Needs Assessment

Central Florida Regional Freight Study

technical report

prepared for

MetroPlan Orlando

FDOT District 5, Lake-Sumter MPO, Space Coast TPO, and Volusia TPO

prepared by

Cambridge Systematics, Inc.

with

HDR Engineering, Inc.
Canin Associates
Aviation Analytics

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CAMBRIDGE SYSTEMATICS

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1.0 Introduction

Goods movement is a derived demand meaning that freight volumes grow as population, income, and employment grow. Since completion of MