST · AVENUE Q · AVENUE O · AVENUE I · AVENUE D · AVENUE C · AVENUE A · FISHERMAN'S WHARF · BINNEY DR · OLD DIXIE HWY · KEEN RD · ANGLERD · N 29 ST · N 13 ST · S FFA RD · CAMPBELL RD · PICOS RD · DELAWARE AVE · GEORGIA AVE · S 17TH ST · S 7TH ST · S 23 ST · HARTMAN RD · OKEECHOBEE RD · NEBRASKA AVE · OHIO AVE · JENKINS RD · MC NEIL RD · KIRBY LOOP RD · CORTEZ BL · SUNRISE BLVD · SAVANNAH RD · OLEANDER AVE · FARMERS MARKET RD · BELL AVE · GLADES RD · SELVITZ RD · MIDWAY RD · PEACHTREE BLVD · CITRUS AVE · BUCHANAN DR · EASY ST · VEATHERBEE RD · MIDWAY RD · ORANGE AVE · SNEED RD · HEADER CANAL RD · SHINN RD · BROCKSMITH RD · GENTILE RD · MC CARTY RD

LEGEND

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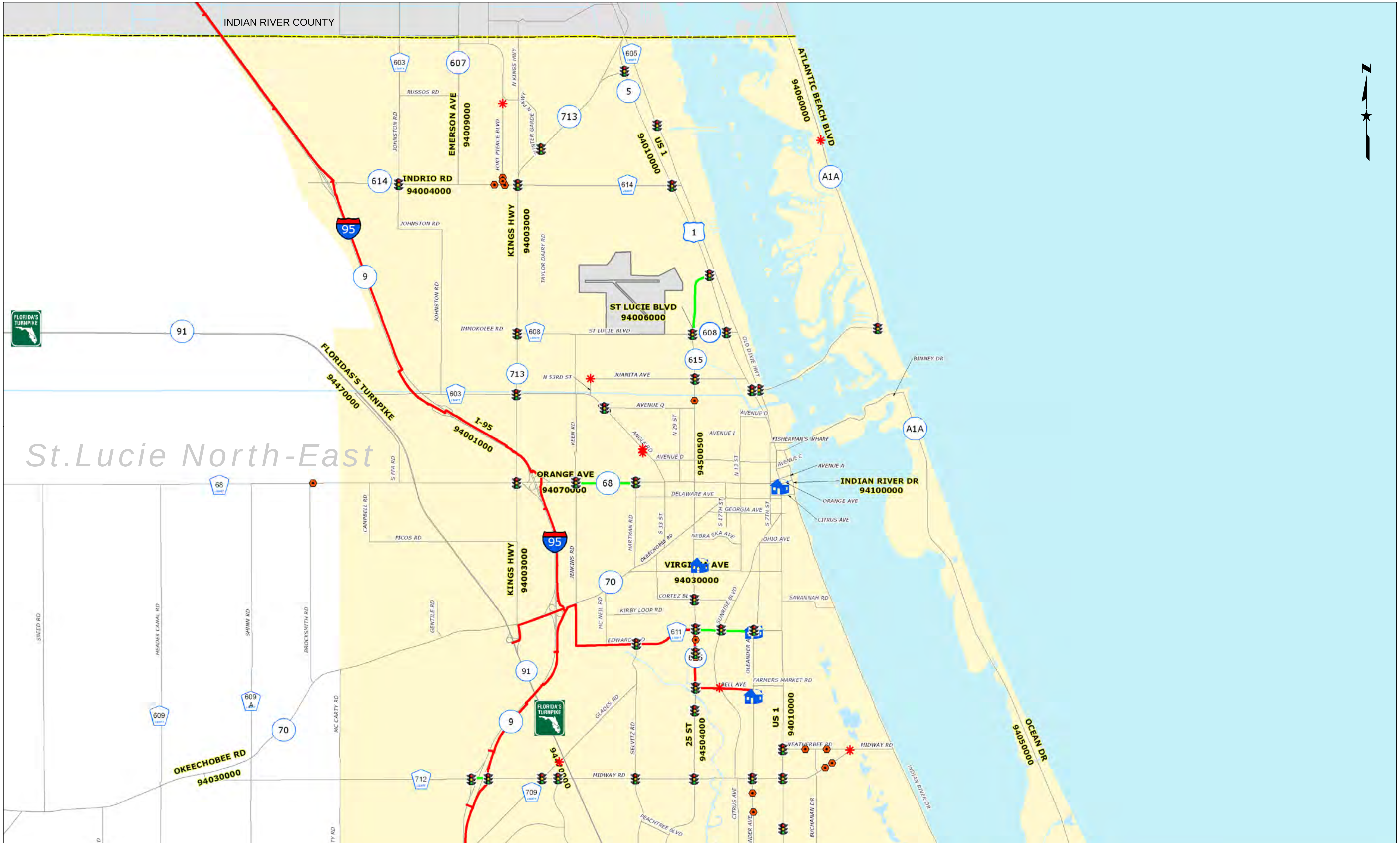

ATMS MASTER PLAN

St.Lucie County

LEGEND

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ATMS MASTER PLAN

St.Lucie County

St.Lucie South-West

OKEECHOBEE RD
94030000

25 ST
94504000

US 1
94010000

94400000

I-95
94001000

PORT ST LUCIE BLVD
94120000

FLORIDA'S TURNPIKE
94470000

MARTIN COUNTY

LEGEND

- Flasher
- School
- Signal
- N3C_FiberSpan
- Basemap
- Traffic Management Center
- SLCConduits

0 0.5 1 2 Miles

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Closed Circuit Television(CCTV) - St.Lucie County

Prepared by

R. ALEMAN & Associates, Inc. CONSULTING ENGINEERS & SURVEYORS

ATMS MASTER PLAN

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

FINAL DRAFT

ATMS MASTER PLAN

St.Lucie County

OKEECHOBEE RD
94030000

PORT ST LUCIE BLVD
94120000

25 ST
94504000

US 1
94010000

I-95
94001000

FLORIDA'S TURNPIKE
94470000

St.Lucie South-West

MARTIN COUNTY

LEGENG

St.Lucie-CCTV
N3C_FiberSpan
Basemap
Traffic Management Center
SLCConduits

0 0.5 1 2 Miles

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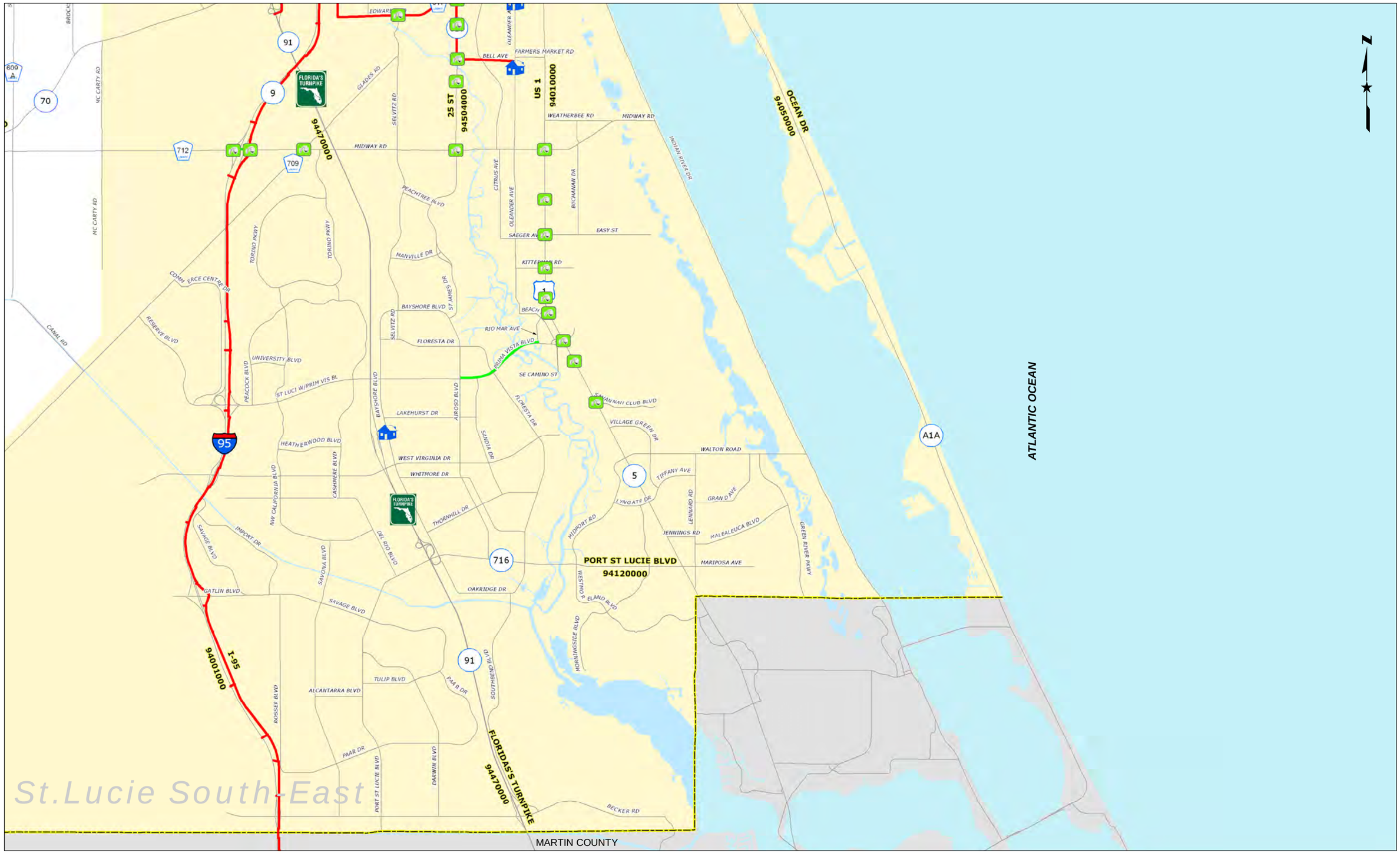
ATMS MASTER PLAN

St.Lucie County



LEGENG

- St.Lucie-CCTV
- N3C_FiberSpan
- Basemap
- Traffic Management Center
- SLCConduits

0 0.5 1 2 Miles

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INDIAN RIVER COUNTY

St.Lucie North-West

ATMS MASTER PLAN

St.Lucie County

LEGENG

St.Lucie-CCTV
N3C_FiberSpan
Basemap
Traffic Management Center
SLCConduits

0 0.5 1 2 Miles

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FINAL DRAFT

ATMS MASTER PLAN

St.Lucie County

St.Lucie North-East

INDIAN RIVER COUNTY

ATLANTIC OCEAN

ATLANTIC BEACH BLVD
94060000

US 1
94010000

EMERSON AVE
94009000

INDRIO RD
94004000

KINGS HWY
94003000

ST LUCIE BLVD
94006000

FLORIDA'S TURNPIKE
94470000

I-95
94001000

ORANGE AVE
94070000

25 ST
94504000

OCEAN DR
94059000

INDIAN RIVER DR
94100000

OKEECHOBEE RD
94030000

94470000

RUSSOS RD
JOHNSTON RD
FORT PIERCE BLVD
TAYLOR DAIRY RD
IMMOKOLEE RD
JUANITA AVE
N 53RD ST
AVENUE Q
AVENUE O
AVENUE I
AVENUE D
AVENUE C
AVENUE A
KEEN RD
ANGLE RD
N 29 ST
N 13 ST
S FFA RD
OLD DIXIE HWY
BINNEY DR
FISHERMAN'S WHARF
DELAWARE AVE
GEORGIA AVE
NEBRASKA AVE
OHIO AVE
CITRUS AVE
S 17TH ST
S 23 ST
HARTMAN RD
OKEECHOBEE RD
JENKINS RD
CAMPBELL RD
PICOS RD
KIRBY LOOP RD
NC NEIL RD
SUNRISE BLVD
SAVANNAH RD
OLEANDER AVE
FARMERS MARKET RD
BELL AVE
GLADES RD
SELVITZ RD
WEATHERBEE RD
MIDWAY RD
PEACHTREE BLVD
CLEANDER AVE
BUCHANAN DR
EASY ST
SAEGER AV
SNEED RD
HEADER CANAL RD
SHINN RD
BROCKSMITH RD
GENTILE RD
MC CARTY RD
HOLDING RD

603 607 605 5 713 614 1 9 91 608 615 611 712 709 68 609 609A 70

FLORIDA'S TURNPIKE

0 0.5 1 2 Miles

LEGENG

St.Lucie-CCTV
N3C_FiberSpan
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FINAL DRAFT

Appendix E

Meeting Minutes

F.R. ALEMAN
& Associates, Inc.
CONSULTING ENGINEERS & SURVEYORS

St. Lucie County ATMS Master Plan
FM: 427372-1-32-01

Interview

Date: 01-13-2011

Time: 1:30PM

Location: 2300 Virginia Avenue, Fort Pierce, FL 34982

Attendees: Ann Amandro (St. Lucie County), Richie Marino (St. Lucie County), Gene Snedeker (St. Lucie County), Melissa Ackert, E.I. (FDOT District IV), Erik Spillmann, P.E. (FR Aleman), Ali Dilmaghani, E.I. (FR Aleman),

Introductions:

Before starting the meeting Richie Marino showed the traffic operation center and explains their system set up including Master Controller.

The meeting was held in St. Lucie County Traffic Signal Operation office. Attendees introduced themselves and Erik started with Introduction of SLC Master plan and its goals and objectives. He said that FDOT has contracted FRA to study the feasibility of an ATMS deployment in St Lucie County and provide them with strategies that will improve the current transportation system.

Ali distributed questionnaires and Melissa joined the meeting via conference call. Erik went thru each items of questionnaire.

Meeting Topics

1. Ann Amandro and Gene Snedeker wanted to know if they are able to get video image of their intersections through Autoscope video detectors.
   They said having access to real time image help them to eliminate unnecessary trips to the location since they don't have enough help.

2. Ann and Gene both agree that they need better technology but they don't think the county can pay for it at this time.

3. Richie said there are three intersections that are not listed in county's GIS system. Erik asked for a list of those intersections.

4. Erik answered questioned about questionnaire and he said it will be a follow up meeting.

Closing of Meeting: The meeting adjourned at 4:00PM.

F.R. ALEMAN
& Associates, Inc.
CONSULTING ENGINEERS & SURVEYORS

St. Lucie County ATMS Master Plan
FM: 427372-1-32-01

MEETING WITH CITY OF FORT PIERCE

Date: 01-26-2011

Time: 1:30PM

Location: Engineering Conference Room at Fort Pierce City Hall. 100 North US 1, Fort Pierce, FL 34950

Attendees: John "Jack" R. Andrews II (City Engineer), Edward Seissiger (Project Coordinator), Eric Spillmann (FR Aleman), Dennis Rowand (FR Aleman).

Meeting Topics:

Opening discussion by Eric Spillmann concerning the intent of the meeting and the intent of the survey. Discussion included overview of City's current GIS being up to date with city and county information, current data collection methods and a request from Eric for an equipment inventory. Discussion on the questionnaire about future needs. Edward mentioned the need to upgrade some signals and add fiber for communication and control. Eric asked what arterials needed fiber? Edward replied all of them. Eric discussed one item of the questionnaire was to indentify possible funding sources.

Eric then went thru the questionnaire question by question.
Discussion on FDOT projects like RRR's. Edward said that would be the tie to upgrade to fiber. Virginia Ave was a big project. Existing conduit would need to be "proofed" and existing pull boxes upgrade to fiber optic size.

Discussion on existing system and future needs. Edward said they want to use Econolite System. ASC-3 on US-1 is Ethernet ready. 25 Street has ASC-2's. Orange Ave needs fiber to get back to the master. Needs signal re-timing for new US-1 system corrider. They use video detention at some intersection. 3 signals on US-1 have RR preemption. No emergency preemption. PTZ cameras exist on US-1 900G back to new central master.

Currently no coordination with County EOC Emergency Center. Need fiber backbone to implement central Econolite system.

Discussion of freight management.
Port is undeveloped and privately owned.
Rail FEC/Amtrak. There is a proposed rail station but no funding currently.

County run limited public transportation system.

Discussion of existing Regional system. Local with interconnection in the future. Possible connection to Treasure Coast TMC

Discussion of monitoring/distribution system for video.

Arterial DMS system. Centrax has off the shelf dist/mon built in. 900 G communication.

Discussion on central system. Traffic responsive? GIS system?

Discussion on future needs

- Weather Management-flooding etc.
- Special Events-minimal
- Traffic Incident Management
- Travel Information System
  - DMS
  - Webpage
  - Level of Service
  - Using ITV System Blue Tooth travel time software

Q&A

- Edward said they would fill and return the questionnaire.
- At least 2 years out on Centrax system
- Intent of 2 year work plan

Discussion of founding sources

- FED
- State
- Local TPO's
- Plan to have fuding documents ready prior to funding requests.

Meeting Adjourned

F.R. ALEMAN
& Associates, Inc.
CONSULTING ENGINEERS & SURVEYORS

St. Lucie County ATMS Master Plan
FM: 427372-1-32-01

MEETING WITH SUNGUIDE TRANSPORTATION MANAGEMENT CENTER

Date: 02-08-2011

Time: 9:00AM

Location: Florida Department of Transportation, District 4, 3400 W. Commercial Blvd, Ft. Lauderdale, FL 33309-3421

Attendees: Daniel Smith (Smart Sunguide TMC), Jason Trujillo E.I (Smart Sunguide TMC) Melissa Ackert, E.I. (FDOT District IV), Erik Spillmann, P.E. (FR Aleman), Vamshi Mudumba, E.I. (FR Aleman).

Introductions:

The meeting was held on Feb 8th 2011 at FDOT District 4 office in Ft. Lauderdale Office. Attendees introduced themselves and Erik asked if SunGuide have any comments. Daniel Smith and Jason Trujillo responded with no comments.

Erik started explaining the "St. Lucie County ATMS Master Plan Questionnaire" step by step and the corresponding responses from the stake holders.

Erik went through the responses for each items of questionnaire.

Meeting Topics

1. Melissa Ackert discussed about the use of Region Wide Bluetooth (Bluetoad) use in FDOT District 2 and the possibility of using the system for St. Lucie County.
2. Jason Trujillo wanted to make the real time traffic data available for public so that mobile applications could be developed for public use.
3. Erik recommended the use of fiber communications for non traffic related usage
4. Daniel Smith requested if the traffic info system could be explained in detail.

Closing of Meeting: The meeting adjourned at 10:15AM.

F.R. ALEMAN
& Associates, Inc.
CONSULTING ENGINEERS & SURVEYORS

ST. LUCIE COUNTY ATMS MASTER PLAN
FM: 427372-1-32-01

TSM&O WORKSHOP – ST. LUCIE COUNTY

Date: 05-23-2011

Time: 10:00 AM-12:00 PM

Location: The Treasure Coast Operations Center, 3601 Oleander Avenue,
Ft. Pierce, Florida 34982

Attendees: Melissa Ackert (FDOT, Conference Call), Erik Spillmann (FRA), Trent Ebersole (McMahon), Robert Carballo (C3TS), Vamshi Mudumba (FRA), Jesse Quirion (City of PSL), Nick Dibenedetto (City of PSL), Ed Seissiger (City of Ft. Pierce), Peter Buchwald (St. Lucie TPO), Marianne Arbore (COASL), Corine C. Williams (SLC), Ann M. Amandro (SLC), Richie R. Marino (SLC), John Ankeny (IRC).

City of PSL-City of Port St Lucie
SLC-St. Lucie County
COASL-Council on Aging of St. Lucie

Meeting Topics:

Erik Spillmann started the workshop with a presentation on the "*TSM&O Applications & Strategies for St Lucie County*" and opened up a discussion for ideas and recommendations from the agencies.

Ed Seissiger raised discussion on the funding for the project. Robert Carballo and Erik Spillmann explained that the intent of the workshop is to develop a master plan with prioritized projects that can help us in developing cost estimate and future funding options. Erik also explained that the objective of the workshop is to gather information from the agencies that can be utilized in the development of the ATMS Master Plan.

City of PSL raised concerns about the possibility of signal coordination as their system is different from the other agencies in the County. City of PSL uses ATMS.now for the past 6 years with communication over fiber optic cable. Both City of PSL & City of Ft. Pierce uses Econolite systems for many years. Also, the agencies expressed concern about coordinating traffic signals along US-1 as the signal spacing is too far for coordination.

Erik Spillmann and Peter Buchwald explained that the project limits can also be extended to off system roads as long as the traffic on the off system roads impact the on system roads.

City of PSL explained their policy of not being able to share their information/data to the public. The City also explained issues with respect to their Homeland Security that does not allow other agencies to connect to their system.

Erik Spillmann discussed about sharing the City of PSL information through the FDOT fiber along I-95. This will eliminate the city's homeland security issues with the other agencies.

Erik Spillmann explained the other components of the TSM&O elements such as BlueTOAD for Travel Times, Traffic Adaptive Systems for real time signal operation, SunGuide Traffic Management Center, Incident and Emergency Management Programs, Intelligent Freight Technologies, Transit Monitoring Systems, etc.

- Erik explained the function of the BlueTOAD system in providing travel times to public. BlueTOAD detects anonymous MAC address of Bluetooth signals broadcasted from mobile devices in vehicles, such as phones, headsets and music players, and thereby punches the location and time stamp of the vehicles. This enables to determine accurate travel times and average speeds along the existing road network. This information can be provided to public using internet, smart phone applications, 511 system, etc. St. Lucie County expressed their concern about the elderly people, who cannot use the internet and smart phone applications to get the travel time systems.

- The functions of the Traffic Adaptive Systems were discussed to provide real-time access to the traffic control system operation for the signal network. Erik Spillmann mentioned about various adaptive systems such as, Synchro Green, SCOOT, etc.

- Erik discussed about a SunGuide Traffic Management Center for the county with the real-time information from the agencies. Eric discussed about the possibility of operating all the agencies from one location. City of PSL expressed their concern about moving their workshop along with their traffic control system.

- Incident management programs such as Road Ranger Service Patrols, Traffic Incident Management Team, etc were discussed. Melissa Ackert explained the existing Road Ranger Service Patrols in the County.

- The benefits of Transit Monitoring Systems were discussed. The transit monitoring systems will encourage more pedestrians and bicyclists in planning their transit rides.

Erik Spillmann explained the benefits of providing the real time traffic data to public such as: less travel times and delays, efficient route planning, more patronage to public transit, etc.

Peter Buchwald talked about prioritizing the TSM&O projects as a next step to the workshop. Such projects include but not limited to:

1. Traffic Signal Coordination along US-1, Okeechobee Road,
2. Fiber Optics along priority corridors,

3. Transit reliability,
4. Identifying locations that need improvement.

Conclusion:

In conclusion, Erik Spillmann discussed various alternatives that can be implemented as a part of the master plan. Erik explained that this can be achieved only with a close coordination between the agencies. A 2nd workshop will be organized with the agencies, to discuss the alternatives/list of projects and their benefits to the public more in detail.

Meeting Adjourned at 12:00 PM

Appendix F

St. Lucie TPO Congestion Management Process Annual Report

St. Lucie Transportation Planning Organization
Congestion Management Process Annual Report
DRAFT - TIER I EVALUATION

Roadway Name	From	To	Lanes	Classification	Adopted LOS	Hourly Directional Capacity	Daily Capacity	Traffic Count Data				V/C Ratio		Level of Service		Meet LOS Standard ??		Tier I Prioritization Criteria			Tier I Prioritization Score
								Station	Count Date (1)	Peak Hour Peak Direction Volume	AADT Volume	Peak Hour Peak Direction	Daily	Peak Hour Peak Direction	Daily	Peak Hour Peak Direction	Daily	PHPD V/C Ratio	Safety	Key Stakeholder Input	
13th Street North	Avenue Q	Avenue D	2-L	Urban 2-L Major City/County Road	D	790	14,850	7051	02/24/2009	219	4,345	0.28	0.29	B	B	Yes	Yes	0	0	0	0
13th Street North	Avenue D	Orange Avenue	2-L	Urban 2-L Major City/County Road	D	790	14,850	7104	02/18/2009	235	4,816	0.30	0.32	B	B	Yes	Yes	0	0	0	0
13th Street South	Orange Avenue	Delaware Avenue	2-L	Urban 2-L Major City/County Road	D	790	14,850	7105	03/03/2009	306	5,630	0.39	0.38	B	B	Yes	Yes	0	0	0	0
13th Street South	Delaware Avenue	Georgia Avenue	2-L	Urban 2-L Major City/County Road	D	790	14,850	7106	03/03/2009	307	6,217	0.39	0.42	B	B	Yes	Yes	0	0	0	0
13th Street South	Georgia Avenue	Virginia Avenue	2-L	Urban 2-L Major City/County Road	D	790	14,850	7107	03/03/2009	424	7,049	0.54	0.47	B	B	Yes	Yes	0	0	0	0
17th Street South	Georgia Avenue	Delaware Avenue	2-L	Urban 2-L Major City/County Road without turn lanes	D	620	11,550	606	11/02/2010	139	2,497	0.22	0.22	B	B	Yes	Yes	0	0	0	0
17th Street South	Delaware Avenue	Orange Avenue	2-L	Urban 2-L Major City/County Road	D	790	14,850	607	10/12/2010	294	6,205	0.37	0.42	B	B	Yes	Yes	0	0	0	0
17th Street North	Orange Avenue	Avenue Q	2-L	Urban 2-L Major City/County Road	D	790	14,850	608	10/06/2010	187	3,939	0.24	0.27	B	B	Yes	Yes	0	0	0	0
25th Street North	US Highway 1	St. Lucie Boulevard	4-L	Urban 4-L State Arterial - Class I	D	1,960	36,700	5165	04/14/2009	260	5,221	0.13	0.14	B	B	Yes	Yes	0	0	0	0
25th Street North	St. Lucie Boulevard	Tampa Trail Boulevard	4-L	Urban 4-L State Arterial - Class I	D	1,960	36,700	0011	-	421	7,900	0.21	0.22	B	B	Yes	Yes	0	0	0	0
25th Street North	Tampa Trail Boulevard	Juanita Avenue	4-L	Urban 4-L State Arterial - Class I	D	1,960	36,700	0791	04/14/2009	297	6,949	0.15	0.19	B	B	Yes	Yes	0	0	0	0
25th Street North	Juanita Avenue	Avenue D	4-L	Urban 4-L State Arterial - Class I	D	1,960	36,700	0050	04/08/2009	669	15,940	0.34	0.43	B	B	Yes	Yes	0	0	0	0
25th Street North	Avenue D	Orange Avenue	4-L	Urban 4-L State Arterial - Class I	D	1,960	36,700	610	12/01/2010	708	17,234	0.36	0.47	B	B	Yes	Yes	0	0	0	0
25th Street South	Orange Avenue	Delaware Avenue	4-L	Urban 4-L State Arterial - Class I	D	1,960	36,700	0014	04/09/2009	829	20,240	0.42	0.55	B	B	Yes	Yes	0	0	0	0
25th Street South	Delaware Avenue	Okeechobee Road	4-L	Urban 4-L State Arterial - Class I	D	1,960	36,700	609	11/30/2010	985	23,096	0.50	0.63	B	B	Yes	Yes	0	0	0	0
25th Street South	Okeechobee Road	Virginia Avenue	4-L	Urban 4-L State Arterial - Class I	D	1,960	36,700	0015	04/15/2009	1,014	22,594	0.52	0.62	B	B	Yes	Yes	0	3	0	3
25th Street South	Virginia Avenue	Cortez Boulevard	4-L	Urban 4-L State Arterial - Class I	D	1,960	36,700	529	11/30/2010	1,217	21,451	0.62	0.58	B	B	Yes	Yes	0	5	0	5
25th Street South	Cortez Boulevard	Edwards Road	4-L	Urban 4-L State Arterial - Class I	D	1,960	36,700	0021	-	976	18,300	0.50	0.50	B	B	Yes	Yes	0	0	0	0
25th Street South	Edwards Road	Bell Avenue	4-L	Urban 4-L State Arterial - Class I	D	1,960	36,700	159	11/17/2010	1,115	18,848	0.57	0.51	B	B	Yes	Yes	0	0	0	0
25th Street South	Bell Avenue	Midway Road	4-L	Urban 4-L State Arterial - Class I	D	1,960	36,700	171	09/12/2006	1,308	17,400	0.67	0.47	B	B	Yes	Yes	0	0	0	0
25th Street South/St James Drive	Midway Road	Peachtree Blvd	4-L	Urban 4-L Major City/County Road	D	1,760	33,030	172	11/16/2010	1,052	17,254	0.60	0.52	B	B	Yes	Yes	0	0	0	0
25th Street South/St James Drive	Peachtree Blvd	St. James Boulevard	4-L	Urban 4-L Major City/County Road	D	1,760	33,030	239	09/28/2010	1,213	19,085	0.69	0.58	B	B	Yes	Yes	0	0	0	0
25th Street South/St James Drive	St. James Boulevard	Airoso Boulevard	4-L	Urban 4-L Major City/County Road	D	1,760	33,030	345	12/01/2010	1,211	24,429	0.69	0.74	B	B	Yes	Yes	0	0	0	0
33rd Street	Okeechobee Road	Delaware Avenue	2-L	Urban 2-L Major City/County Road	D	790	14,850	611	10/05/2010	337	6,468	0.43	0.44	B	B	Yes	Yes	0	0	0	0
35th Street	Kirby Loop Road	Virginia Avenue	2-L	Urban 2-L Major City/County Road	D	790	14,850	612	10/13/2010	351	5,419	0.44	0.36	B	B	Yes	Yes	0	0	0	0
35th Street	Virginia Avenue	Okeechobee Road	2-L	Urban 2-L Major City/County Road	D	790	14,850	613	10/12/2010	244	4,062	0.31	0.27	B	B	Yes	Yes	0	0	0	0
53rd Street	Angle Road	Juanita Avenue	2-L	Urban 2-L Major City/County Road without turn lanes	D	620	11,550	614	10/13/2010	134	2,248	0.22	0.19	B	B	Yes	Yes	0	0	0	0
7th Street South	Orange Avenue	Delaware Avenue	2-L	Urban 2-L Major City/County Road	D	790	14,850	7101	03/17/2009	207	3,305	0.26	0.22	B	B	Yes	Yes	0	0	0	0
7th Street South	Delaware Avenue	Georgia Avenue	2-L	Urban 2-L Major City/County Road	D	790	14,850	7102	03/03/2009	193	2,440	0.24	0.16	B	B	Yes	Yes	0	0	0	0
7th Street South	Georgia Avenue	Nebraska Avenue	2-L	Urban 2-L Major City/County Road without turn lanes	D	620	11,550	7103	03/03/2009	155	1,775	0.25	0.15	B	B	Yes	Yes	0	0	0	0
Airoso Boulevard	St. James Drive	Floresta Drive	4-L	Urban 4-L Major City/County Road	E	1,760	33,030	-	04/15/2008	1,175	20,864	0.67	0.63	B	B	Yes	Yes	0	0	0	0
Airoso Boulevard	Floresta Drive	Prima Vista Boulevard	4-L	Urban 4-L Major City/County Road	E	1,760	33,030	-	04/15/2008	723	12,977	0.41	0.39	B	B	Yes	Yes	0	0	0	0
Airoso Boulevard	Prima Vista Boulevard	Crosstown Parkway	4-L	Urban 4-L Major City/County Road	E	1,760	33,030	-	04/15/2008	794	16,858	0.45	0.51	B	B	Yes	Yes	0	0	0	0
Airoso Boulevard	Crosstown Parkway	Port St. Lucie Boulevard	4-L	Urban 4-L Major City/County Road	E	1,760	33,030	-	04/15/2008	1,077	16,587	0.61	0.50	B	B	Yes	Yes	0	0	0	0
Angle Road	Johnston Road	Kings Highway	2-L	Urban 2-L Major City/County Road	D	790	14,850	617	10/12/2010	137	2,688	0.17	0.18	B	B	Yes	Yes	0	0	10	10
Angle Road	Kings Highway	53rd Street	2-L	Urban 2-L Major City/County Road	D	790	14,850	616	11/02/2010	236	4,385	0.30	0.30	B	B	Yes	Yes	0	0	10	10
Angle Road	53rd Street	Avenue Q	2-L	Urban 2-L Major City/County Road	D	790	14,850	615	11/03/2010	328	6,715	0.42	0.45	B	B	Yes	Yes	0	0	0	0
Angle Road	Avenue Q	Orange Avenue	2-L	Urban 2-L Major City/County Road	D	790	14,850	0199	02/18/2009	495	9,188	0.63	0.62	C	C	Yes	Yes	0	0	0	0
Avenue A	Indian River Drive	US Highway 1	2-L	Urban 2-L Major City/County Road	D	790	14,850	5033	04/08/2009	156	2,514	0.20	0.17	B	B	Yes	Yes	0	0	10	10
Avenue A	US Highway 1	7th Street North	2-L	Urban 2-L One-Way Major City/County Road	D	1,760	33,030	5034	04/08/2009	173	1,670	0.10	0.05	B	B	Yes	Yes	0	0	10	10
Avenue D	US Highway 1	7th Street North	2-L	Urban 2-L Major City/County Road without turn lanes	D	620	11,550	160	09/29/2010	134	2,976	0.22	0.26	B	B	Yes	Yes	0	0	0	0
Avenue D	7th Street North	13th Street North	2-L	Urban 2-L Major City/County Road without turn lanes	D	620	11,550	161	09/29/2010	188	4,933	0.30	0.43	B	B	Yes	Yes	0	0	0	0
Avenue D	13th Street North	17th Street North	2-L	Urban 2-L Major City/County Road without turn lanes	D	620	11,550	162	09/30/2010	216	5,290	0.35	0.46	B	B	Yes	Yes	0	0	0	0
Avenue D	17th Street North	25th Street North	2-L	Urban 2-L Major City/County Road without turn lanes	D	620	11,550	163	09/29/2010	216	5,463	0.35	0.47	B	B	Yes	Yes	0	0	0	0
Avenue D	25th Street North	Angle Road	2-L	Urban 2-L Major City/County Road without turn lanes	D	620	11,550	164	09/22/2010	216	5,023	0.35	0.43	B	B	Yes	Yes	0	0	0	0
Avenue I	25th Street North	13th Street North	2-L	Urban 2-L Major City/County Road without turn lanes	D	620	11,550	620	10/13/2010	185	2,949	0.30	0.26	B	B	Yes	Yes	0	0	0	0
Bayshore Boulevard	St. James Drive	Floresta Drive	2-L	Urban 2-L Major City/County Road	E	790	14,850	622	12/01/2010	536	11,951	0.68	**0.80**	C	C	Yes	Yes	0	0	10	10
Bayshore Boulevard	Floresta Drive	Prima Vista Boulevard	2-L	Urban 2-L Major City/County Road	E	790	14,850	7069	04/21/2009	644	14,476	**0.82**	**0.97**	C	D	Yes	Yes	4	0	10	14
Bayshore Boulevard	Prima Vista Boulevard	Crosstown Parkway	4-L	Urban 4-L Major City/County Road	E	1,760	33,030	307	12/01/2010	1,146	25,258	0.65	0.76	B	B	Yes	Yes	0	0	0	0
Bayshore Boulevard	Crosstown Parkway	Thornhill Drive	4-L	Urban 4-L Major City/County Road	E	1,760	33,030	8508	-	1,120	21,000	0.64	0.64	B	B	Yes	Yes	0	0	0	0
Bayshore Boulevard	Thornhill Drive	Port St. Lucie Boulevard	4-L	Urban 4-L Major City/County Road	E	1,760	33,030	309	12/01/2010	945	22,285	0.54	0.67	B	B	Yes	Yes	0	0	0	0
Bayshore Boulevard	Port St. Lucie Boulevard	Oakridge Drive	4-L	Urban 4-L Major City/County Road	E	1,760	33,030	621	10/20/2010	258	5,321	0.15	0.16	B	B	Yes	Yes	0	0	0	0
Becker Road	Interstate 95	Savona Boulevard	4-L	Urban 4-L Non-State Arterial - Class II with right-turn lanes	E	1,780	33,350	625	11/09/2010	893	8,941	0.50	0.27	C	C	Yes	Yes	0	0	0	0
Becker Road	Savona Boulevard	Port St. Lucie Boulevard	4-L	Urban 4-L Non-State Arterial - Class I with right-turn lanes	E	1,860	34,870	626	11/09/2010	320	5,822	0.17	0.17	B	B	Yes	Yes	0	0	0	0
Becker Road	Port St. Lucie Boulevard	Darwin Boulevard	4-L	Urban 4-L Non-State Arterial - Class I with right-turn lanes	E	1,860	34,870	7067	05/05/2009	416	5,475	0.22	0.16	B	B	Yes	Yes	0	0	0	0
Becker Road	Darwin Boulevard	Florida's Turnpike	4-L	Urban 4-L Non-State Arterial - Class I with right-turn lanes	E	1,860	34,870	627	11/10/2010	920	11,033	0.49	0.32	B	B	Yes	Yes	0	0	0	0
Becker Road	Florida's Turnpike	Southbend Boulevard	4-L	Urban 4-L Non-State Arterial - Class II with right-turn lanes	E	1,780	33,350	628	11/10/2010	857	9,684	0.48	0.29	C	C	Yes	Yes	0	0	0	0
Bell Avenue	Oleander Avenue	Sunrise Boulevard	2-L	Urban 2-L Major City/County Road without turn lanes	D	620	11,550	7002	03/24/2009	207	2,956	0.33	0.26	B	B	Yes	Yes	0	0	0	0
Bell Avenue	Sunrise Boulevard	25th Street South	2-L	Urban 2-L Major City/County Road without turn lanes	D	620	11,550	7003	03/24/2009	214	3,007	0.35	0.26	B	B	Yes	Yes	0	0	0	0
California Boulevard	University Drive	St. Lucie West Boulevard	2-L	Urban 2-L Major City/County Road	E	790	14,850	7060	03/31/2009	360	6,999	0.46	0.47	B	B	Yes	Yes	0	0	10	10
California Boulevard	St. Lucie West Boulevard	Crosstown Parkway	2-L	Urban 2-L Major City/County Road	E	790	14,850	234	09/29/2010	568	12,101	0.72	**0.81**	C	C	Yes	Yes	0	0	10	10
California Boulevard	Crosstown Parkway	Del Rio Boulevard	2-L	Urban 2-L Major City/County Road	E	790	14,850	636	09/30/2010	618	11,787	0.78	0.79	C	C	Yes	Yes	0	0	10	10
California Boulevard	Del Rio Boulevard	Savona Boulevard	2-L	Urban 2-L Major City/County Road	E	790	14,850	635	12/02/2010	593	10,509	0.75	0.71	C	C	Yes	Yes	0	0	10	10
California Boulevard	Savona Boulevard	Del Rio Boulevard	2-L	Urban 2-L Major City/County Road	E	790	14,850	634	10/26/2010	538	10,997	0.68	0.74	C	C	Yes	Yes	0	0	10	10
California Boulevard	Del Rio Boulevard	Cameo Boulevard	2-L	Urban 2-L Major City/County Road	E	790	14,850	633	10/26/2010	324	5,953	0.41	0.40	B	B	Yes	Yes	0	0	10	10
Cameo Boulevard	Port St. Lucie Boulevard	California Boulevard	2-L	Urban 2-L Major City/County Road	E	790	14,850	638	10/20/2010	257	4,622	0.33	0.31	B	B	Yes	Yes	0	0	0	0
Cameo Boulevard	California Boulevard	Crosstown Parkway	2-L	Urban 2-L Major City/County Road	E	790	14,850	639	10/20/2010	439	7,138	0.56	0.48	B	B	Yes	Yes	0	0	0	0

St. Lucie Transportation Planning Organization
Congestion Management Process Annual Report
DRAFT - TIER I EVALUATION

Roadway Name	From	To	Lanes	Classification	Adopted LOS	Hourly Directional Capacity	Daily Capacity	Traffic Count Data				V/C Ratio		Level of Service		Meet LOS Standard ??		Tier I Prioritization Criteria			Tier I Prioritization Score
								Station	Count Date (1)	Peak Hour Peak Direction Volume	AADT Volume	Peak Hour Peak Direction	Daily	Peak Hour Peak Direction	Daily	Peak Hour Peak Direction	Daily	PHPD V/C Ratio	Safety	Key Stakeholder Input	
Cashmere Boulevard	Peacock Boulevard	St. Lucie West Boulevard	2-L	Urban 2-L Major City/County Road	E	790	14,850	7058	03/31/2009	494	8,733	0.63	0.59	C	C	Yes	Yes	0	0	10	10
Cashmere Boulevard	St. Lucie West Boulevard	Crosstown Parkway	2-L	Urban 2-L Major City/County Road	E	790	14,850	232	09/22/2010	549	11,852	0.69	0.80	C	C	Yes	Yes	0	0	10	10
Cashmere Boulevard	Crosstown Parkway	Del Rio Boulevard	2-L	Urban 2-L Major City/County Road	E	790	14,850	642	10/20/2010	463	8,448	0.59	0.57	C	B	Yes	Yes	0	0	0	0
Citrus Avenue	US Highway 1	Indian River Drive	4-L	Urban 4-L State Arterial - Class I	D	1,960	36,700	0160	04/08/2009	415	6,140	0.21	0.17	B	B	Yes	Yes	0	0	10	10
Commerce Center Parkway	Crosstown Parkway	St. Lucie West Boulevard	4-L	Urban 4-L Non-State Arterial - Class I	E	1,760	33,030	645	11/09/2010	75	1,178	0.04	0.04	B	B	Yes	Yes	0	0	0	0
Commerce Center Parkway	St. Lucie West Boulevard	Glades Cut-Off Road	2-L	Urban 2-L Non-State Arterial - Class I	E	790	14,850	646	11/10/2010	251	3,687	0.32	0.25	B	B	Yes	Yes	0	0	0	0
Crosstown Parkway	Village Parkway	Interstate 95	4-L	Urban 4-L Non-State Arterial - Class I (CTP)	E	2,230	42,840	650	10/20/2010	254	5,093	0.11	0.12	A	A	Yes	Yes	0	0	0	0
Crosstown Parkway	Interstate 95	California Boulevard	6-L	Urban 6-L Non-State Arterial - Class I (CTP)	E	3,350	64,200	651	10/20/2010	856	13,190	0.26	0.21	B	B	Yes	Yes	0	0	0	0
Crosstown Parkway	California Boulevard	Cashmere Boulevard	6-L	Urban 6-L Non-State Arterial - Class I (CTP)	E	3,350	64,200	652	10/20/2010	775	13,779	0.23	0.21	B	B	Yes	Yes	0	0	0	0
Crosstown Parkway	Cashmere Boulevard	Cameo Boulevard	6-L	Urban 6-L Non-State Arterial - Class I (CTP)	E	3,350	64,200	653	10/20/2010	741	16,410	0.22	0.26	B	B	Yes	Yes	0	0	0	0
Crosstown Parkway	Cameo Boulevard	Bayshore Boulevard	6-L	Urban 6-L Non-State Arterial - Class I (CTP)	E	3,350	64,200	654	10/20/2010	898	19,980	0.27	0.31	B	B	Yes	Yes	0	0	0	0
Crosstown Parkway	Bayshore Boulevard	Airoso Boulevard	6-L	Urban 6-L Non-State Arterial - Class I (CTP)	E	3,350	64,200	655	10/26/2010	620	12,530	0.19	0.20	B	B	Yes	Yes	0	0	0	0
Crosstown Parkway	Airoso Boulevard	Sandia Drive	6-L	Urban 6-L Non-State Arterial - Class I (CTP)	E	3,350	64,200	656	10/26/2010	355	7,173	0.11	0.11	A	A	Yes	Yes	0	0	0	0
Crosstown Parkway	Sandia Drive	Ocean Lane	2-L	Urban 2-L Major City/County Road without turn lanes	E	620	11,550	657	10/26/2010	245	4,919	0.40	0.43	B	B	Yes	Yes	0	0	0	0
Crosstown Parkway	Ocean Lane	Floresta Drive	2-L	Urban 2-L Major City/County Road without turn lanes	E	620	11,550	658	10/26/2010	211	3,961	0.34	0.34	B	B	Yes	Yes	0	0	0	0
Darwin Boulevard	Port St. Lucie Boulevard	Tulip Boulevard	2-L	Urban 2-L Major City/County Road	D	790	14,850	659	11/10/2010	545	11,353	0.69	0.76	C	C	Yes	Yes	0	0	0	0
Del Rio Boulevard	Cashmere Boulevard	California Boulevard	2-L	Urban 2-L Major City/County Road	E	790	14,850	660	11/10/2010	459	8,618	0.58	0.58	B	B	Yes	Yes	0	0	0	0
Del Rio Boulevard	California Boulevard	Port St. Lucie Boulevard	2-L	Urban 2-L Major City/County Road	E	790	14,850	311	09/22/2010	481	10,995	0.61	0.74	C	C	Yes	Yes	0	0	0	0
Delaware Avenue	Hartman Road	Angle Road	2-L	Urban 2-L Major City/County Road	D	790	14,850	662	11/02/2010	320	2,414	0.41	0.16	B	B	Yes	Yes	0	0	0	0
Delaware Avenue	17th Street South	13th Street South	2-L	Urban 2-L Non-State Arterial - Class II	D	730	13,680	663	11/03/2010	534	11,532	0.73	**0.84**	D	D	Yes	Yes	0	0	0	0
Delaware Avenue	13th Street South	7th Street South	2-L	Urban 2-L Non-State Arterial - Class II	D	730	13,680	664	11/03/2010	411	8,697	0.56	0.64	C	C	Yes	Yes	0	0	0	0
Delaware Avenue	7th Street South	US Highway 1	2-L	Urban 2-L Non-State Arterial - Class II	D	730	13,680	665	11/03/2010	390	7,032	0.53	0.51	C	C	Yes	Yes	0	0	0	0
Edwards Road	Jenkins Road	McNeil Road	2-L	Urban 2-L Major City/County Road	D	790	14,850	-	10/16/2007	469	9,964	0.59	0.67	C	C	Yes	Yes	0	0	0	0
Edwards Road	McNeil Road	Selvitz Road	2-L	Urban 2-L Major City/County Road	D	790	14,850	174	10/19/2010	508	10,296	0.64	0.69	C	C	Yes	Yes	0	0	0	0
Edwards Road	Selvitz Road	25th Street South	2-L	Urban 2-L Major City/County Road	D	790	14,850	110	10/20/2010	495	10,293	0.63	0.69	C	C	Yes	Yes	0	0	0	0
Edwards Road	25th Street South	Sunrise Boulevard	4-L	Urban 4-L Major City/County Road	D	1,760	33,030	108	11/17/2010	660	14,212	0.38	0.43	B	B	Yes	Yes	0	0	0	0
Edwards Road	Sunrise Boulevard	Oleander Avenue	4-L	Urban 4-L Major City/County Road	D	1,760	33,030	502	11/17/2010	551	11,958	0.31	0.36	B	B	Yes	Yes	0	0	0	0
Edwards Road	Oleander Avenue	US Highway 1	4-L	Urban 4-L Major City/County Road	D	1,760	33,030	173	12/01/2010	402	9,076	0.23	0.27	B	B	Yes	Yes	0	0	0	0
Emerson Avenue	North Boulevard	Indrio Road	2-L	Urban 2-L State Arterial - Class I	D	880	16,500	7004	02/18/2009	321	4,568	0.36	0.28	B	B	Yes	Yes	0	0	0	0
Farmers Market Road	Oleander Avenue	US Highway 1	2-L	Urban 2-L Major City/County Road without turn lanes	D	620	11,550	7010	03/24/2009	130	1,950	0.21	0.17	B	B	Yes	Yes	0	0	0	0
Floresta Drive	Bayshore Boulevard	Airoso Boulevard	2-L	Urban 2-L Major City/County Road	E	790	14,850	7073	04/07/2009	221	3,478	0.28	0.23	B	B	Yes	Yes	0	0	0	0
Floresta Drive	Airoso Boulevard	Prima Vista Boulevard	2-L	Urban 2-L Major City/County Road	E	790	14,850	7006	-	512	9,600	0.65	0.65	C	C	Yes	Yes	0	0	0	0
Floresta Drive	Prima Vista Boulevard	Crosstown Parkway	2-L	Urban 2-L Major City/County Road	E	790	14,850	7008	04/07/2009	647	12,181	**0.82**	**0.82**	C	C	Yes	Yes	4	0	0	4
Floresta Drive	Crosstown Parkway	Port St. Lucie Boulevard	2-L	Urban 2-L Major City/County Road	E	790	14,850	315	09/22/2010	759	15,287	**0.96**	**1.03**	D	**F**	Yes	**No**	6	0	0	6
Floresta Drive	Port St. Lucie Boulevard	Southbend Boulevard	2-L	Urban 2-L Major City/County Road	E	790	14,850	7076	04/07/2009	629	11,273	0.80	0.76	C	C	Yes	Yes	0	0	10	10
Florida's Turnpike	North of Okeechobee Road		4-L	Urban 4-L Freeway	C	3,020	59,800	0421	-	1,448	27,144	0.48	0.45	B	B	Yes	Yes	0	0	0	0
Florida's Turnpike	Okeechobee Road	Port St. Lucie Boulevard	4-L	Urban 4-L Freeway	C	3,020	59,800	1964	-	1,654	31,000	0.55	0.52	B	B	Yes	Yes	0	0	0	0
Florida's Turnpike	Port St. Lucie Boulevard	Becker Road	4-L	Urban 4-L Freeway	C	3,020	59,800	1960	-	1,958	36,700	0.65	0.61	B	B	Yes	Yes	0	0	0	0
Florida's Turnpike	South of Becker Road		4-L	Urban 4-L Freeway	C	3,020	59,800	1958	-	2,171	40,700	0.72	0.68	B	B	Yes	Yes	0	0	0	0
Gatlin Boulevard	Interstate 95	Savage Boulevard	6-L	Urban 6-L Non-State Arterial - Class I with right-turn lanes	E	2,790	52,540	5075	-	2,054	38,500	0.74	0.73	B	B	Yes	Yes	0	0	0	0
Gatlin Boulevard	Savage Boulevard	Savona Boulevard	6-L	Urban 6-L Non-State Arterial - Class I with right-turn lanes	E	2,790	52,540	304	05/25/2005	1,258	24,300	0.45	0.46	B	B	Yes	Yes	0	0	0	0
Gatlin Boulevard	Savona Boulevard	Port St. Lucie Boulevard	6-L	Urban 6-L Non-State Arterial - Class I with right-turn lanes	E	2,790	52,540	0718	08/27/2007	1,294	35,862	0.46	0.68	B	B	Yes	Yes	0	0	0	0
Georgia Avenue	US Highway 1	7th Street South	2-L	Urban 2-L Major City/County Road without turn lanes	D	620	11,550	7093	03/03/2009	126	2,029	0.20	0.18	B	B	Yes	Yes	0	0	10	10
Georgia Avenue	7th Street South	13th Street South	2-L	Urban 2-L Major City/County Road without turn lanes	D	620	11,550	7094	03/03/2009	145	2,128	0.23	0.18	B	B	Yes	Yes	0	0	0	0
Georgia Avenue	13th Street South	Okeechobee Road	2-L	Urban 2-L Major City/County Road without turn lanes	D	620	11,550	667	10/13/2010	194	3,891	0.31	0.34	B	B	Yes	Yes	0	0	0	0
Gilson Road	Becker Road	Martin County Line	2-L	Urban 2-L Major City/County Road	D	790	14,850	111	09/22/2010	599	8,923	0.76	0.60	C	C	Yes	Yes	0	0	0	0
Glades Cut-Off Road	Selvitz Road	Jenkins Road	2-L	Urban 2-L Major City/County Road	D	790	14,850	113	10/05/2010	204	3,924	0.26	0.26	B	B	Yes	Yes	0	0	10	10
Glades Cut-Off Road	Jenkins Road	Midway Road	2-L	Urban 2-L Major City/County Road	D	790	14,850	115	10/13/2010	353	6,018	0.45	0.41	B	B	Yes	Yes	0	0	0	0
Glades Cut-Off Road	Midway Road	Reserve Blvd	2-L	Urban 2-L Major City/County Road	D	790	14,850	7014	03/17/2009	198	2,953	0.25	0.20	B	B	Yes	Yes	0	0	0	0
Glades Cut-Off Road	Reserve Blvd	Range Line Road	2-L	Urban 2-L Major City/County Road	D	790	14,850	119	10/05/2010	401	3,389	0.51	0.23	B	B	Yes	Yes	0	0	0	0
Green River Parkway	Walton Road	Melaleuca Boulevard	2-L	Urban 2-L Major City/County Road	D	790	14,850	7077	-	123	2,300	0.16	0.15	B	B	Yes	Yes	0	0	0	0
Header Canal Road	Orange Avenue	Okeechobee Road	2-L	Urban 2-L Major City/County Road	D	790	14,850	7018	02/24/2009	26	365	0.03	0.02	B	B	Yes	Yes	0	0	0	0
Indian River Drive	Seaway Drive	A.E. Backus Avenue	2-L	Urban 2-L State Arterial - Class II	D	810	15,200	0004	06/10/2009	328	7,090	0.40	0.47	C	C	Yes	Yes	0	0	0	0
Indian River Drive	A.E. Backus Avenue	Orange Avenue	2-L	Urban 2-L State Arterial - Class II	D	810	15,200	0003	04/08/2009	326	5,865	0.40	0.39	C	C	Yes	Yes	0	0	0	0
Indian River Drive	Orange Avenue	Citrus Avenue	2-L	Urban 2-L State Arterial - Class II	D	810	15,200	5029	04/08/2009	419	6,355	0.52	0.42	C	C	Yes	Yes	0	0	0	0
Indian River Drive	Citrus Avenue	Savannah Road	2-L	Urban 2-L Major City/County Road	D	790	14,850	501	09/23/2010	306	4,279	0.39	0.29	B	B	Yes	Yes	0	0	0	0
Indian River Drive	Savannah Road	Midway Road	2-L	Urban 2-L Major City/County Road	D	790	14,850	123	09/23/2010	328	4,545	0.42	0.31	B	B	Yes	Yes	0	0	0	0
Indian River Drive	Midway Road	Walton Road	2-L	Urban 2-L Major City/County Road	D	790	14,850	125	11/17/2010	226	3,802	0.29	0.26	B	B	Yes	Yes	0	0	0	0
Indian River Drive	Walton Road	Martin County Line	2-L	Urban 2-L Major City/County Road	D	790	14,850	127	09/23/2010	316	5,594	0.40	0.38	B	B	Yes	Yes	0	0	0	0
Indrio Road	West of Interstate 95		2-L	Urban 2-L State Arterial - Class I	D	880	16,500	128	07/09/2007	121	1,814	0.14	0.11	B	B	Yes	Yes	0	0	0	0
Indrio Road	Interstate 95	Johnston Road	2-L	Urban 2-L State Arterial - Class I	D	880	16,500	0038	04/14/2009	725	9,034	**0.82**	0.55	C	B	Yes	Yes	4	0	0	4
Indrio Road	Johnston Road	Emerson Avenue	2-L	Urban 2-L State Arterial - Class I	D	880	16,500	116	02/22/2005	725	9,700	**0.82**	0.59	C	C	Yes	Yes	4	0	0	4
Indrio Road	Emerson Avenue	Kings Highway	2-L	Urban 2-L State Arterial - Class I	D	880	16,500	0281	04/08/2009	578	11,092	0.66	0.67	C	C	Yes	Yes	0	0	10	10
Indrio Road	Kings Highway	US Highway 1	2-L	Urban 2-L Non-State Arterial - Class I	D	790	14,850	7012	-	293	5,500	0.37	0.37	B	B	Yes	Yes	0	0	10	10
Indrio Road	US Highway 1	Old Dixie Highway	2-L	Urban 2-L Non-State Arterial - Class I	D	790	14,850	672	10/12/2010	76	1,171	0.10	0.08	B	B	Yes	Yes	0	0	0	0

FINAL DRAFT

St. Lucie Transportation Planning Organization
Congestion Management Process Annual Report
DRAFT - TIER I EVALUATION

Roadway Name	From	To	Lanes	Classification	Adopted LOS	Hourly Directional Capacity	Daily Capacity	Traffic Count Data				V/C Ratio		Level of Service		Meet LOS Standard ??		Tier I Prioritization Criteria			Tier I Prioritization Score
								Station	Count Date (1)	Peak Hour Peak Direction Volume	AADT Volume	Peak Hour Peak Direction	Daily	Peak Hour Peak Direction	Daily	Peak Hour Peak Direction	Daily	PHPD V/C Ratio	Safety	Key Stakeholder Input	
Interstate 95	Indrio Road	Orange Avenue	4-L	Urban 4-L Freeway	C	3,020	59,800	1905	-	1,921	36,000	0.64	0.60	B	B	Yes	Yes	0	5	0	5
Interstate 95	Orange Avenue	Okeechobee Road	4-L	Urban 4-L Freeway	C	3,020	59,800	0260	-	2,552	47,834	0.85	0.80	C	C	Yes	Yes	4	5	0	9
Interstate 95	Okeechobee Road	Midway Road	6-L	Urban 6-L Freeway	C	4,580	90,500	1902	04/22/2009	2,598	59,089	0.57	0.65	B	B	Yes	Yes	0	0	0	0
Interstate 95	Midway Road	St. Lucie West Boulevard	6-L	Urban 6-L Freeway	C	4,580	90,500	1904	04/22/2009	2,634	60,228	0.58	0.67	B	B	Yes	Yes	0	5	0	5
Interstate 95	St. Lucie West Boulevard	Crosstown Parkway	6-L	Urban 6-L Freeway with auxiliary lanes	C	5,580	110,500	1901	04/22/2009	2,539	63,562	0.46	0.58	B	B	Yes	Yes	0	5	0	5
Interstate 95	Crosstown Parkway	Gatlin Boulevard	6-L	Urban 6-L Freeway	C	4,580	90,500	1901	04/22/2009	2,539	63,562	0.55	0.70	B	B	Yes	Yes	0	5	0	5
Interstate 95	Gatlin Boulevard	Becker Road	6-L	Urban 6-L Freeway	C	4,580	90,500	0334	-	2,735	51,266	0.60	0.57	B	B	Yes	Yes	0	0	0	0
Jenkins Road	Orange Avenue	Okeechobee Road	2-L	Urban 2-L Major City/County Road	D	790	14,850	131	09/29/2010	351	7,456	0.44	0.50	B	B	Yes	Yes	0	0	0	0
Jenkins Road	Okeechobee Road	Edwards Road	2-L	Urban 2-L Major City/County Road	D	790	14,850	7027	02/24/2009	335	6,454	0.42	0.43	B	B	Yes	Yes	0	0	0	0
Jennings Road	US Highway 1	Lennard Road	4-L	Urban 4-L Major City/County Road	E	1,760	33,030	673	10/26/2010	259	4,694	0.15	0.14	B	B	Yes	Yes	0	0	0	0
Johnston Road	Indian River County Line	Indrio Road	2-L	Urban 2-L Major City/County Road	D	790	14,850	7029	02/18/2009	346	6,201	0.44	0.42	B	B	Yes	Yes	0	0	0	0
Johnston Road	St. Lucie Boulevard	Angle Road	2-L	Urban 2-L Major City/County Road	D	790	14,850	674	10/12/2010	88	1,815	0.11	0.12	B	B	Yes	Yes	0	0	0	0
Juanita Avenue	US Highway 1	17th Street North	2-L	Urban 2-L Major City/County Road without turn lanes	D	620	11,550	7015	-	181	3,400	0.29	0.29	B	B	Yes	Yes	0	0	0	0
Juanita Avenue	17th Street North	25th Street North	2-L	Urban 2-L Major City/County Road without turn lanes	D	620	11,550	7017	02/18/2009	173	3,352	0.28	0.29	B	B	Yes	Yes	0	0	0	0
Juanita Avenue	25th Street North	53rd Street North	2-L	Urban 2-L Major City/County Road without turn lanes	D	620	11,550	7019	02/18/2009	320	5,473	0.52	0.47	B	B	Yes	Yes	0	0	0	0
Kings Highway	US Highway 1	Winter Garden Parkway	2-L	Urban 2-L State Arterial - Class I	D	880	16,500	0269	04/07/2009	554	10,085	0.63	0.61	C	C	Yes	Yes	0	0	0	0
Kings Highway	Winter Garden Parkway	Indrio Road	2-L	Urban 2-L State Arterial - Class I	D	880	16,500	0745	04/08/2009	744	14,912	0.85	0.90	C	C	Yes	Yes	4	0	10	14
Kings Highway	Indrio Road	Grove Road	2-L	Urban 2-L State Arterial - Class I	D	880	16,500	0006	04/08/2009	771	14,710	0.88	0.89	C	C	Yes	Yes	4	0	10	14
Kings Highway	Grove Road	St. Lucie Boulevard	2-L	Urban 2-L State Arterial - Class I	D	880	16,500	0749	04/08/2009	644	14,626	0.73	0.89	C	C	Yes	Yes	0	0	10	10
Kings Highway	St. Lucie Boulevard	Angle Road	2-L	Urban 2-L State Arterial - Class I	D	880	16,500	0751	04/15/2009	577	13,259	0.66	0.80	C	C	Yes	Yes	0	0	10	10
Kings Highway	Angle Road	Orange Avenue	2-L	Urban 2-L State Arterial - Class I	D	880	16,500	0077	02/19/2007	989	21,000	1.12	1.27	F	F	No	No	10	5	10	25
Kings Highway	Orange Avenue	Picos Road	2-L	Urban 2-L State Arterial - Class I	D	880	16,500	0076	04/15/2009	389	8,320	0.44	0.50	B	B	Yes	Yes	0	5	10	15
Kings Highway	Picos Road	Okeechobee Road	2-L	Urban 2-L State Arterial - Class I	D	880	16,500	0757	04/15/2009	347	8,364	0.39	0.51	B	B	Yes	Yes	0	0	0	0
Kitterman Road	Oleander Avenue	US Highway 1	2-L	Urban 2-L Major City/County Road without turn lanes	D	620	11,550	7021	03/24/2009	136	2,575	0.22	0.22	B	B	Yes	Yes	0	0	0	0
Lennard Road	Walton Road	Tiffany Avenue	4-L	Urban 4-L Major City/County Road	E	1,760	33,030	323	10/26/2010	285	5,981	0.16	0.18	B	B	Yes	Yes	0	0	0	0
Lennard Road	Tiffany Avenue	Mariposa Avenue	4-L	Urban 4-L Major City/County Road	E	1,760	33,030	325	10/26/2010	744	16,142	0.42	0.49	B	B	Yes	Yes	0	0	0	0
Mariposa Avenue	Calais Street	Lennard Road	2-L	Urban 2-L Major City/County Road without turn lanes	E	620	11,550	7052	04/21/2009	476	5,991	0.77	0.52	C	B	Yes	Yes	0	0	0	0
Mariposa Avenue	Lennard Road	US Highway 1	4-L	Urban 4-L Major City/County Road	E	1,760	33,030	167	10/22/2007	490	6,903	0.28	0.21	B	B	Yes	Yes	0	0	0	0
Midport Road/Veterans Memorial Pkwy	US Highway 1	Lyngate Drive	4-L	Urban 4-L Non-State Arterial - Class I	E	1,760	33,030	327	10/22/2007	749	11,967	0.43	0.36	B	B	Yes	Yes	0	0	0	0
Midport Road/Veterans Memorial Pkwy	Lyngate Drive	Port St. Lucie Boulevard	4-L	Urban 4-L Non-State Arterial - Class I	E	1,760	33,030	8536	-	838	15,700	0.48	0.48	B	B	Yes	Yes	0	0	0	0
Midway Road	Indian River Drive	US Highway 1	2-L	Urban 2-L Non-State Arterial - Class I	D	790	14,850	0023	03/24/2009	283	3,275	0.36	0.22	B	B	Yes	Yes	0	0	0	0
Midway Road	US Highway 1	Oleander Avenue	2-L	Urban 2-L Non-State Arterial - Class I	D	790	14,850	8540	-	608	11,400	0.77	0.77	C	C	Yes	Yes	0	0	0	0
Midway Road	Oleander Avenue	Sunrise Boulevard	2-L	Urban 2-L Non-State Arterial - Class I	D	790	14,850	242	09/29/2010	630	14,388	0.80	0.97	C	D	Yes	Yes	0	0	0	0
Midway Road	Sunrise Boulevard	25th Street South	2-L	Urban 2-L Non-State Arterial - Class I	D	790	14,850	130	09/29/2010	683	14,989	0.86	1.01	C	F	Yes	No	4	0	0	4
Midway Road	25th Street South	Selvitz Road	2-L	Urban 2-L Non-State Arterial - Class I	D	790	14,850	132	10/13/2010	629	13,025	0.80	0.88	C	C	Yes	Yes	0	0	0	0
Midway Road	Selvitz Road	East Torino Parkway	2-L	Urban 2-L Non-State Arterial - Class I	D	790	14,850	134	10/13/2010	666	14,597	0.84	0.98	C	D	Yes	Yes	4	0	0	4
Midway Road	East Torino Parkway	Glades Cut-Off Road	4-L	Urban 4-L Non-State Arterial - Class I	D	1,760	33,030	228	09/23/2010	738	14,813	0.42	0.45	B	B	Yes	Yes	0	0	0	0
Midway Road	Glades Cut-Off Road	Interstate 95	4-L	Urban 4-L Non-State Arterial - Class I	D	1,760	33,030	5140	05/07/2009	737	14,121	0.42	0.43	B	B	Yes	Yes	0	0	0	0
Midway Road	Interstate 95	Okeechobee Road	2-L	Urban 2-L Non-State Arterial - Class I	D	790	14,850	0732	04/21/2009	260	4,977	0.33	0.34	B	B	Yes	Yes	0	0	0	0
Okeechobee Road	Okeechobee County Line	Midway Road	2-L	Transitioning 2-L State Arterial - Uninterrupted Flow	C	800	15,100	0039	04/22/2009	317	6,222	0.40	0.41	B	B	Yes	Yes	0	0	0	0
Okeechobee Road	Midway Road	Matthews Road	4-L	Transitioning 4-L State Arterial - Uninterrupted Flow	C	2,420	45,400	0195	-	272	5,100	0.11	0.11	B	B	Yes	Yes	0	0	0	0
Okeechobee Road	Matthews Road	Kings Highway	4-L	Urban 4-L State Arterial - Class I	C	1,890	35,500	0025	04/15/2009	354	7,415	0.19	0.21	B	B	Yes	Yes	0	0	0	0
Okeechobee Road	Kings Highway	Crossroads Parkway	4-L	Urban 4-L State Arterial - Class I	C	1,890	35,500	0748	05/07/2009	1,027	24,977	0.54	0.70	B	B	Yes	Yes	0	5	10	15
Okeechobee Road	Crossroads Parkway	Interstate 95	4-L	Urban 4-L State Arterial - Class I	C	1,890	35,500	0106	04/08/2009	1,241	31,762	0.66	0.89	B	C	Yes	Yes	0	5	10	15
Okeechobee Road	Interstate 95	Jenkins Road	6-L	Urban 6-L State Arterial - Class I	D	2,940	55,300	0029	04/08/2009	1,283	26,368	0.44	0.48	B	B	Yes	Yes	0	0	0	0
Okeechobee Road	Jenkins Road	McNeil Road	6-L	Urban 6-L State Arterial - Class I	D	2,940	55,300	136	03/22/2005	1,549	30,400	0.53	0.55	B	B	Yes	Yes	0	0	0	0
Okeechobee Road	McNeil Road	Virginia Avenue	6-L	Urban 6-L State Arterial - Class I	D	2,940	55,300	0742	08/08/2007	1,482	33,228	0.50	0.60	B	B	Yes	Yes	0	0	0	0
Okeechobee Road	Virginia Avenue	35th Street South	4-L	Urban 4-L State Arterial - Class II	D	1,770	33,200	688	11/03/2010	627	13,565	0.35	0.41	C	C	Yes	Yes	0	0	0	0
Okeechobee Road	35th Street South	25th Street South	4-L	Urban 4-L State Arterial - Class II	D	1,770	33,200	689	11/03/2010	684	15,123	0.39	0.46	C	C	Yes	Yes	0	0	0	0
Okeechobee Road	25th Street South	Delaware Avenue	4-L	Urban 4-L State Arterial - Class II	D	1,770	33,200	690	11/03/2010	650	13,650	0.37	0.41	C	C	Yes	Yes	0	0	0	0
Old Dixie Highway	St. Lucie Boulevard	Harbor Branch Road	2-L	Urban 2-L Non-State Arterial - Class I	D	790	14,850	227	09/29/2010	122	2,582	0.15	0.17	B	B	Yes	Yes	0	0	0	0
Oleander Avenue	Sunrise Boulevard	Virginia Avenue	2-L	Urban 2-L State Arterial - Class I	D	880	16,500	5062	03/10/2009	248	4,674	0.28	0.28	B	B	Yes	Yes	0	0	0	0
Oleander Avenue	Virginia Avenue	Azalea Avenue	2-L	Urban 2-L State Arterial - Class I	D	880	16,500	505	09/22/2010	420	9,238	0.48	0.56	B	B	Yes	Yes	0	0	0	0
Oleander Avenue	Azalea Avenue	Edwards Road	2-L	Urban 2-L State Arterial - Class I	D	880	16,500	507	09/11/2006	682	14,100	0.78	0.85	C	C	Yes	Yes	0	0	0	0
Oleander Avenue	Edwards Road	Bell Avenue	2-L	Urban 2-L State Arterial - Class I	D	880	16,500	240	10/06/2010	404	9,137	0.46	0.55	B	B	Yes	Yes	0	0	0	0
Oleander Avenue	Bell Avenue	Midway Road	2-L	Urban 2-L State Arterial - Class I	D	880	16,500	139	10/06/2010	416	6,853	0.47	0.42	B	B	Yes	Yes	0	0	0	0
Oleander Avenue	Midway Road	Saeger Avenue	2-L	Urban 2-L Major City/County Road	D	790	14,850	7032	03/10/2009	411	6,373	0.52	0.43	B	B	Yes	Yes	0	0	0	0
Oleander Avenue	Saeger Avenue	Kitterman Road	2-L	Urban 2-L Major City/County Road	D	790	14,850	7033	03/10/2009	298	5,053	0.38	0.34	B	B	Yes	Yes	0	0	0	0
Orange Avenue	Okeechobee County Line	Shinn Road	2-L	Transitioning 2-L State Arterial - Uninterrupted Flow	D	1,120	21,100	0144	-	137	2,575	0.12	0.12	B	B	Yes	Yes	0	0	0	0
Orange Avenue	Shinn Road	Kings Highway	2-L	Urban 2-L State Arterial - Class I	D	880	16,500	142	08/08/2006	368	5,600	0.42	0.34	B	B	Yes	Yes	0	5	10	15
Orange Avenue	Kings Highway	Interstate 95	4-L	Urban 4-L State Arterial - Class I	D	1,960	36,700	0041	04/15/2009	693	16,254	0.35	0.44	B	B	Yes	Yes	0	0	10	10
Orange Avenue	Interstate 95	Jenkins Road	4-L	Urban 4-L State Arterial - Class I	D	1,960	36,700	0035	04/14/2009	604	12,128	0.31	0.33	B	B	Yes	Yes	0	0	0	0
Orange Avenue	Jenkins Road	Hartman Road	4-L	Urban 4-L State Arterial - Class I	D	1,960	36,700	0028	04/14/2009	549	11,859	0.28	0.32	B	B	Yes	Yes	0	0	0	0
Orange Avenue	Hartman Road	Angle Road	4-L	Urban 4-L State Arterial - Class I	D	1,960	36,700	140	02/23/2005	654	12,700	0.33	0.35	B	B	Yes	Yes	0	5	0	5
Orange Avenue	Angle Road	29th Street	4-L	Urban 4-L State Arterial - Class II	D	1,770	33,200	0151	08/01/2007	804	15,292	0.45	0.46	C	C	Yes	Yes	0	5	0	5
Orange Avenue	29th Street	25th Street	4-L	Urban 4-L State Arterial - Class II	D	1,770	33,200	5044	04/14/2009	743	16,004	0.42	0.48	C	C	Yes	Yes	0	5	0	5
Orange Avenue	25th Street	13th Street	4-L	Urban 4-L State Arterial - Class II	D	1,770	33,200	5040	04/08/2009	668	13,513	0.38	0.41	C	C	Yes	Yes	0	5	0	5
Orange Avenue	13th Street	7th Street	2-L	Urban 2-L State Arterial - Class II	D	810	15,200	0155	-	443	8,300	0.55	0.55	C	C	Yes	Yes	0	0	0	0
Orange Avenue	7th Street	US Highway 1	2-L	Urban 2-L State Arterial - Class II	D	810	15,200	5134	04/16/2009	229	5,111	0.28	0.34	C	C	Yes	Yes	0	0	10	10
Orange Avenue	US Highway 1	Indian River Drive	2-L	Urban 2-L State Arterial - Class II	D	810	15,200	5133	04/08/2009	214	3,373	0.26	0.22	C	C	Yes	Yes	0	0	10	10

St. Lucie Transportation Planning Organization
Congestion Management Process Annual Report
DRAFT - TIER I EVALUATION

Roadway Name	From	To	Lanes	Classification	Adopted LOS	Hourly Directional Capacity	Daily Capacity	Traffic Count Data				V/C Ratio		Level of Service		Meet LOS Standard ??		Tier I Prioritization Criteria			Tier I Prioritization Score
								Station	Count Date (1)	Peak Hour Peak Direction Volume	AADT Volume	Peak Hour Peak Direction	Daily	Peak Hour Peak Direction	Daily	Peak Hour Peak Direction	Daily	PHPD V/C Ratio	Safety	Key Stakeholder Input	
Paar Drive	Port St. Lucie Boulevard	Darwin Boulevard	2-L	Urban 2-L Major City/County Road	E	790	14,850	209	11/16/2010	157	2,456	0.20	0.17	B	B	Yes	Yes	0	0	0	0
Peacock Boulevard	St. Lucie West Boulevard	University Drive	4-L	Urban 4-L Major City/County Road	E	1,760	33,030	8514	-	1,040	19,500	0.59	0.59	B	B	Yes	Yes	0	0	0	0
Peacock Boulevard	University Drive	California Boulevard	2-L	Urban 2-L Major City/County Road	E	790	14,850	694	11/30/2010	348	6,125	0.44	0.41	B	B	Yes	Yes	0	0	0	0
Port St. Lucie Boulevard	Becker Road	Paar Drive	2-L	Urban 2-L Major City/County Road	E	790	14,850	8518	-	272	5,100	0.34	0.34	B	B	Yes	Yes	0	0	0	0
Port St. Lucie Boulevard	Paar Drive	Darwin Boulevard	2-L	Urban 2-L Major City/County Road	E	790	14,850	8519	-	774	14,500	0.98	0.98	D	D	Yes	Yes	6	0	0	6
Port St. Lucie Boulevard	Darwin Boulevard	Gatlin Boulevard	4-L	Urban 4-L Major City/County Road	E	1,760	33,030	697	11/17/2010	1,416	28,560	0.80	0.86	C	C	Yes	Yes	4	0	0	4
Port St. Lucie Boulevard	Gatlin Boulevard	Del Rio Boulevard	6-L	Urban 6-L State Arterial - Class I	E	2,940	55,300	698	11/16/2010	1,855	37,617	0.63	0.68	B	B	Yes	Yes	0	0	10	10
Port St. Lucie Boulevard	Del Rio Boulevard	Florida's Turnpike	6-L	Urban 6-L State Arterial - Class I	E	2,940	55,300	5074	04/22/2009	2,303	43,379	0.78	0.78	B	B	Yes	Yes	0	0	0	0
Port St. Lucie Boulevard	Florida's Turnpike	Airoso Boulevard	6-L	Urban 6-L State Arterial - Class I	E	2,940	55,300	5073	-	2,347	44,000	0.80	0.80	B	B	Yes	Yes	0	0	0	0
Port St. Lucie Boulevard	Airoso Boulevard	Floresta Drive	6-L	Urban 6-L State Arterial - Class I	E	2,940	55,300	0780	04/22/2009	2,364	44,437	0.80	0.80	B	B	Yes	Yes	4	0	0	4
Port St. Lucie Boulevard	Floresta Drive	Midport Road	6-L	Urban 6-L State Arterial - Class I	E	2,940	55,300	0778	04/22/2009	3,432	63,100	1.17	1.14	F	F	No	No	10	0	0	10
Port St. Lucie Boulevard	Midport Road	Morningside Boulevard	6-L	Urban 6-L State Arterial - Class I	E	2,940	55,300	0776	-	1,947	36,500	0.66	0.66	B	B	Yes	Yes	0	0	0	0
Port St. Lucie Boulevard	Morningside Boulevard	US Highway 1	6-L	Urban 6-L State Arterial - Class I	E	2,940	55,300	5072	04/23/2009	2,057	40,146	0.70	0.73	B	B	Yes	Yes	0	8	0	8
Prima Vista Boulevard	US Highway 1	Riomar Drive	4-L	Urban 4-L Non-State Arterial - Class I with right-turn lanes	E	1,860	34,870	146	11/16/2010	1,503	29,658	0.81	0.85	C	C	Yes	Yes	4	0	10	14
Prima Vista Boulevard	Riomar Drive	Floresta Drive	4-L	Urban 4-L Non-State Arterial - Class I with right-turn lanes	E	1,860	34,870	148	09/22/2010	1,905	37,121	1.02	1.06	F	F	No	No	8	0	0	8
Prima Vista Boulevard	Floresta Drive	Airoso Boulevard	4-L	Urban 4-L Non-State Arterial - Class I with right-turn lanes	E	1,860	34,870	150	10/16/2006	1,452		0.78		B		Yes		0	0	0	0
Prima Vista Boulevard	Airoso Boulevard	Bayshore Blvd	4-L	Urban 4-L Non-State Arterial - Class I with right-turn lanes	E	1,860	34,870	8545	-	1,494	28,000	0.80	0.80	C	C	Yes	Yes	4	0	0	4
Range Line Road	Glades Cut-Off Road	Martin County Line	2-L	Urban 2-L Major City/County Road	D	790	14,850	7035	03/17/2009	120	1,533	0.15	0.10	B	B	Yes	Yes	0	0	0	0
Riomar Drive	US Highway 1	Prima Vista Boulevard	2-L	Urban 2-L Major City/County Road	E	790	14,850	7036	03/31/2009	288	5,450	0.36	0.37	B	B	Yes	Yes	0	0	0	0
Savage Boulevard	Import Drive	Gatlin Boulevard	2-L	Urban 2-L Major City/County Road	E	790	14,850	7053	05/05/2009	250	4,287	0.32	0.29	B	B	Yes	Yes	0	0	0	0
Savannah Road	Indian River Drive	Compound Road	2-L	Urban 2-L Major City/County Road	D	790	14,850	7098	03/24/2009	115	1,478	0.15	0.10	B	B	Yes	Yes	0	0	0	0
Savannah Road	Compound Road	US Highway 1	2-L	Urban 2-L Major City/County Road	D	790	14,850	7100	03/24/2009	142	2,286	0.18	0.15	B	B	Yes	Yes	0	0	0	0
Shinn Road	Orange Avenue	Okeechobee Road	2-L	Transitioning 2-L Major City/County Road	D	720	13,680	7038	02/24/2009	57	745	0.08	0.05	B	B	Yes	Yes	0	0	0	0
Sneed Road	Orange Avenue	Okeechobee Road	2-L	Transitioning 2-L Major City/County Road	D	720	13,680	7040	-	29	550	0.04	0.04	B	B	Yes	Yes	0	0	0	0
Southbend Boulevard	Becker Road	Eagle Drive	2-L	Urban 2-L Major City/County Road	E	790	14,850	230	10/29/2007	367	5,603	0.46	0.38	B	B	Yes	Yes	0	0	0	0
Southbend Boulevard	Eagle Drive	Floresta Drive	2-L	Urban 2-L Major City/County Road	E	790	14,850	7088	04/07/2009	504	9,568	0.64	0.64	C	C	Yes	Yes	0	0	10	10
State Road A1A	Indian River County Line	Jackson Way	2-L	Urban 2-L State Arterial - Uninterrupted Flow	D	1,140	22,200	0703	04/23/2009	287	5,807	0.25	0.26	B	B	Yes	Yes	0	0	0	0
State Road A1A	Jackson Way	Shorewinds Drive	2-L	Urban 2-L State Arterial - Uninterrupted Flow	D	1,140	22,200	-	08/07/2007	365	8,316	0.32	0.37	B	C	Yes	Yes	0	0	0	0
State Road A1A	Shorewinds Drive	North Bridge	2-L	Urban 2-L State Arterial - Uninterrupted Flow	D	1,140	22,200	0705	04/16/2009	378	6,808	0.33	0.31	B	B	Yes	Yes	0	0	0	0
State Road A1A	North Bridge	US Highway 1	2-L	Urban 2-L State Arterial - Class I	D	880	16,500	0114	04/16/2009	514	9,098	0.58	0.55	C	B	Yes	Yes	0	0	0	0
State Road A1A	US Highway 1	South Bridge	4-L	Urban 4-L State Arterial - Class I	D	1,960	36,700	0711	04/16/2009	641	11,692	0.33	0.32	B	B	Yes	Yes	0	8	0	8
State Road A1A	South Bridge	Ocean Drive	2-L	Urban 2-L State Arterial - Class I	D	880	16,500	0115	04/16/2009	694	12,540	0.79	0.76	C	C	Yes	Yes	0	0	0	0
State Road A1A	Ocean Drive	Plover Avenue	2-L	Urban 2-L State Arterial - Class I	D	880	16,500	5016	04/16/2009	466	7,592	0.53	0.46	B	B	Yes	Yes	0	0	0	0
State Road A1A	Plover Avenue	Blue Heron Boulevard	2-L	Urban 2-L State Arterial - Uninterrupted Flow	D	1,140	22,200	-	08/07/2007	335	3,350	0.29	0.15	B	B	Yes	Yes	0	0	0	0
State Road A1A	Blue Heron Boulevard	Walton Rocks Beach Road	2-L	Urban 2-L State Arterial - Uninterrupted Flow	D	1,140	22,200	0116	04/16/2009	352	3,643	0.31	0.16	B	B	Yes	Yes	0	0	0	0
State Road A1A	Walton Rocks Beach Road	Nettles Boulevard	2-L	Urban 2-L State Arterial - Uninterrupted Flow	D	1,140	22,200	0719	04/23/2009	549	4,271	0.48	0.19	C	B	Yes	Yes	0	0	0	0
State Road A1A	Nettles Boulevard	Martin County Line	2-L	Urban 2-L State Arterial - Uninterrupted Flow	D	1,140	22,200	0157	05/05/2009	631	13,166	0.55	0.59	C	C	Yes	Yes	0	0	0	0
St. Lucie Boulevard	Kings Highway	Sapp Road	2-L	Urban 2-L State Arterial - Class I without turn lanes	D	700	13,200	7044	02/18/2009	344	5,091	0.49	0.39	B	B	Yes	Yes	0	0	10	10
St. Lucie Boulevard	Sapp Road	25th Street North	2-L	Urban 2-L State Arterial - Class I	D	880	16,500	7042	02/18/2009	240	4,561	0.27	0.28	B	B	Yes	Yes	0	0	0	0
St. Lucie Boulevard	25th Street North	US Highway 1	2-L	Urban 2-L State Arterial - Class I	D	880	16,500	0270	-	240	4,500	0.27	0.27	B	B	Yes	Yes	0	0	0	0
St. Lucie West Boulevard	Bayshore Boulevard	Cashmere Boulevard	6-L	Urban 6-L Non-State Arterial - Class II with right-turn lanes	E	2,690	50,450	316	11/17/2010	1,803	43,532	0.67	0.86	C	D	Yes	Yes	0	0	10	10
St. Lucie West Boulevard	Cashmere Boulevard	California Boulevard	4-L	Urban 4-L Non-State Arterial - Class II with right-turn lanes	E	1,780	33,350	-	11/05/2007	1,772	44,053	1.00	1.32	E	F	Yes	No	6	0	10	16
St. Lucie West Boulevard	California Boulevard	Interstate 95	4-L	Urban 4-L Non-State Arterial - Class II with right-turn lanes	E	1,780	33,350	318	11/17/2010	1,201	30,130	0.67	0.90	C	D	Yes	Yes	0	0	0	0
St. Lucie West Boulevard	Interstate 95	Commerce Center Parkway	2-L	Urban 2-L Non-State Arterial - Class II with right-turn lanes	E	820	15,390	152	09/23/2010	478	11,060	0.58	0.72	C	D	Yes	Yes	0	0	0	0
Sunrise Boulevard	US Highway 1	Virginia Avenue	2-L	Urban 2-L Major City/County Road	D	790	14,850	509	09/23/2010	324	4,867	0.41	0.33	B	B	Yes	Yes	0	0	10	10
Sunrise Boulevard	Virginia Avenue	Cortez Boulevard	2-L	Urban 2-L Major City/County Road without turn lanes	D	620	11,550	511	10/19/2010	336	5,374	0.54	0.47	B	B	Yes	Yes	0	0	0	0
Sunrise Boulevard	Cortez Boulevard	Edwards Road	2-L	Urban 2-L Major City/County Road without turn lanes	D	620	11,550	7099	03/17/2009	286	4,631	0.46	0.40	B	B	Yes	Yes	0	0	0	0
Sunrise Boulevard	Edwards Road	Bell Avenue	2-L	Urban 2-L Major City/County Road without turn lanes	D	620	11,550	153	10/20/2010	222	3,373	0.36	0.29	B	B	Yes	Yes	0	0	0	0
Sunrise Boulevard	Bell Avenue	Midway Road	2-L	Urban 2-L Major City/County Road without turn lanes	D	620	11,550	155	10/19/2010	173	2,750	0.28	0.24	B	B	Yes	Yes	0	0	0	0
Tiffany Ave	Lennard Road	Village Green Drive	2-L	Urban 2-L Major City/County Road	D	790	14,850	7078	04/21/2009	264	3,831	0.33	0.26	B	B	Yes	Yes	0	0	0	0
Tiffany Ave	Village Green Drive	US Highway 1	4-L	Urban 4-L Major City/County Road	D	1,760	33,030	8535	-	347	6,500	0.20	0.20	B	B	Yes	Yes	0	0	0	0
US Highway 1	Indian River County Line	Indrio Road	4-L	Urban 4-L State Arterial - Class I	D	1,960	36,700	0107	04/07/2009	1,047	20,401	0.53	0.56	B	B	Yes	Yes	0	0	0	0
US Highway 1	Indrio Road	St. Lucie Boulevard	4-L	Urban 4-L State Arterial - Class I	D	1,960	36,700	0009	04/14/2009	928	16,552	0.47	0.45	B	B	Yes	Yes	0	0	0	0
US Highway 1	St. Lucie Boulevard	North Bridge	4-L	Urban 4-L State Arterial - Class I	D	1,960	36,700	0010	04/14/2009	907	16,833	0.46	0.46	B	B	Yes	Yes	0	0	0	0
US Highway 1	North Bridge	Old Dixie Highway	4-L	Urban 4-L State Arterial - Class I	D	1,960	36,700	0123	-	1,334	25,000	0.68	0.68	B	B	Yes	Yes	0	0	10	10
US Highway 1	Old Dixie Highway	South Bridge	4-L	Urban 4-L State Arterial - Class I	D	1,960	36,700	715	11/30/2010	1,032	22,929	0.53	0.62	B	B	Yes	Yes	0	8	10	18
US Highway 1	South Bridge	Orange Avenue	4-L	Urban 4-L State Arterial - Class II	D	1,770	33,200	5014	-	1,334	25,000	0.75	0.75	D	C	Yes	Yes	0	8	10	18
US Highway 1	Orange Avenue	Delaware Avenue	4-L	Urban 4-L State Arterial - Class II	D	1,770	33,200	0118	04/08/2009	1,090	24,209	0.62	0.73	C	C	Yes	Yes	0	0	10	10
US Highway 1	Delaware Avenue	Georgia Avenue	4-L	Urban 4-L State Arterial - Class II	D	1,770	33,200	5006	-	1,654	31,000	0.93	0.93	D	D	Yes	Yes	4	0	10	14
US Highway 1	Georgia Avenue	Virginia Avenue	4-L	Urban 4-L State Arterial - Class II	D	1,770	33,200	5003	04/16/2009	1,892	39,699	1.07	1.20	F	F	No	No	8	8	10	26
US Highway 1	Virginia Avenue	Edwards Road	4-L	Urban 4-L State Arterial - Class II	D	1,770	33,200	5002	04/23/2009	1,856	43,118	1.05	1.30	E	F	No	No	8	8	10	26
US Highway 1	Edwards Road	Market Avenue	4-L	Urban 4-L State Arterial - Class I	D	1,960	36,700	0012	04/16/2009	1,580	33,991	0.81	0.93	C	C	Yes	Yes	4	0	0	4
US Highway 1	Market Avenue	Midway Road	4-L	Urban 4-L State Arterial - Class I	D	1,960	36,700	0020	04/16/2009	1,512	28,343	0.77	0.77	B	B	Yes	Yes	0	0	0	0
US Highway 1	Midway Road	Easy Street	6-L	Urban 6-L State Arterial - Class I	D	2,940	55,300	5156	04/22/2009	1,415	32,281	0.48	0.58	B	B	Yes	Yes	0	0	0	0
US Highway 1	Easy Street	Kitterman Road	6-L	Urban 6-L State Arterial - Class I	D	2,940	55,300	0266	04/16/2009	1,381	28,576	0.47	0.52	B	B	Yes	Yes	0	0	0	0
US Highway 1	Kitterman Road	Prima Vista Boulevard	6-L	Urban 6-L State Arterial - Class I	D	2,940	55,300	0264	04/23/2009	1,659	35,613	0.56	0.64	B	B	Yes	Yes	0	0	10	10
US Highway 1	Prima Vista Boulevard	Savanna Club Boulevard	6-L	Urban 6-L State Arterial - Class I	D	2,940	55,300	0265	-	2,614	49,000	0.89	0.89	C	C	Yes	Yes	4	3	10	17
US Highway 1	Savanna Club Boulevard	Village Green Drive	6-L	Urban 6-L State Arterial - Class I	D	2,940	55,300	262	05/19/2010	3,094	54,233	1.05	0.98	F	D	No	Yes	8	3	0	11
US Highway 1	Village Green Drive	Walton Road	6-L	Urban 6-L State Arterial - Class I	D	2,940	55,300	262	05/19/2010	2,437	46,957	0.83	0.85	C	C	Yes	Yes	4	0	0	4
US Highway 1	Walton Road	Tiffany Avenue	6-L	Urban 6-L State Arterial - Class I	D	2,940	55,300	262	05/18/2010	2,114	41,024	0.72	0.74	B	B	Yes	Yes	0	0	0	0
US Highway 1	Tiffany Avenue	Port St. Lucie Boulevard	6-L	Urban 6-L State Arterial - Class I	D	2,940	55,300	262	05/18/2010	1,718	38,160	0.58	0.69	B	B	Yes	Yes	0	3	0	3
US Highway 1	Port St. Lucie Boulevard	Martin County Line	8-L	Urban 8-L State Arterial - Class I	D	3,940	73,800	5071	-	2,988	56,000	0.76	0.76	B	B	Yes	Yes	0	8	10	18

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Roadway Name	From	To	Lanes	Classification	Adopted LOS	Hourly Directional Capacity	Daily Capacity	Traffic Count Data				V/C Ratio		Level of Service		Meet LOS Standard ??		Tier I Prioritization Criteria			Tier I Prioritization Score
								Station	Count Date (1)	Peak Hour Peak Direction Volume	AADT Volume	Peak Hour Peak Direction	Daily	Peak Hour Peak Direction	Daily	Peak Hour Peak Direction	Daily	PHPD V/C Ratio	Safety	Key Stakeholder Input	
Village Parkway	Tradition Parkway	Westcliffe Lane	4-L	Urban 4-L Non-State Arterial - Class I with right-turn lanes	E	1,860	34,870	719	11/09/2010	789	16,132	0.42	0.46	B	B	Yes	Yes	0	0	0	0
Village Parkway	Westcliffe Lane	Crosstown Parkway	4-L	Urban 4-L Non-State Arterial - Class I with right-turn lanes	E	1,860	34,870	720	11/10/2010	294	5,445	0.16	0.16	B	B	Yes	Yes	0	0	0	0
Virginia Avenue	US Highway 1	Oleander Avenue	6-L	Urban 6-L State Arterial - Class II	D	2,680	50,300	0034	04/21/2009	1,239	28,223	0.46	0.56	C	C	Yes	Yes	0	8	10	18
Virginia Avenue	Oleander Avenue	Sunrise Boulevard	6-L	Urban 6-L State Arterial - Class II	D	2,680	50,300	0792	04/21/2009	1,254	30,541	0.47	0.61	C	C	Yes	Yes	0	0	0	0
Virginia Avenue	Sunrise Boulevard	13th Street South	6-L	Urban 6-L State Arterial - Class II	D	2,680	50,300	0794	04/21/2009	1,402	33,541	0.52	0.67	C	C	Yes	Yes	0	0	0	0
Virginia Avenue	13th Street South	25th Street South	6-L	Urban 6-L State Arterial - Class II	D	2,680	50,300	0033	04/15/2009	1,074	24,122	0.40	0.48	C	C	Yes	Yes	0	8	10	18
Virginia Avenue	25th Street South	35th Street South	6-L	Urban 6-L State Arterial - Class II	D	2,680	50,300	0032	04/21/2009	1,091	22,556	0.41	0.45	C	C	Yes	Yes	0	5	0	5
Virginia Avenue	35th Street South	Okeechobee Road	6-L	Urban 6-L State Arterial - Class II	D	2,680	50,300	0030	04/14/2009	1,096	22,388	0.41	0.45	C	C	Yes	Yes	0	0	0	0
Walton Road	Indian River Drive	Green River Parkway	2-L	Urban 2-L Major City/County Road	D	790	14,850	324	09/23/2010	299	5,034	0.38	0.34	B	B	Yes	Yes	0	0	0	0
Walton Road	Green River Parkway	Lennard Road	2-L	Urban 2-L Major City/County Road	D	790	14,850	7082	-	389	7,300	0.49	0.49	B	B	Yes	Yes	0	0	0	0
Walton Road	Lennard Road	Village Green Drive	2-L	Urban 2-L Major City/County Road	D	790	14,850	7083	-	539	10,100	0.68	0.68	C	C	Yes	Yes	0	0	0	0
Walton Road	Village Green Drive	US Highway 1	4-L	Urban 4-L Major City/County Road	D	1,760	33,030	330	10/27/2010	562	12,907	0.32	0.39	B	B	Yes	Yes	0	0	0	0
Weatherbee Road	US Highway 1	Midway Road	2-L	Urban 2-L Major City/County Road	D	790	14,850	7046	03/24/2009	352	6,284	0.45	0.42	B	B	Yes	Yes	0	0	0	0
Westmoreland Boulevard	Port St. Lucie Boulevard	Morningside Boulevard	2-L	Urban 2-L Major City/County Road	E	790	14,850	339	11/17/2010	724	16,706	0.92	1.12	C	F	Yes	No	4	0	0	4
Westmoreland Boulevard	Morningside Boulevard	Martin County Line	2-L	Urban 2-L Major City/County Road	E	790	14,850	245	11/16/2010	484	8,987	0.61	0.61	C	C	Yes	Yes	0	0	10	10

Notes:

(1) Count data collected in 2010 was provided by the St. Lucie Transportation Planning Organization (TPO).

(1) Count data collected in 2009 was obtained from the 2009 Florida Department of Transportation *Florida Traffic Information* database.

(1) Count data for segments showing a "-" in the date column was obtained from the 2009 Florida Department of Transportation Florida Traffic Information database. Note that the PHPD volume shown was calculated by applying standard K (0.097) & D (0.55) factors to the reported AADT due to the lack of hourly data.

(1) Count data collected prior to 2009 was either obtained from the 2008 Florida Department of Transportation *Florida Traffic Information* database or the previous CMP Update due to lack of more recent data.

St. Lucie Transportation Planning Organization

Congestion Management Process

Major Update

Prepared by

Kimley-Horn and Associates, Inc.

FINAL DRAFT

04250401.11

VI. TIER II EVALUATION

The Tier II analysis evaluates the selected locations identified in the Tier I evaluation using more in-depth performance evaluation measures. A consensus list of intersections (as agreed upon by the St. Lucie TPO Board, the St. Lucie TPO Technical Advisory Committee, and the St. Lucie TPO Citizens Advisory Committee) was developed for Tier II evaluation. The following intersections were evaluated in the Tier II analysis:

- US Highway 1 @ Old Dixie Highway
- US Highway 1 @ Orange Avenue
- US Highway 1 @ Georgia Avenue / Sunrise Boulevard
- US Highway 1 @ Virginia Avenue
- US Highway 1 @ Edwards Road
- St. Lucie West Boulevard @ Peacock Boulevard
- St. Lucie West Boulevard @ Cashmere Boulevard
- Prima Vista Boulevard @ Bayshore Boulevard
- Port St. Lucie Boulevard @ Gatlin Boulevard
- Floresta Drive / Oakridge Drive @ Southbend Boulevard / Oaklyn Street
- Selvitz Road @ Bayshore Boulevard
- Selvitz Road @ Glades Cut-Off Road
- Selvitz Road @ Midway Road

WHAT IS LEVELS OF SERVICE?

Turning movement count data collection was performed during the AM and PM peak hours at the above-mentioned intersections during March of 2011. Raw turning movement count data can be found in Appendix C. These raw traffic volumes were converted to peak season volumes using seasonal factors published by FDOT. Peak season traffic volume calculations are detailed in Appendix D. AM and PM peak hour level of service (LOS) analyses were then performed for each intersection using *Highway Capacity Software Version 5.4*. Intersection levels of service range from LOS A through LOS F. Descriptions for each LOS category are described below:

- Level of service A
  - Free flow and little or no delay at signalized intersections.
- Level of service B
  - Stable flow and slight interference from other vehicles
  - Minimal delays at signalized intersections
- Level of service C
  - Stable flow but lower vehicle speeds
  - Delays at most signalized intersections (vehicles typically forced to stop at red light but are able to get through the intersection on the first green indication)
  - Traffic queues at signalized intersections begin to form
- Level of service D
  - Approaching unstable flow
  - Operating speeds are slow (although tolerable)
  - Noticeable delays at intersections (vehicles are not delayed more than two signal cycles)
- Level of service E
  - Unstable flow where a roadway's capacity is reached
  - Low/variable operating speeds
  - Substantial delays at intersections (vehicles are sometimes delayed for more than two signal cycles)
- Level of service F
  - Unstable flow
  - Major delays at all critical signalized intersections
  - Low speeds that may drop to zero for short time periods

In addition to the above descriptions, below are photos that illustrate different level of service descriptions:

Level of Service A

Level of Service C

Level of Service E

EXISTING CONDITIONS AT TIER II INTERSECTIONS

Table 11 details the results of the AM and PM peak hour intersection level of service analyses for existing conditions. Intersection analysis output sheets for existing conditions are found in Appendix E.

Table 11
Peak Hour Intersection Level of Service Results
(Existing Conditions)

Intersection	Type of Traffic Control (1)	AM Peak Hour Intersection LOS	PM Peak Hour Intersection LOS
US Highway 1 @ Old Dixie Highway	Unsignalized	C	F
US Highway 1 @ SR A1A / North Causeway (2)	Signalized	C	C
US Highway 1 @ Orange Avenue	Signalized	C	D
US Highway 1 @ Georgia Avenue / Sunrise Boulevard	Signalized	B	C
US Highway 1 @ Virginia Avenue	Signalized	D	D
US Highway 1 @ Edwards Road	Signalized	C	D
St. Lucie West Boulevard @ Peacock Boulevard	Signalized	E	E
St. Lucie West Boulevard @ Cashmere Boulevard	Signalized	D	D
Prima Vista Boulevard @ Bayshore Boulevard	Signalized	F	F
Port St. Lucie Boulevard @ Gatlin Boulevard	Signalized	D	F
Floresta Drive @ Southbend Boulevard	Signalized	E	E
Selvitz Road @ Bayshore Boulevard	Unsignalized	D / D	C / E
Selvitz Road @ Glades Cut-Off Road	Unsignalized	C	C

(1) Levels of service shown for unsignalized intersections represent the stop-controlled approach(es) level of service.
(1) Levels of service for signalized intersections represent the overall level of service.
(2) Intersection analyzed based on potential traffic diversions caused by improvements to the intersection of US Highway 1 @ Old Dixie Highway.

INTERSECTION ANALYSIS AND RECOMMENDED IMPROVEMENTS

The following are descriptions summarizing the level of service analyses for each of the analyzed intersections. Note that the existing signal timing plans were applied to each signalized intersection analysis.

US Highway 1 @ Old Dixie Highway

The westbound approach of this intersection is controlled by a stop sign and is currently operating at a deficient level of service during the PM peak hour. The majority of vehicles that are using this westbound approach are making a left-turn to travel south on US Highway 1. One option to eliminate this level of service deficiency is to prohibit this 'westbound to southbound' left-turn movement. Disallowing this movement would result in re-routing these 'westbound to southbound' left-turning vehicles up to the intersection of US Highway 1 @ SR A1A / North Causeway.

The intersection of US Highway 1 @ SR A1A / North Causeway was also evaluated to confirm its ability to handle the additional re-routed traffic. In order to perform this evaluation, AM and PM peak hour turning movement count data was collected at this intersection in May of 2011. The raw traffic volumes were converted to peak season volumes using seasonal factors published by FDOT. Furthermore, the additional westbound left-turning volumes (re-routed from the intersection of US Highway 1 @ Old Dixie Highway) were added. It was determined that this intersection continues to operate acceptably even with the additional westbound left-turning vehicles.

US Highway 1 @ Orange Avenue

This signalized intersection is currently operating acceptably during AM and PM peak hour conditions. However, members of the St. Lucie TPO Technical Advisory Committee and City of Fort Pierce staff have expressed concerns about the safety of this intersection upon the opening of the new federal courthouse at the southwest quadrant. Their primary safety concern is associated with the increasing number of pedestrians that will have to cross the intersection after the courthouse opens (courthouse staff and visitors will park at the parking garage that is located generally at the northeast quadrant of the intersection and have to cross the intersection to get to the courthouse). In order to accommodate additional pedestrians, an 'all-pedestrian' signal phase can be implemented which allows pedestrians to

cross the intersection any way they desire (even diagonally). Advantages of accommodating diagonal crosswalks include the following:

- Pedestrians can cross without experiencing vehicle conflicts (all vehicular approaches see a red indication)
- Pedestrians can cross an intersection diagonally and avoid two separate crossings
- Provide improved safety for pedestrians

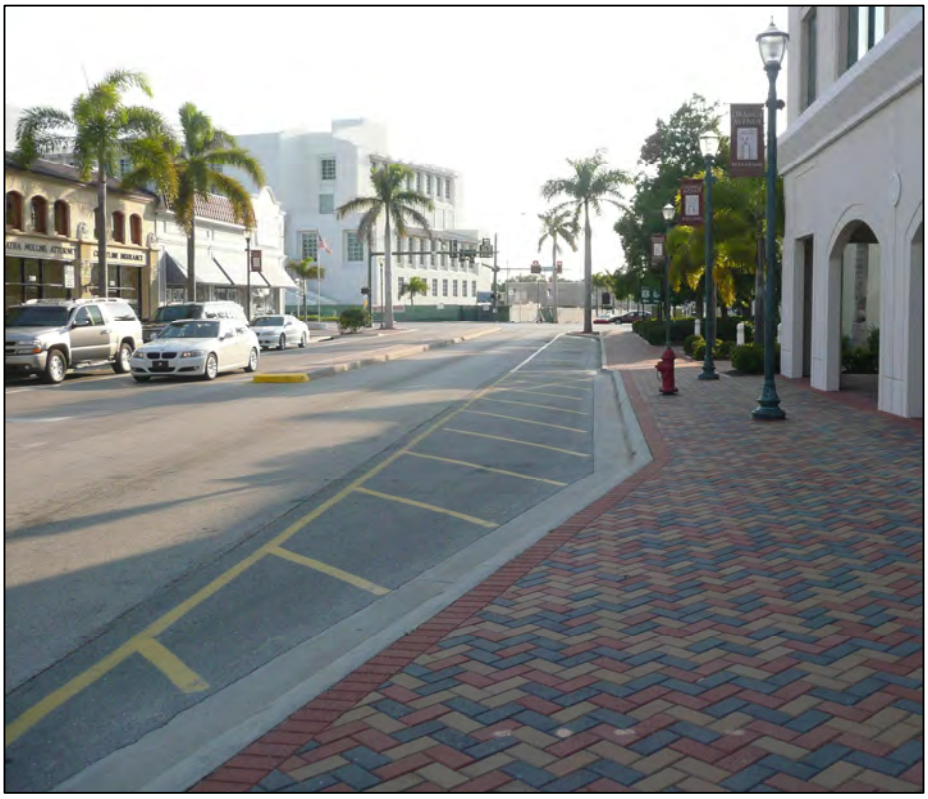
Diagonal crosswalks are appropriate when pedestrian volumes are high across all legs of the intersection and when there are high levels of conflicts between turning vehicles and pedestrians and bicyclists. It should be noted that accommodating an 'all-pedestrian' signal phase will increase vehicular delay, as it decreases the proportion of green time that each intersection approach occupies during a signal cycle.

Example Diagonal Crosswalk Sign

The westbound approach of this intersection consists of one shared left-turn/through/right-turn lane. In addition to this travel lane, there are four on-street parking spaces adjacent to this westbound lane. One option to improve operations at this intersection is to convert these on-street parking spaces to create an

additional westbound approach travel lane. The improved westbound approach could consist of one exclusive westbound left-turn lane and one shared through/right-turn lane. This lane conversion would require the construction of a modified curb radius and the removal and relocation of an existing palm tree. In addition, the signal pole on the northeast quadrant may need to be moved in order to accommodate the modified curb radius.

Photo of On-Street Parking Spaces for Possible Lane Conversion



US Highway 1 @ Georgia Avenue / Sunrise Boulevard

This five-legged signalized intersection is operating acceptably during existing AM and PM peak hour conditions. Therefore, no improvements are recommended at this time.

US Highway 1 @ Virginia Avenue

This signalized intersection is a major intersection where two state roadways converge. The intersection is currently operating at acceptable levels of service during the AM and PM peak hours. The City of

Fort Pierce is collecting funds from other sources (such as impact fees) for the construction of a southbound right-turn lane. This improvement would improve operations by removing right-turning vehicles from the southbound through lane, thus creating additional capacity at the intersection.

US Highway 1 @ Edwards Road

This signalized intersection is operating acceptably during existing AM and PM peak hour conditions. Therefore, no improvements are recommended at this time.

St. Lucie West Boulevard @ Peacock Boulevard

This signalized intersection is currently operating at level of service E during AM and PM peak hour conditions. The two particular movements at this intersection that experience the most amount of delay per vehicle are the eastbound left-turn movement and the southbound right-turn movement. Two improvement options were evaluated and are detailed below:

- Option 1 includes the following intersection improvements:
  - Implement a southbound right-turn overlap signal phase
  - Extend the southbound innermost left-turn lane
- Option 2 includes the following intersection improvements:
  - Implement a southbound right-turn overlap signal phase
  - Extend the southbound innermost left-turn lane
  - Construct an additional eastbound left-turn lane

The intersection projects to operate at level of service D with the improvements mentioned above in both option 1 and option 2.

Implementation of a southbound right-turn overlap signal phase will allow southbound right-turning vehicles to proceed through the intersection (in a protected fashion) while the signal concurrently accommodates eastbound left-turning vehicles. This improvement will require a signal modification, as an additional five-section signal head would be required for the southbound approach. An additional improvement identified for the southbound approach is the extension of the southbound innermost left-turn lane, which would accommodate additional left-turning vehicles.

The only difference between option 1 and option 2 is that option 2 includes the construction of an additional eastbound left-turn lane. Dual left-turn lanes are generally considered when left-turn volumes exceed 300 vehicles per hour. Based on traffic count data collected during the year 2011 peak season, there are approximately 460 eastbound left-turning vehicles during the AM peak hour and 370 eastbound left-turning vehicles during the PM peak hour. Therefore, this movement is a strong candidate for dual left-turn lanes. Construction of an additional eastbound left-turn lane will require the removal of some existing landscaping within the median on the west leg of this intersection.

St. Lucie West Boulevard @ Cashmere Boulevard

This signalized intersection is operating acceptably during existing AM and PM peak hour conditions. Therefore, no improvements are recommended at this time.

Prima Vista Boulevard @ Bayshore Boulevard

This signalized intersection is currently operating at level of service F during AM and PM peak hour conditions. The following intersection movements exceed their capacity during AM and PM peak hour conditions:

- AM Peak Hour:
  - Eastbound left-turn movement
  - Southbound right-turn movement
- PM Peak Hour:
  - Eastbound left-turn movement
  - Westbound left-turn movement
  - Westbound through movement
  - Southbound right-turn movement

While there are several individual movements that exceed their capacity, the following improvements were found to achieve level of service E during AM and PM peak hour conditions:

- Implement a southbound right-turn overlap signal phase
- Extend the southbound right-turn lane towards the north (up to Macedo Boulevard)

In addition to the above-mentioned intersection improvements, a sidewalk is recommended along Bayshore Boulevard between Prima Vista Boulevard and Selvitz Road. Pedestrian quality of service depends on the following factors:

- Existence of sidewalks
- Existence of crosswalks at convenient locations
- Lateral separation of vehicles and pedestrians (distance between travel lanes and sidewalks)

Constructing a sidewalk along this roadway segment would greatly improve the pedestrian quality of service in this area, as it would provide pedestrian connectivity between the adjacent residential area and some of the commercial destinations along Prima Vista Boulevard.

Port St. Lucie Boulevard @ Gatlin Boulevard

This signalized intersection is operating at level of service D during existing AM peak hour conditions and level of service F during existing PM peak hour conditions. The following intersection movements exceed their capacity during PM peak hour conditions:

- Northbound left-turn movement
- Northbound through movement
- Southbound through movement

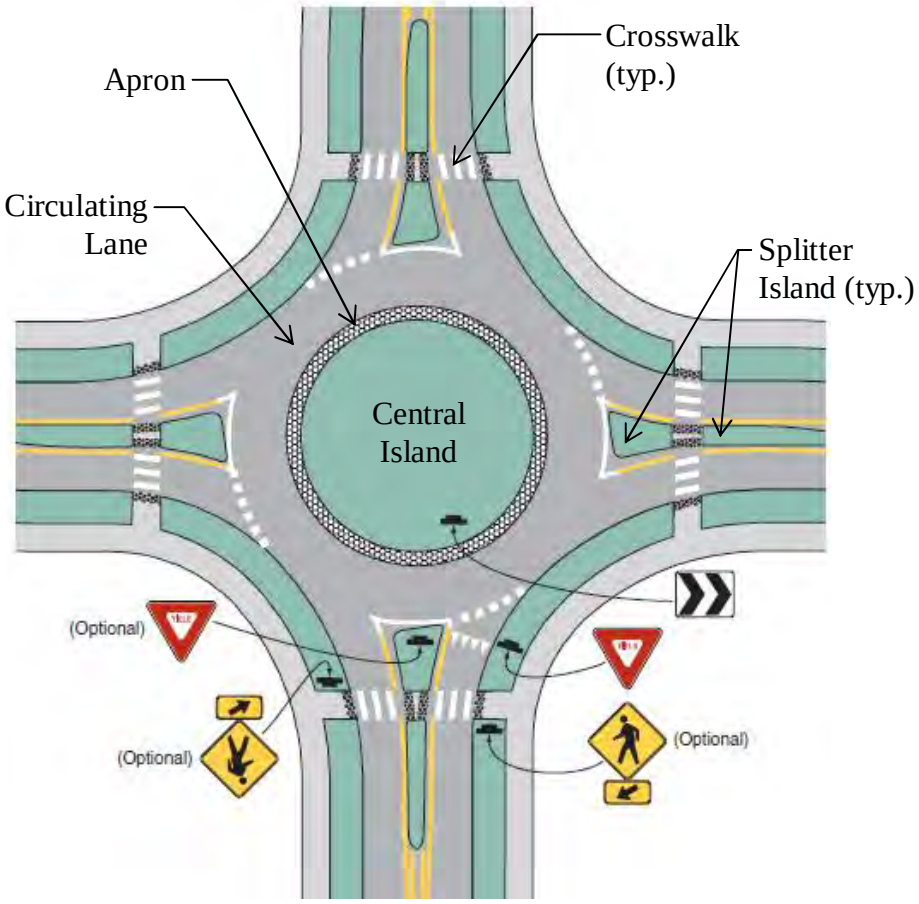
Slight adjustments to the existing PM peak hour signal timing plan are projected to improve the intersection's operation from level of service F to level of service E. These timing adjustments consist of reallocating green time from the eastbound and westbound approaches to the northbound and southbound approaches. Furthermore, removing the southbound overlap phase may be justified because the southbound left-turn volume does not warrant additional protected green time.

Floresta Drive / Oakridge Drive @ Southbend Boulevard / Oaklyn Street

This signalized intersection is currently operating at level of service E during AM and PM peak hour conditions. The signal timing plan at this intersection is split phased, where the eastbound and westbound approaches are given separate green indications. This type of timing plan is implemented because of the limited lane geometry on these approaches (both the eastbound and westbound approaches consist of one shared left-turn/through/right-turn lane).

The improvement that was examined as part of this analysis was converting this signalized intersection into a one-lane roundabout. Roundabouts, when compared to a standard four-legged signalized intersection, reduce the number of conflict points from 32 to 8. In addition, roundabouts can reduce the severity of crashes as traffic typically enters the roundabout at slower speeds.

General Roundabout Features



The existing AM and PM peak hour intersection volumes were analyzed under a roundabout condition using *SIDRA Version 5.1*. This analysis showed that a roundabout at this intersection would operate acceptably (level of service A) during existing AM and PM peak hour conditions.

Selvitz Road @ Bayshore Boulevard

The stop-controlled northbound and southbound approaches at this intersection are each operating at level of service D during AM peak hour conditions. During PM peak hour conditions, the stop-

controlled northbound and southbound approaches are operating at level of service C and level of service E, respectively.

Two improvement options were evaluated and are detailed below:

- Option 1:
  - Construct a southbound right-turn lane
- Option 2:
  - Convert the intersection into a roundabout

If option 1 is selected, the southbound approach will benefit from the exclusive right-turn lane, as removing the right-turns from the through movements and left-turning movements will increase the capacity of this approach. The southbound approach, if option 1 is selected, improves to level of service C during existing AM and PM peak hour conditions.

For option 2, the existing AM and PM peak hour intersection volumes were analyzed under a roundabout condition using *SIDRA Version 5.1*. Based on this analysis, if option 2 is selected and the intersection is converted into a roundabout, the intersection will operate acceptably (level of service B) during existing AM and PM peak hour conditions. Constructing a roundabout at this intersection will likely require right-of-way purchases.

Selvitz Road @ Glades Cut-Off Road

The eastbound approach of this intersection is controlled by a stop sign and is currently operating acceptably (level of service C) during AM and PM peak hour conditions. Therefore, no improvements are recommended at this time.

Selvitz Road @ Midway Road

This intersection is currently under design as part of the Midway Road widening project from Selvitz Road to South 25th Street. This widening project includes capacity enhancements at the Midway Road and Selvitz Road intersection including turn lanes on the approaches. As of May 2011, these design

plans were at the 60 percent completion level. No additional analyses were performed for this intersection because of the capacity improvements that are currently being designed.

SUMMARY OF RECOMMENDED IMPROVEMENTS

Table 12 details the recommended improvements that have been discussed in the above section. Intersection analysis output sheets for improved conditions can be found in Appendix F. *Table 13* details the projected 'post-improvement' levels of service in addition to recommended improvements.

Table 12
Summary of Recommended Improvements

Intersection	Recommended Improvement
US Highway 1 @ Old Dixie Highway	Prohibit the 'westbound to southbound' left-turn movement
US Highway 1 @ SR A1A / North Causeway	No improvements recommended (intersection meets overall level of service)
US Highway 1 @ Orange Avenue	Convert the westbound approach to one shared through/left-turn lane and one right-turn lane; consider implementing an 'all-pedestrian' signal phase to accommodate additional pedestrians associated with the new courthouse
US Highway 1 @ Georgia Avenue / Sunrise Boulevard	No improvements recommended (intersection meets overall level of service)
US Highway 1 @ Virginia Avenue	Construct a southbound right-turn lane
US Highway 1 @ Edwards Road	No improvements recommended (intersection meets overall level of service)
St. Lucie West Boulevard @ Peacock Boulevard	Option 1; Implement a southbound right-turn overlap signal phase and extend the southbound innermost left-turn lane
	Option 2; same improvements identified in option 1 and the construction of an additional eastbound left-turn lane
St. Lucie West Boulevard @ Cashmere Boulevard	No improvements recommended (intersection meets overall level of service)
Prima Vista Boulevard @ Bayshore Boulevard	Implement a southbound right-turn overlap signal phase and extend the southbound right-turn lane towards the north to create additional queue storage; Construct a sidewalk along Bayshore Boulevard between Prima Vista Boulevard and Selvitz Road
Port St. Lucie Boulevard @ Gatlin Boulevard	Signal timing adjustments

Table 12, cont.
Summary of Recommended Improvements

Intersection	Recommended Improvement
Floresta Drive @ Southbend Boulevard	Construct a roundabout
Selvitz Road @ Bayshore Boulevard	Option 1; construct a southbound right-turn lane
	Option 2; construct a roundabout
Selvitz Road @ Glades Cut-Off Road	No improvements recommended (intersection meets overall level of service)

Table 13
Summary of Post-Improvement LOS

Intersection	Signalized or Unsignalized ??	Existing Conditions AM Peak Hour Level of Service (1)	Existing Conditions PM Peak Hour Level of Service (1)	Suggested Improvement	Improved Conditions AM Peak Hour Level of Service (1)	Improved Conditions PM Peak Hour Level of Service (1)
1) Bayshore Blvd & Selvitz Road	Unsignalized	D / D	C / E	Option 1 - Construct a southbound right-turn lane	D / C	C / C
				Option 2 - Construct a roundabout (may require ROW purchases)	B	B
2) Glades Cut-Off Road & Selvitz Road	Unsignalized	C	C	No improvements required; intersection meets level of service	-	-
3) US Highway 1 & Old Dixie Highway	Unsignalized	C	F	Close the westbound to southbound left-turn movement at this intersection and reroute these trips to US Hwy 1	(2) (3)	(2) (3)
4) US Highway 1 & Edwards Road	Signalized	C	D	No improvements required; intersection meets level of service	-	-
5) US Highway 1 & Orange Avenue	Signalized	C	D	Consider converting westbound approach to one shared left-turn/through lane and one right-turn lane. In addition, consider an "all-pedestrian" signal phase to accommodate additional pedestrian traffic that will result from new courthouse.	D	E
6) US Highway 1 & Virginia Avenue	Signalized	D	D	Construct southbound right-turn lane; City of Fort Pierce is collecting funds from other sources for this improvement.	D	D
7) US Highway 1 & Georgia Ave/Sunrise Blvd	Signalized	B	C	No improvements required; intersection meets level of service	-	-
8) St. Lucie West Blvd & Peacock Blvd	Signalized	E	E	Option 1 - implement a southbound right-turn overlap signal phase and extend the southbound innermost left-turn lane	D	D
				Option 2 - implement a southbound right-turn overlap signal phase and extend the southbound innermost left-turn lane; construct an additional eastbound left-turn lane, which will require the removal of existing landscaping in median	D	D
9) St. Lucie West Blvd & Cashmere Blvd	Signalized	D	D	No improvements required; intersection meets level of service	-	-
10) Port St. Lucie Blvd & Gatlin Blvd	Signalized	D	F	Optimize signal timing during the PM peak hour by providing the northbound and southbound approaches more green time. This can be done by slightly decreasing the green times for the eastbound and westbound movements. In addition, removing the southbound overlap phase may be justified because the southbound left-turn volume does not warrant the additional protected time.	D	E
11) Floresta Drive & Southbend Blvd	Signalized	E	E	Construct a roundabout	A	A
12) Prima Vista Blvd & Bayshore Blvd	Signalized	F	F	Implement a southbound right-turn overlap signal phase and extend the southbound right-turn lane towards the north (up to Macedo Blvd); Construct sidewalk along Bayshore Blvd between Prima Vista Blvd and Selvitz Road	E	E
13) US Highway 1 & SR-A1A/North Causeway	Signalized	C	C	No improvements required; intersection meets level of service	-	-

Notes:

(1) Levels of service shown for unsignalized intersections represent the stop-controlled approach(es) level of service. Levels of service shown for signalized intersections represent the overall level of service.

(2) Closing the 'westbound to southbound' left-turn movement at this intersection will remove the only approach that experiences delay. Therefore, no level of service is applicable.

(3) Closing the 'westbound to southbound' left-turn movement at this intersection requires rerouting the trips that used this segment to make westbound left-turns at the intersection of US Highway 1 & SR-A1A/North Causeway. Therefore, the intersection of US Highway 1 & SR-A1A/North Causeway was analyzed during AM & PM peak hours (see intersection # 13 above).

DRAFT - Sorted Tier II Prioritization Scoring Summary

Rank	Intersection	Improvement Description	Tier II Total Score
1	US Highway 1 @ Old Dixie Highway	Close/prohibit the westbound to southbound left-turn movement	18
2	Bayshore Blvd @ Selvitz Road	Option 1 - Construct a southbound right-turn lane	15
3	Port St. Lucie Blvd @ Gatlin Blvd	Signal timing optimization	13
3	Prima Vista Blvd @ Bayshore Blvd	Construct sidewalk along Bayshore Blvd between Prima Vista Blvd and Selvitz Road	13
5	Prima Vista Blvd @ Bayshore Blvd	Implement a southbound right-turn overlap signal phase and extend the southbound right-turn lane towards the north (up to Macedo Blvd)	12
6	Bayshore Blvd @ Selvitz Road	Option 2 - Construct a roundabout (may require ROW purchases)	11
6	Floresta Drive @ Southbend Blvd	Construct a roundabout	11
8	St. Lucie West Blvd @ Peacock Blvd	Option 1 - implement a southbound right-turn overlap signal phase and extend the southbound innermost left-turn lane	10
8	St. Lucie West Blvd @ Peacock Blvd	Option 2 - Option 1 improvements plus the construction of an additional eastbound left-turn lane	10
10	US Highway 1 @ Orange Avenue	Reconfigure the westbound approach to one shared left-turn/through lane and one right-turn lane. Consider an "all-pedestrian" signal phase.	8
11	US Highway 1 @ Virginia Avenue	Construct southbound right-turn lane	7

DRAFT - Detailed Tier II Prioritization Scoring Tabulation

Improvement ID	Intersection	Improvement Description	Tier II Prioritization Criteria								Tier II Total Score
			Criteria 1		Criteria 2		Criteria 3		Criteria 4		
			Type of Improvement	Score	Level of Benefit	Score	Cost Range	Score	Potential Issues	Score	
1a	Bayshore Blvd @ Selvitz Road	Option 1 - Construct a southbound right-turn lane	Operational	2	High	4	less than $75K	6	None	3	15
1b	Bayshore Blvd @ Selvitz Road	Option 2 - Construct a roundabout (may require ROW purchases)	Operational	2	Very High	6	greater than $150K	2	Right of Way	1	11
2	US Highway 1 @ Old Dixie Highway	Close/prohibit the westbound to southbound left-turn movement	Safety	5	Very High	6	between $75K and $150K	4	None	3	18
3	US Highway 1 @ Orange Avenue	Reconfigure the westbound approach to one shared left-turn/through lane and one right-turn lane. Consider an "all-pedestrian" signal phase.	Operational	2	Moderate	2	greater than $150K	2	Signal/Utilities	2	8
4	US Highway 1 @ Virginia Avenue	Construct southbound right-turn lane	Operational	2	Moderate	2	greater than $150K	2	Right of Way; Signal/Utilities	1	7
5a	St. Lucie West Blvd @ Peacock Blvd	Option 1 - implement a southbound right-turn overlap signal phase and extend the southbound innermost left-turn lane	Operational	2	Moderate	2	between $75K and $150K	4	Lost Landscaping; Signal/Utilities	2	10
5b	St. Lucie West Blvd @ Peacock Blvd	Option 2 - Option 1 improvements plus the construction of an additional eastbound left-turn lane	Operational	2	High	4	greater than $150K	2	Lost Landscaping; Signal/Utilities	2	10
6	Port St. Lucie Blvd @ Gatlin Blvd	Signal timing optimization	Operational	2	Moderate	2	less than $75K	6	None	3	13
7	Floresta Drive @ Southbend Blvd	Construct a roundabout	Operational	2	Very High	6	greater than $150K	2	Right of Way	1	11
8a	Prima Vista Blvd @ Bayshore Blvd	Implement a southbound right-turn overlap signal phase and extend the southbound right-turn lane towards the north (up to Macedo Blvd)	Operational	2	High	4	between $75K and $150K	4	Signal/Utilities	2	12
8b	Prima Vista Blvd @ Bayshore Blvd	Construct sidewalk along Bayshore Blvd between Prima Vista Blvd and Selvitz Road	Safety	5	High	4	greater than $150K	2	Drainage	2	13

The following criteria were used to generate Tier II scores for each improvement:

Criteria 1 - Type of Improvement
- Safety = 5 points
- Operational = 2 points

Criteria 2 - Level of Benefit
- Very High = 6 points
- High = 4 points
- Moderate = 2 points

Criteria 3 - Cost
- less than $75K = 6 points
- between $75K and $150K = 4 points
- greater than $150K = 2 points

Criteria 4 - Potential Issues
- None = 3 points
- Signal/Utilities = 2 points
- Lost Landscaping = 2 points
- Drainage = 2 points
- Right of Way = 1 point
- Public Acceptance = 1 point

Appendix G

Proposed ATMS Infrastructure GIS Inventory

Legend

- Traffic Management Center
- Proposed Fiber Trunk Line
- Flasher
- School
- Signal
- SLCConduits
- Fort Pierce Conduits
- N3C_FiberSpan
- Base Map
- FORT PIERCE
- PORT ST LUCIE

N

W E

S

City of Fort Pierce City Hall

St Lucie County Public Works

St Lucie County Road Department – Traffic Division

Treasure Coast Operations

City of Port St. Lucie - Engineering Dept. - Traffic Operations Office

JUANITA AVE
N 53 ST
AVE Q
AVE O
AVE I
AVE D
ANGLE RD
N 29 ST
OLD DIXIE HWY
ATLANTIC BEACH BLVD
BINNEY DR
FISHERMAN'S WHARF
INDIAN RIVER DR
JOHNSTON RD
FTA RD
SB I-95 TO REST AREA
NB I-95 FR WB SR-68
ORANGE AVE
HARTMAN RD
S 33 ST
N 25 ST
DELAWARE AVE
S 17 ST
S 13 ST
N 7 ST
CITRUS AVE
GEORGIA AVE
NEBRASKA AVE
OHIO AVE
KINGS HWY
KEEN RD
VIRGINIA AVE
S 35 ST
CORTEZ BLVD
SUNRISE BLVD
KIRBY LOOP RD
MCNEIL RD
EDWARDS RD
SB I-95 TO WB SR-70
NB I-95 TO EB SR-70
BROCKSMITH RD
BELL AVE
OLEANDER AVE
WEATHERBEE RD
SEAWAY DR
S INDIAN RIVER DR
MCCARTY RD
SELVITZ RD
FLORIDA'S TURNPIKE
MIDWAY RD
NB I-95 TO MIDWAY RD
NW E TORINO PKWY
NW PEACHTREE BLVD
CITRUS AVE
FEDERAL HWY
BUCHANAN DR
EASY ST
SAEGER AVE
ST JAMES DR
NW MANVILLE DR
KITTERMAN RD
GLADES CUT OFF RD
I-95
NW COMMERCE CTR DR
NW PEACOCK BLVD
NW CASHMERE BLVD
NW SELVITZ RD
BEACH AVE
NE CAMINO ST
NW FLORESTA DR
NE FLORESTA DR
C-24 CANAL RD
NW UNIVERSITY BLVD
PRIMA VISTA BLVD
NW RESERVE BLVD
NB I-95 TO ST. LU BL
FORT PIERCE SERV PLZ
SW HEATHERWOOD BLVD
SE SANDIA DR
SE WEST VIRGINIA DR
CROSSTOWN PKWY
SE WHITMORE DR
SW DEL RIO BLVD
NW CALIFORNIA BLVD
S 25 ST
NW BAYSHORE BLVD
SE THORNHILL DR
SE FLORESTA DR
SE VETERANS MEM PKWY
SE TIFFANY AVE
SE LENNARD RD
SE GRAND DR
GREEN RIVER PKWY
SE WALTON RD
JENNINGS RD
SE MELALEUCA BLVD
I-95 SB OFF RAMP
I-95 NB OFF RAMP
SW IMPORT DR
SW SAVAGE BLVD
SW PORT ST LUCIE BLV
SE MARIPOSA AVE
SW BAYSHORE BLVD
SE OAKRIDGE DR
SE SOUTHBEND BLVD
SE WESTMORELAND BLV
SE MOONINGSIDE BLVD
NW BRITT RD
GATLIN BL TO NB I95
SB I-95 TO EB GATLIN
SW SAVONA BLVD
SW PORT ST LUCIE BLV
SW TULIP BLVD
SW DARWIN BLVD
SW ALCANTARRA BLVD
SW ROSSER BLVD
SW PAAR DR
JENSEN BEACH BLVD
NW PINE LAKE DR
NE BAKER RD
SE BRIDGE RD

St.Lucie County Traffic Signals

0 1 2 4 Miles

FINAL DRAFT

Appendix H

Phase 1 Corridor Map

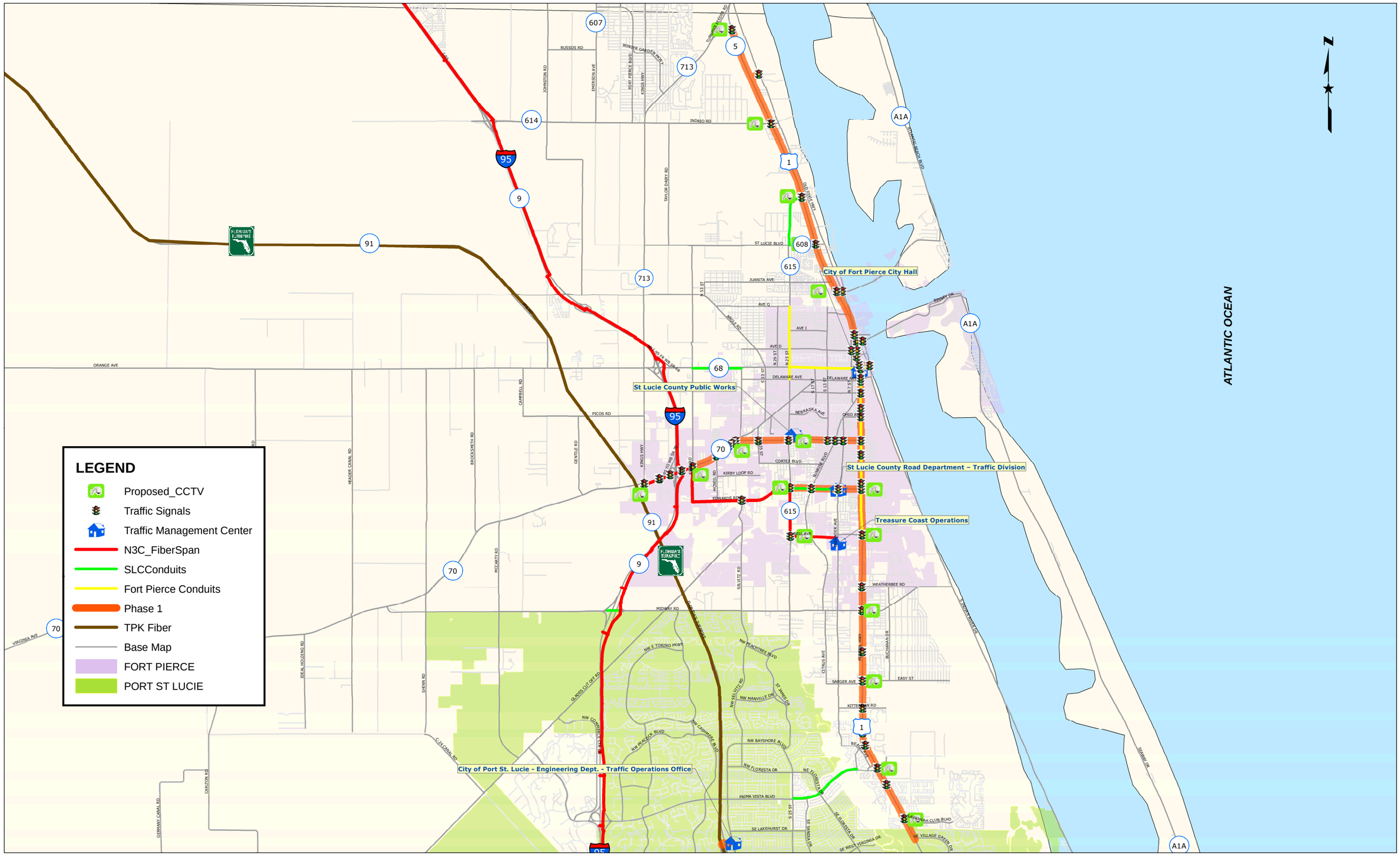
Phase 2 Corridor Map

Phase 3 Corridor Map

Phase 4 Corridor Map

ATMS MASTER PLAN

St.Lucie County



St.Lucie County

R. ALEMAN & Associates, Inc. CONSULTING ENGINEERS & SURVEYORS

Phase 1

Map Production Date: 11/31/11
This data is accurate up to date of production.
For further details please reference the general disclaimer found in the front of document.

ATMS MASTER PLAN

City of Fort Pierce City Hall

St Lucie County Public Works

St Lucie County Road Department – Traffic Division

Treasure Coast Operations

City of Port St. Lucie - Engineering Dept. - Traffic Operations Office

ATLANTIC OCEAN

LEGEND

- Proposed_CCTV
- Traffic Signals
- Traffic Management Center
- N3C_FiberSpan
- SLCConduits
- Fort Pierce Conduits
- Phase 2
- TPK Fiber
- Base Map
- FORT PIERCE
- PORT ST LUCIE

St.Lucie County

St.Lucie County

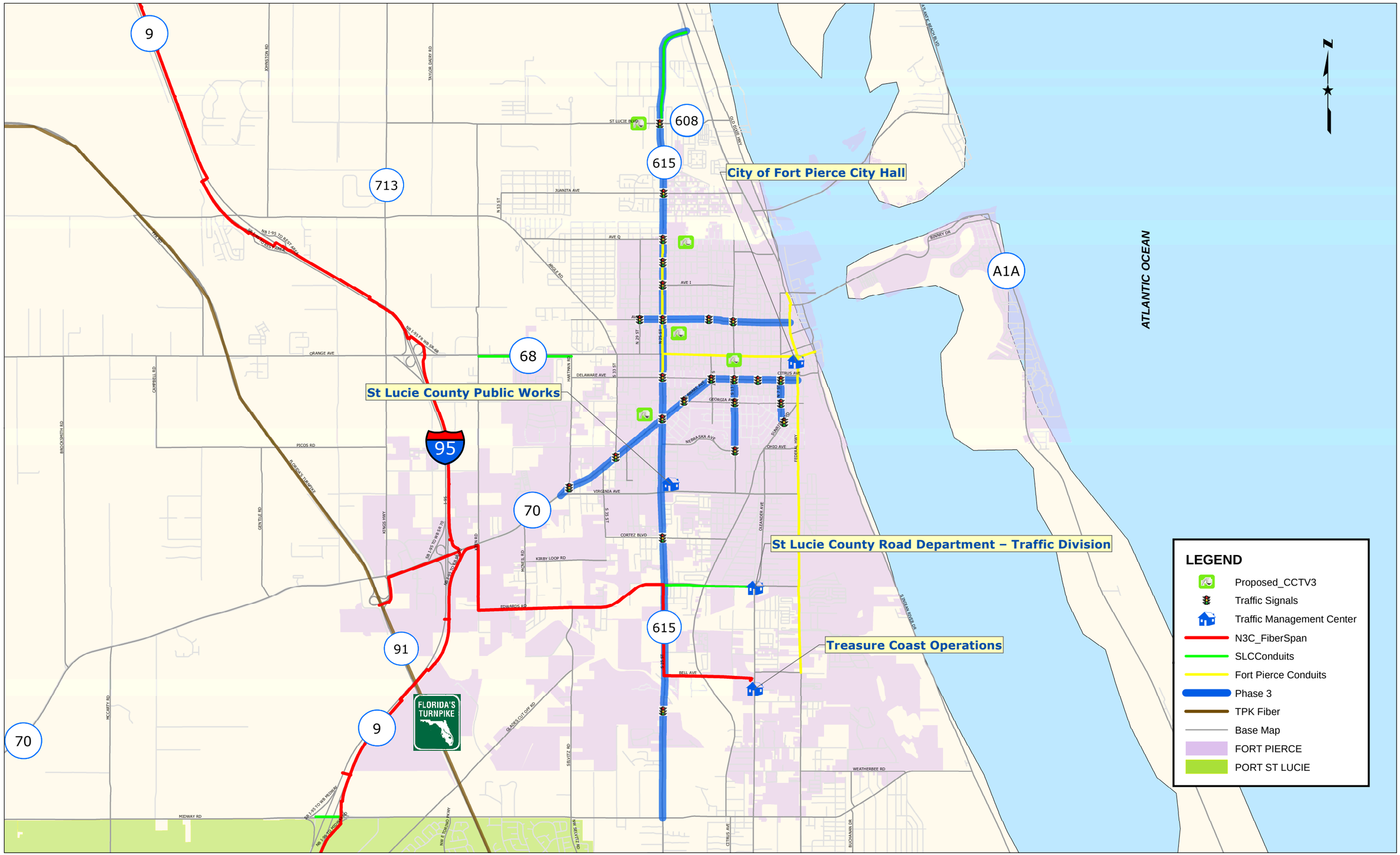
R. ALEMAN & Associates, Inc. CONSULTING ENGINEERS SURVEYORS

0 0.5 1 2 Miles

Phase 2

Map Production Date: 11/31/11
This data is accurate up to date of production. For further details please reference the general disclaimer found in the front of document.

ATMS MASTER PLAN



LEGEND

- Proposed_CCTV3
- Traffic Signals
- Traffic Management Center
- N3C_FiberSpan
- SLCConduits
- Fort Pierce Conduits
- Phase 3
- TPK Fiber
- Base Map
- FORT PIERCE
- PORT ST LUCIE

St.Lucie County

R. ALEMAN & Associates, Inc. CONSULTING ENGINEERS & SURVEYORS

0 0.5 1 2 Miles

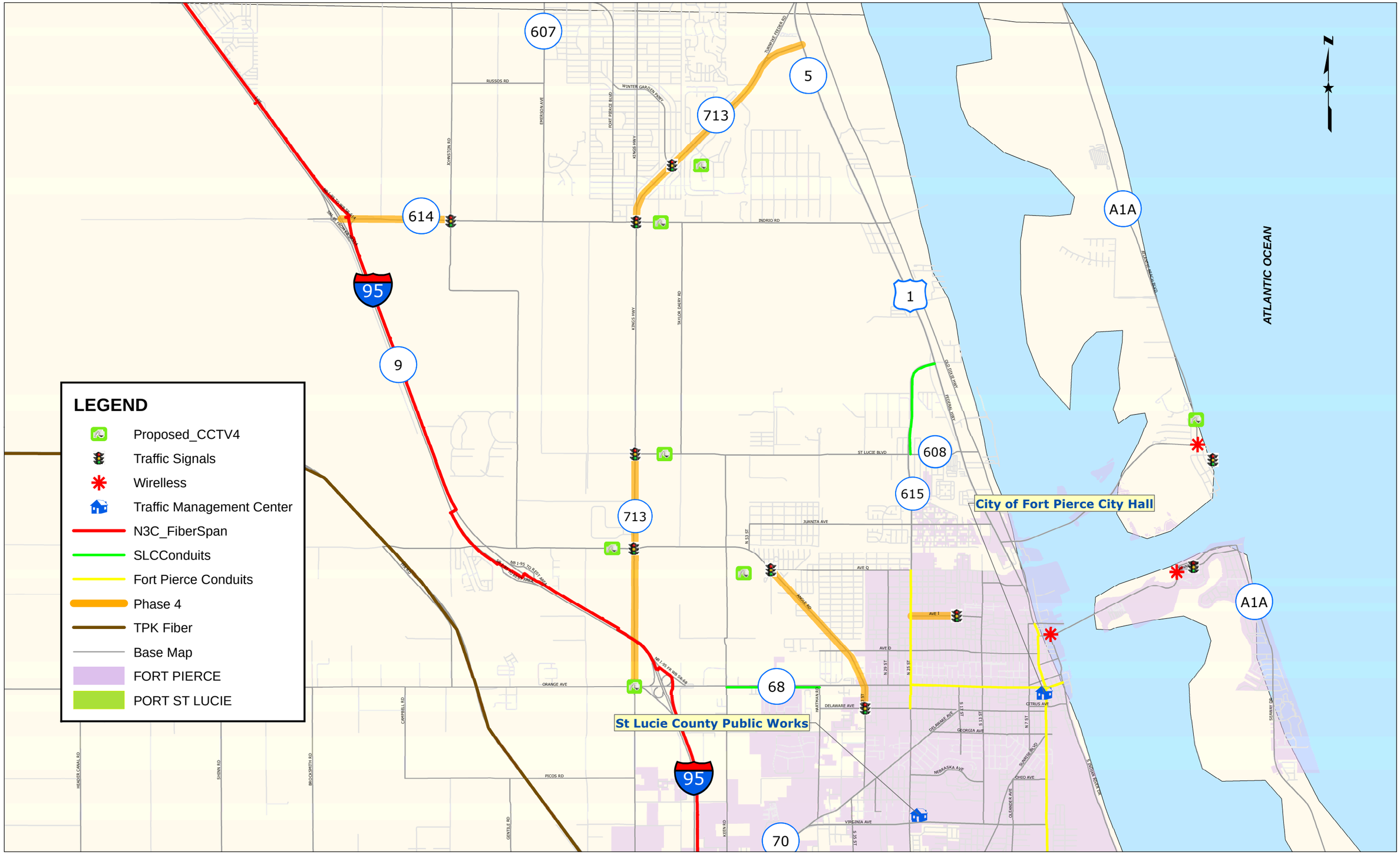
Phase 3

Map Production Date: 11/31/11
This data is accurate up to date of production. For further details please reference the general disclaimer found in the front of document.

St.Lucie County

ATMS MASTER PLAN

St.Lucie County



LEGEND

- Proposed_CCTV4
- Traffic Signals
- Wirelless
- Traffic Management Center
- N3C_FiberSpan
- SLCConduits
- Fort Pierce Conduits
- Phase 4
- TPK Fiber
- Base Map
- FORT PIERCE
- PORT ST LUCIE

St.Lucie County

R. ALEMAN & Associates, Inc. — CONSULTING ENGINEERS SURVEYORS

0 0.5 1 2 Miles

Phase 4

Map Production Date: 11/31/11
This data is accurate up to date of production. For further details please reference the general disclaimer found in the front of document.

Appendix I

Local Government Financial Information Handbook

2012
Local Government Financial Information Handbook

October 2012

The Florida Legislature's

Office of Economic and Demographic Research

FINAL DRAFT

Constitutional Fuel Tax

Revenue Estimates for the Local Fiscal Year Ending September 30, 2013

County	Collection Component	Population Component	Area Component	Distribution Factor		Estimated Distribution
Osceola	0.88771%	0.36216%	0.62880%	1.87870%	$	3,652,381
Palm Beach	2.98387%	1.75318%	0.93300%	5.67010%	$	11,023,241
Pasco	1.08544%	0.61694%	0.32410%	2.02650%	$	3,939,719
Pinellas	1.99016%	1.21462%	0.18120%	3.38600%	$	6,582,723
Polk	1.57382%	0.79978%	0.83950%	3.21310%	$	6,246,588
Putnam	0.18391%	0.09793%	0.34560%	0.62740%	$	1,219,728
St. Johns	0.63539%	0.25503%	0.29250%	1.18290%	$	2,299,676
St. Lucie	0.70886%	0.36987%	0.25450%	1.33320%	$	2,591,874
Santa Rosa	0.37491%	0.20484%	0.48500%	1.06470%	$	2,069,883
Sarasota	0.85117%	0.50426%	0.24910%	1.60450%	$	3,119,308
Seminole	1.07266%	0.56147%	0.14620%	1.78030%	$	3,461,081
Sumter	0.39195%	0.12776%	0.24110%	0.76080%	$	1,479,071
Suwannee	0.15118%	0.05715%	0.28870%	0.49700%	$	966,218
Taylor	0.09087%	0.02975%	0.44040%	0.56100%	$	1,090,640
Union	0.03540%	0.02046%	0.10450%	0.16040%	$	311,834
Volusia	1.19963%	0.65512%	0.52300%	2.37770%	$	4,622,487
Wakulla	0.05836%	0.04083%	0.26040%	0.35960%	$	699,098
Walton	0.20289%	0.07333%	0.47960%	0.75580%	$	1,469,351
Washington	0.06429%	0.03258%	0.26040%	0.35730%	$	694,627
Totals	**50.00000%**	**25.00000%**	**25.00000%**	**100.00000%**	**$**	**194,410,000**

Note: The dollar figures represent a 100 percent distribution of estimated monies.

County Fuel Tax

Revenue Estimates for the Local Fiscal Year Ending September 30, 2013

County	Collection Component	Population Component	Area Component	Distribution Factor	Estimated Distribution
Osceola	0.88771%	0.36216%	0.62880%	1.87870%	$ 1,597,412
Palm Beach	2.98387%	1.75318%	0.93300%	5.67010%	$ 4,821,144
Pasco	1.08544%	0.61694%	0.32410%	2.02650%	$ 1,723,082
Pinellas	1.99016%	1.21462%	0.18120%	3.38600%	$ 2,879,031
Polk	1.57382%	0.79978%	0.83950%	3.21310%	$ 2,732,019
Putnam	0.18391%	0.09793%	0.34560%	0.62740%	$ 533,463
St. Johns	0.63539%	0.25503%	0.29250%	1.18290%	$ 1,005,790
St. Lucie	0.70886%	0.36987%	0.25450%	1.33320%	$ 1,133,587
Santa Rosa	0.37491%	0.20484%	0.48500%	1.06470%	$ 905,288
Sarasota	0.85117%	0.50426%	0.24910%	1.60450%	$ 1,364,266
Seminole	1.07266%	0.56147%	0.14620%	1.78030%	$ 1,513,745
Sumter	0.39195%	0.12776%	0.24110%	0.76080%	$ 646,889
Suwannee	0.15118%	0.05715%	0.28870%	0.49700%	$ 422,587
Taylor	0.09087%	0.02975%	0.44040%	0.56100%	$ 477,004
Union	0.03540%	0.02046%	0.10450%	0.16040%	$ 136,384
Volusia	1.19963%	0.65512%	0.52300%	2.37770%	$ 2,021,699
Wakulla	0.05836%	0.04083%	0.26040%	0.35960%	$ 305,759
Walton	0.20289%	0.07333%	0.47960%	0.75580%	$ 642,638
Washington	0.06429%	0.03258%	0.26040%	0.35730%	$ 303,803
Totals	**50.00000%**	**25.00000%**	**25.00000%**	**100.00000%**	**$ 85,027,500**

Note: The dollar figures represent a 100 percent distribution of estimated monies.

County Revenue Sharing Program

Revenue Estimates for the State Fiscal Year Ending June 30, 2013

County	First Guaranteed	Second Guaranteed	Growth Money	Yearly Total
Pasco	$ 310,426	$ 1,782,481	$ 7,491,317	$ 9,584,224
Pinellas	$ 2,452,694	$ 3,368,283	$ 8,131,881	$ 13,952,858
Polk	$ 857,616	$ 2,627,126	$ 7,216,871	$ 10,701,613
Putnam	$ 98,535	$ 409,282	$ 833,948	$ 1,341,765
St. Johns	$ 152,548	$ 403,262	$ 3,633,664	$ 4,189,474
St. Lucie	$ 187,010	$ 618,973	$ 2,696,035	$ 3,502,018
Santa Rosa	$ 77,885	$ 448,253	$ 2,425,308	$ 2,951,446
Sarasota	$ 1,119,924	$ 1,148,225	$ 5,323,319	$ 7,591,468
Seminole	$ 339,130	$ 1,316,016	$ 5,732,698	$ 7,387,844
Sumter	$ 35,653	$ 182,301	$ 1,569,685	$ 1,787,639
Suwannee	$ 32,719	$ 175,516	$ 541,597	$ 749,832
Taylor	$ 36,940	$ 118,139	$ 198,010	$ 353,089
Union	$ 18,615	$ 33,326	$ 128,427	$ 180,368
Volusia	$ 698,366	$ 1,525,368	$ 4,518,285	$ 6,742,019
Wakulla	$ 24,054	$ 90,110	$ 431,939	$ 546,103
Walton	$ 39,806	$ 151,427	$ 1,244,869	$ 1,436,102
Washington	$ 16,827	$ 101,973	$ 281,956	$ 400,756
Statewide Totals	**$ 30,329,957**	**$ 64,756,373**	**$ 255,163,253**	**$ 350,249,583**

Notes:

1) These estimates represent a 95 percent distribution of trust fund monies.

2) Duval County's total distribution includes $5,391,660 pursuant to s. 218.23(2), F.S., (Calculation = $6.24 times the 2011 countywide population of 864,048).

3) The proportional contribution of each revenue source comprising the County Revenue Sharing Program in state fiscal year 2013 has been estimated to be as follows: state sales tax, $360.8 million or 97.9%; cigarette tax, $7.6 million or 2.1%.

4) On September 10, 2012, the U.S. Census Bureau revised the 2010 census counts for the City of Panama City and unincorporated Bay County, which also caused their respective 2011 revenue-sharing populations to change as well. Panama City's population was decreased by 981; unincorporated Bay County's population was increased by 981. Consequently, Bay County's estimated distribution was increased by $11,375 and all other counties' estimated distributions were decreased by negligible amounts.

Municipal Revenue Sharing Program

Revenue Estimates for the State Fiscal Year Ending June 30, 2013

Municipality	County	Guaranteed	Section 212.20(6)(d)5.,F.S. Distribution	Growth Money	Section 218.245(3),F.S. Distribution	Yearly Total
Dundee	Polk	$ 25,917	$ 41,724	$ 14,595	$ 15,103	$ 97,339
Eagle Lake	Polk	$ 20,806	$ 52,004	$ 754	$ 9,163	$ 82,727
Fort Meade	Polk	$ 76,018	$ 139,315	$ 12,355	$ 22,860	$ 250,547
Frostproof	Polk	$ 59,573	$ 16,744	$ 254	$ 12,157	$ 88,728
Haines City	Polk	$ 182,087	$ 253,960	$ 68,590	$ 83,454	$ 588,091
Highland Park	Polk	$ -	$ 2,740	$ 962	$ 935	$ 4,636
Hillcrest Heights	Polk	$ 498	$ 4,933	$ 347	$ 1,032	$ 6,810
Lake Alfred	Polk	$ 36,465	$ 67,725	$ 23,065	$ 20,377	$ 147,632
Lake Hamilton	Polk	$ 15,272	$ 14,019	$ -	$ 5,002	$ 34,293
Lake Wales	Polk	$ 190,668	$ 99,186	$ 33,379	$ 57,799	$ 381,032
Lakeland	Polk	$ 973,011	$ 1,183,911	$ 202,660	$ 395,846	$ 2,755,428
Mulberry	Polk	$ 53,918	$ 36,479	$ 1,483	$ 15,509	$ 107,389
Polk City	Polk	$ 15,070	$ 51,140	$ -	$ 6,347	$ 72,556
Winter Haven	Polk	$ 439,141	$ 303,030	$ 73,694	$ 137,637	$ 953,502
Crescent City	Putnam	$ 47,077	$ 14,453	$ -	$ 4,491	$ 66,021
Interlachen	Putnam	$ 11,693	$ 30,525	$ -	$ 3,995	$ 46,213
Palatka	Putnam	$ 276,527	$ 92,156	$ -	$ 30,071	$ 398,753
Pomona Park	Putnam	$ 7,968	$ 14,081	$ 804	$ 2,597	$ 25,450
Welaka	Putnam	$ 7,493	$ 7,421	$ -	$ 1,996	$ 16,911
Hastings	St. Johns	$ 15,795	$ 11,024	$ -	$ 3,262	$ 30,081
St. Augustine	St. Johns	$ 340,862	$ 131,711	$ -	$ 72,973	$ 545,545
St. Augustine Beach	St. Johns	$ 7,099	$ 95,665	$ 7,221	$ 34,734	$ 144,719
Fort Pierce	St. Lucie	$ 711,816	$ 324,578	$ 7,426	$ 110,793	$ 1,154,613
Port St. Lucie	St. Lucie	$ 6,475	$ 1,696,431	$ 1,116,110	$ 436,570	$ 3,255,586
St. Lucie Village	St. Lucie	$ 2,371	$ 8,188	$ -	$ 1,565	$ 12,124
Gulf Breeze	Santa Rosa	$ 75,883	$ 88,344	$ -	$ 19,304	$ 183,531
Jay	Santa Rosa	$ 20,822	$ 7,321	$ -	$ 1,785	$ 29,929
Milton	Santa Rosa	$ 116,957	$ 150,174	$ -	$ 29,303	$ 296,434
North Port	Sarasota	$ 24,372	$ 435,594	$ 531,179	$ 334,656	$ 1,325,802
Sarasota	Sarasota	$ 937,613	$ 519,388	$ -	$ 302,980	$ 1,759,981
Venice	Sarasota	$ 240,488	$ 242,976	$ -	$ 121,057	$ 604,521
Altamonte Springs	Seminole	$ 57,567	$ 824,280	$ 89,708	$ 198,242	$ 1,169,797
Casselberry	Seminole	$ 170,722	$ 488,283	$ 51,434	$ 125,335	$ 835,773
Lake Mary	Seminole	$ -	$ 175,333	$ 41,128	$ 66,033	$ 282,494
Longwood	Seminole	$ 80,818	$ 231,114	$ 7,098	$ 65,245	$ 384,274
Oviedo	Seminole	$ 39,986	$ 475,431	$ 153,187	$ 159,288	$ 827,892
Sanford	Seminole	$ 376,081	$ 611,108	$ 227,990	$ 255,724	$ 1,470,903
Winter Springs	Seminole	$ 13,825	$ 673,732	$ 97,907	$ 159,001	$ 944,465
Bushnell	Sumter	$ 36,546	$ 37,825	$ -	$ 11,071	$ 85,443
Center Hill	Sumter	$ 8,283	$ 27,199	$ -	$ 4,513	$ 39,995
Coleman	Sumter	$ 13,609	$ 27,386	$ -	$ 3,211	$ 44,206
Webster	Sumter	$ 17,618	$ 18,676	$ -	$ 3,585	$ 39,880
Wildwood	Sumter	$ 61,478	$ 72,500	$ 11,403	$ 30,643	$ 176,024
Branford	Suwannee	$ 20,042	$ 4,266	$ -	$ 1,986	$ 26,295
Live Oak	Suwannee	$ 153,904	$ 117,320	$ -	$ 19,108	$ 290,332
Perry	Taylor	$ 180,555	$ 57,391	$ -	$ 29,294	$ 267,240
Lake Butler	Union	$ 29,351	$ 46,307	$ -	$ 3,458	$ 79,117
Raiford	Union	$ 1,694	$ 8,057	$ -	$ 465	$ 10,216
Worthington Springs	Union	$ 4,563	$ 2,353	$ 3,767	$ 330	$ 11,013
Daytona Beach	Volusia	$ 1,027,176	$ 657,390	$ -	$ 224,477	$ 1,909,044
Daytona Beach Shores	Volusia	$ 91,781	$ 7,979	$ -	$ 15,641	$ 115,401
DeBary	Volusia	$ -	$ 241,559	$ 70,253	$ 71,152	$ 382,963
DeLand	Volusia	$ 318,746	$ 142,072	$ 119,716	$ 99,550	$ 680,084
Deltona	Volusia	$ -	$ 1,548,977	$ 896,153	$ 313,708	$ 2,758,838
Edgewater	Volusia	$ 68,458	$ 392,955	$ 97,327	$ 76,418	$ 635,158
Holly Hill	Volusia	$ 155,248	$ 143,841	$ 8,011	$ 42,938	$ 350,038
Lake Helen	Volusia	$ 8,885	$ 58,031	$ 5,849	$ 9,664	$ 82,429
New Smyrna Beach	Volusia	$ 201,998	$ 197,487	$ 34,687	$ 82,730	$ 516,903
Oak Hill	Volusia	$ 13,952	$ 22,879	$ 2,463	$ 6,600	$ 45,893
Orange City	Volusia	$ 21,923	$ 108,197	$ 64,877	$ 39,686	$ 234,683
Ormond Beach	Volusia	$ 294,368	$ 472,729	$ 67,921	$ 140,429	$ 975,447
Pierson	Volusia	$ 18,098	$ 13,177	$ 9,540	$ 6,393	$ 47,209
Ponce Inlet	Volusia	$ 4,946	$ 32,790	$ 4,264	$ 11,166	$ 53,167
Port Orange	Volusia	$ 93,493	$ 980,523	$ 229,242	$ 209,109	$ 1,512,367
South Daytona	Volusia	$ 132,655	$ 192,449	$ 11,133	$ 45,122	$ 381,359
St. Marks	Wakulla	$ 9,455	$ 15,580	$ -	$ 761	$ 25,795
Sopchoppy	Wakulla	$ 9,800	$ 23,142	$ -	$ 1,186	$ 34,128

Municipal Revenue Sharing Program

Revenue Estimates for the State Fiscal Year Ending June 30, 2013

Municipality	County	Guaranteed	Section 212.20(6)(d)5.,F.S. Distribution	Growth Money	Section 218.245(3),F.S. Distribution	Yearly Total
DeFuniak Springs	Walton	$ 100,398	$ 116,851	$ -	$ 57,084	$ 274,332
Freeport	Walton	$ 11,372	$ 31,161	$ 3,099	$ 19,842	$ 65,474
Paxton	Walton	$ 13,228	$ 7,606	$ 4,653	$ 7,151	$ 32,638
Caryville	Washington	$ 11,357	$ 1,616	$ 197	$ 765	$ 13,935
Chipley	Washington	$ 67,615	$ 46,974	$ -	$ 9,780	$ 124,369
Ebro	Washington	$ 4,447	$ 4,418	$ -	$ 738	$ 9,603
Vernon	Washington	$ 12,365	$ 26,926	$ -	$ 1,877	$ 41,168
Wausau	Washington	$ 4,597	$ 16,650	$ -	$ 1,046	$ 22,294
Statewide Totals		**$ 124,683,365**	**$ 122,417,058**	**$ 27,919,603**	**$ 47,600,000**	**$ 322,620,025**

Notes:

1) These estimates represent a 100 percent distribution of trust fund monies.

2) The column labeled "Section 212.20(6)(d)5., F.S. Distribution" reflects the distribution authorized in Chapter 2000-355, L.O.F. This law restructured the Municipal Revenue Sharing Program by transferring the portions of cigarette tax that previously funded the former Municipal Financial Assistance Trust Fund and Revenue Sharing Trust Fund for Municipalities to the state's General Revenue Fund and providing a separate distribution from state sales and use taxes to the Revenue Sharing Trust Fund for Municipalities.

3) The column labeled "Section 218.245(3), F.S. Distribution" reflects the distribution authorized in Chapter 2004-265, L.O.F. Chapter 2003-402, L.O.F., which addressed state funding of the judicial system, including reductions in the proportion of state sales and use taxes transferred to the Local Government Half-cent Sales Tax Clearing Trust Fund and Revenue Sharing Trust Fund for Counties and an increase in the proportion of state sales and use taxes transferred to the Revenue Sharing Trust Fund for Municipalities to offset municipalities' losses from the Local Government Half-cent Sales Tax reduction. Chapter 2004-265, L.O.F., included a hold harmless provision such that the revenue sharing dollar increases to individual municipalities resulting from the increased share of state sales and use taxes transferred to the Revenue Sharing Trust Fund for Municipalities are to be distributed in proportion to their respective loss from the Local Government Half-cent Sales Tax Program.

4) The proportional contribution of each revenue source comprising the Municipal Revenue Sharing Program in state fiscal year 2013 has been estimated to be as follows: state sales tax, $236.7 million or 73.37%; municipal fuel tax, $85.9 million or 26.6%; and the state alternative fuel user decal fee collections, 0.1 million or 0.02%.

Local Option Fuel Tax Levies on Motor Fuel in Florida's Counties

Estimation of Realized and Unrealized Tax Revenues

Local Fiscal Year Ending September 30, 2013

	Ninth-Cent Fuel Tax				1-6 Cents Local Option Fuel Tax				1-5 Cents Local Option Fuel Tax				Combined Total: All Taxes			
County	2012 Tax Rate	Countywide Realized Tax Revenues	Unutilized Tax Rate	Countywide Unrealized Tax Revenues	2012 Tax Rate	Countywide Realized Tax Revenues	Unutilized Tax Rate	Countywide Unrealized Tax Revenues	2012 Tax Rate	Countywide Realized Tax Revenues	Unutilized Tax Rate	Countywide Unrealized Tax Revenues	2012 Tax Rate	Countywide Realized Tax Revenues	Unutilized Tax Rate	Countywide Unrealized Tax Revenues
Alachua	1	$ 1,171,874	0	$ -	6	$ 6,602,292	0	$ -	5	$ 4,907,769	0	$ -	12	$ 12,681,934	0	$ -
Baker	1	$ 185,738	0	$ -	6	$ 1,045,043	0	$ -	0	$ -	5	$ 737,337	7	$ 1,230,781	5	$ 737,337
Bay	1	$ 988,286	0	$ -	6	$ 5,569,726	0	$ -	0	$ -	5	$ 4,099,085	7	$ 6,558,012	5	$ 4,099,085
Bradford	0	$ 22,896	1	$ 132,513	6	$ 878,543	0	$ -	0	$ -	5	$ 619,235	6	$ 901,439	6	$ 751,748
Brevard	0	$ 768,233	1	$ 2,042,900	6	$ 16,250,038	0	$ -	0	$ -	5	$ 9,546,505	6	$ 17,018,272	6	$ 11,589,405
Broward	1	$ 8,395,828	0	$ -	6	$ 47,200,374	0	$ -	5	$ 35,531,746	0	$ -	12	$ 91,127,948	0	$ -
Calhoun	0	$ 23,535	1	$ 37,474	6	$ 344,300	0	$ -	0	$ -	5	$ 175,118	6	$ 367,835	6	$ 212,593
Charlotte	1	$ 891,716	0	$ -	6	$ 5,020,283	0	$ -	5	$ 3,576,066	0	$ -	12	$ 9,488,065	0	$ -
Citrus	1	$ 546,855	0	$ -	6	$ 3,082,838	0	$ -	5	$ 2,310,592	0	$ -	12	$ 5,940,284	0	$ -
Clay	1	$ 817,084	0	$ -	6	$ 4,600,996	0	$ -	0	$ -	5	$ 3,479,337	7	$ 5,418,079	5	$ 3,479,337
Collier	1	$ 1,384,624	0	$ -	6	$ 7,787,693	0	$ -	5	$ 5,941,620	0	$ -	12	$ 15,113,937	0	$ -
Columbia	1	$ 573,464	0	$ -	6	$ 3,226,755	0	$ -	0	$ -	5	$ 2,007,204	7	$ 3,800,219	5	$ 2,007,204
DeSoto	1	$ 131,259	0	$ -	6	$ 741,398	0	$ -	5	$ 468,218	0	$ -	12	$ 1,340,875	0	$ -
Dixie	0	$ 26,858	1	$ 62,137	6	$ 508,003	0	$ -	0	$ -	5	$ 290,369	6	$ 534,861	6	$ 352,507
Duval	0	$ 997,119	1	$ 4,244,886	6	$ 29,528,717	0	$ -	0	$ -	5	$ 19,836,419	6	$ 30,525,836	6	$ 24,081,305
Escambia	1	$ 1,500,823	0	$ -	6	$ 8,454,975	0	$ -	0	$ -	5	$ 5,856,346	7	$ 9,955,798	5	$ 5,856,346
Flagler	1	$ 385,738	0	$ -	6	$ 2,171,503	0	$ -	0	$ -	5	$ 1,619,936	7	$ 2,557,241	5	$ 1,619,936
Franklin	0	$ 12,189	1	$ 55,621	5	$ 330,206	1	$ 51,984	0	$ -	5	$ 259,920	5	$ 342,395	7	$ 367,525
Gadsden	0	$ 207,941	1	$ 239,679	6	$ 2,585,287	0	$ -	0	$ -	5	$ 1,120,024	6	$ 2,793,228	6	$ 1,359,703
Gilchrist	1	$ 69,321	0	$ -	6	$ 390,119	0	$ -	0	$ -	5	$ 279,876	7	$ 459,441	5	$ 279,876
Glades	1	$ 49,003	0	$ -	6	$ 279,479	0	$ -	0	$ -	5	$ 172,519	7	$ 328,483	5	$ 172,519
Gulf	1	$ 62,188	0	$ -	6	$ 353,867	0	$ -	0	$ -	5	$ 242,891	7	$ 416,056	5	$ 242,891
Hamilton	0	$ 73,427	1	$ 70,192	6	$ 809,321	0	$ -	0	$ -	5	$ 328,008	6	$ 882,748	6	$ 398,200
Hardee	1	$ 134,858	0	$ -	6	$ 762,448	0	$ -	5	$ 461,200	0	$ -	12	$ 1,358,505	0	$ -
Hendry	1	$ 231,465	0	$ -	6	$ 1,311,759	0	$ -	2	$ 272,950	3	$ 409,426	9	$ 1,816,175	3	$ 409,426
Hernando	1	$ 816,588	0	$ -	6	$ 4,601,169	0	$ -	2	$ 1,305,343	3	$ 1,958,015	9	$ 6,723,100	3	$ 1,958,015
Highlands	1	$ 508,930	0	$ -	6	$ 2,868,334	0	$ -	5	$ 1,869,035	0	$ -	12	$ 5,246,300	0	$ -
Hillsborough	1	$ 6,590,241	0	$ -	6	$ 37,076,013	0	$ -	0	$ -	5	$ 26,154,411	7	$ 43,666,254	5	$ 26,154,411
Holmes	1	$ 112,452	0	$ -	6	$ 633,700	0	$ -	0	$ -	5	$ 366,845	7	$ 746,152	5	$ 366,845
Indian River	0	$ 167,178	1	$ 615,428	6	$ 4,398,880	0	$ -	0	$ -	5	$ 2,875,904	6	$ 4,566,058	6	$ 3,491,331
Jackson	1	$ 496,587	0	$ -	6	$ 2,793,850	0	$ -	0	$ -	5	$ 1,298,304	7	$ 3,290,436	5	$ 1,298,304
Jefferson	1	$ 115,159	0	$ -	6	$ 648,792	0	$ -	0	$ -	5	$ 306,662	7	$ 763,950	5	$ 306,662
Lafayette	0	$ 8,724	1	$ 21,744	6	$ 174,825	0	$ -	0	$ -	5	$ 101,608	6	$ 183,549	6	$ 123,351
Lake	1	$ 1,447,021	0	$ -	6	$ 8,147,022	0	$ -	0	$ -	5	$ 6,093,471	7	$ 9,594,043	5	$ 6,093,471
Lee	1	$ 2,930,515	0	$ -	6	$ 16,497,849	0	$ -	5	$ 12,212,274	0	$ -	12	$ 31,640,638	0	$ -
Leon	1	$ 1,391,370	0	$ -	6	$ 7,825,320	0	$ -	0	$ -	5	$ 5,893,197	7	$ 9,216,690	5	$ 5,893,197
Levy	0	$ 43,689	1	$ 198,222	6	$ 1,364,201	0	$ -	0	$ -	5	$ 926,294	6	$ 1,407,890	6	$ 1,124,515
Liberty	1	$ 42,417	0	$ -	6	$ 239,896	0	$ -	0	$ -	5	$ 99,585	7	$ 282,312	5	$ 99,585
Madison	0	$ 191,042	1	$ 102,898	6	$ 1,650,131	0	$ -	0	$ -	5	$ 480,846	6	$ 1,841,173	6	$ 583,744
Manatee	1	$ 1,543,792	0	$ -	6	$ 8,685,658	0	$ -	5	$ 6,385,357	0	$ -	12	$ 16,614,807	0	$ -
Marion	1	$ 1,982,059	0	$ -	6	$ 11,152,799	0	$ -	5	$ 7,254,320	0	$ -	12	$ 20,389,179	0	$ -
Martin	1	$ 776,105	0	$ -	6	$ 4,368,456	0	$ -	5	$ 3,280,003	0	$ -	12	$ 8,424,564	0	$ -
Miami-Dade	1	$ 10,888,762	0	$ -	6	$ 61,283,328	0	$ -	3	$ 27,104,889	2	$ 18,069,926	10	$ 99,276,979	2	$ 18,069,926
Monroe	1	$ 507,785	0	$ -	6	$ 2,854,439	0	$ -	3	$ 1,317,417	2	$ 878,278	10	$ 4,679,641	2	$ 878,278
Nassau	1	$ 369,770	0	$ -	6	$ 2,077,321	0	$ -	0	$ -	5	$ 1,363,099	7	$ 2,447,090	5	$ 1,363,099
Okaloosa	1	$ 1,054,421	0	$ -	6	$ 5,925,069	0	$ -	0	$ -	5	$ 4,558,546	7	$ 6,979,490	5	$ 4,558,546
Okeechobee	1	$ 302,909	0	$ -	6	$ 1,710,055	0	$ -	5	$ 1,083,194	0	$ -	12	$ 3,096,159	0	$ -
Orange	0	$ 1,012,296	1	$ 5,477,597	6	$ 36,546,527	0	$ -	0	$ -	5	$ 25,596,899	6	$ 37,558,823	6	$ 31,074,496
Osceola	1	$ 1,675,020	0	$ -	6	$ 9,414,138	0	$ -	0	$ -	5	$ 7,209,606	7	$ 11,089,158	5	$ 7,209,606
Palm Beach	1	$ 5,705,854	0	$ -	6	$ 32,119,219	0	$ -	5	$ 23,992,986	0	$ -	12	$ 61,818,059	0	$ -
Pasco	1	$ 1,999,087	0	$ -	6	$ 11,246,080	0	$ -	0	$ -	5	$ 8,250,868	7	$ 13,245,167	5	$ 8,250,868
Pinellas	1	$ 3,721,435	0	$ -	6	$ 20,929,893	0	$ -	0	$ -	5	$ 15,841,837	7	$ 24,651,328	5	$ 15,841,837
Polk	1	$ 2,901,654	0	$ -	6	$ 16,364,860	0	$ -	5	$ 10,163,782	0	$ -	12	$ 29,430,297	0	$ -
Putnam	1	$ 318,461	0	$ -	6	$ 1,793,915	0	$ -	5	$ 1,195,957	0	$ -	12	$ 3,308,333	0	$ -
St. Johns	0	$ 209,119	1	$ 1,005,223	6	$ 6,821,258	0	$ -	0	$ -	5	$ 4,697,421	6	$ 7,030,378	6	$ 5,702,644
St. Lucie	1	$ 1,316,279	0	$ -	6	$ 7,409,567	0	$ -	5	$ 5,252,747	0	$ -	12	$ 13,978,593	0	$ -
Santa Rosa	0	$ 80,020	1	$ 641,687	6	$ 4,072,958	0	$ -	0	$ -	5	$ 2,998,614	6	$ 4,152,978	6	$ 3,640,301
Sarasota	1	$ 1,576,203	0	$ -	6	$ 8,861,319	0	$ -	5	$ 6,650,449	0	$ -	12	$ 17,087,971	0	$ -
Seminole	1	$ 1,978,812	0	$ -	6	$ 11,133,612	0	$ -	0	$ -	5	$ 8,504,166	7	$ 13,112,424	5	$ 8,504,166

Local Option Fuel Tax Levies on Motor Fuel in Florida's Counties

Estimation of Realized and Unrealized Tax Revenues

Local Fiscal Year Ending September 30, 2013

	Ninth-Cent Fuel Tax				1-6 Cents Local Option Fuel Tax				1-5 Cents Local Option Fuel Tax				Combined Total: All Taxes			
County	2012 Tax Rate	Countywide Realized Tax Revenues	Unutilized Tax Rate	Countywide Unrealized Tax Revenues	2012 Tax Rate	Countywide Realized Tax Revenues	Unutilized Tax Rate	Countywide Unrealized Tax Revenues	2012 Tax Rate	Countywide Realized Tax Revenues	Unutilized Tax Rate	Countywide Unrealized Tax Revenues	2012 Tax Rate	Countywide Realized Tax Revenues	Unutilized Tax Rate	Countywide Unrealized Tax Revenues
Sumter	1	$ 752,201	0	$ -	6	$ 4,232,841	0	$ -	0	$ -	5	$ 2,045,364	7	$ 4,985,042	5	$ 2,045,364
Suwannee	1	$ 267,989	0	$ -	6	$ 1,509,637	0	$ -	5	$ 904,460	0	$ -	12	$ 2,682,086	0	$ -
Taylor	0	$ 61,660	1	$ 102,319	6	$ 928,042	0	$ -	0	$ -	5	$ 478,140	6	$ 989,701	6	$ 580,459
Union	1	$ 64,722	0	$ -	6	$ 365,521	0	$ -	0	$ -	5	$ 169,027	7	$ 430,243	5	$ 169,027
Volusia	1	$ 2,277,876	0	$ -	6	$ 12,818,133	0	$ -	5	$ 9,592,488	0	$ -	12	$ 24,688,497	0	$ -
Wakulla	1	$ 109,305	0	$ -	6	$ 617,310	0	$ -	0	$ -	5	$ 415,353	7	$ 726,615	5	$ 415,353
Walton	1	$ 332,750	0	$ -	6	$ 1,876,070	0	$ -	0	$ -	5	$ 1,306,445	7	$ 2,208,820	5	$ 1,306,445
Washington	1	$ 113,716	0	$ -	6	$ 642,607	0	$ -	0	$ -	5	$ 443,591	7	$ 756,323	5	$ 443,591
Florida Total		$ 78,414,293		$ 15,050,521		$ 526,516,579		$ 51,984		$ 173,034,864		$ 200,461,873		$ 777,965,736		$ 215,564,378

Notes:
1) The estimation of realized and unrealized revenues reflects countywide totals and assumes those tax rates in effect beginning January 1, 2012. Tax rates for 2013 are not yet available.
2) The estimation of unrealized revenues from the Ninth-Cent Fuel Tax levy on motor fuel assumes the maximum levy rate of $0.01 per gallon and reflects countywide totals.
3) The estimation of unrealized revenues from the 1-6 Cents Local Option Fuel Tax levy on motor fuel assumes the maximum levy rate of $0.06 per gallon and reflects countywide totals.
4) The estimation of unrealized revenues from the 1-5 Cents Local Option Fuel Tax levy on motor fuel assumes the maximum levy rate of $0.05 per gallon and reflects countywide totals.
5) The Ninth-Cent Fuel Tax and 1-6 Cents Local Option Fuel Tax are imposed on diesel fuel in every county at the maximum rate of $0.01 and $0.06 per gallon, respectively, as the result of statewide equalization. Consequently, there are no unrealized tax revenues resulting from these levies on diesel fuel.
6) Current law requires the countywide tax proceeds generated from the 1-6 Cents and 1-5 Cents Local Option Fuel Taxes to be distributed among the county government and municipalities within the county's boundaries pursuant to interlocal agreement or default formula (i.e., historical transportation expenditures) methodology. County governments are not required by law to share the Ninth-Cent Fuel Tax proceeds with municipalities within their respective boundaries.

Data Sources:
1) Office of Economic and Demographic Research, "2012 Local Government Financial Information Handbook" Table: 2012 Federal, State, and County Tax Rates on Motor Fuel and Diesel Fuel in Florida's Counties.
2) Office of Economic and Demographic Research, "2012 Local Government Financial Information Handbook" Table: Ninth-Cent Fuel Tax - Estimated Gallons and Tax by Fuel Type - Revenue Estimates for the Local Fiscal Year Ending September 30, 2013.
3) Office of Economic and Demographic Research, "2012 Local Government Financial Information Handbook" Table: Local Option Fuel Taxes - Revenue Estimates for the Local Fiscal Year Ending September 30, 2013.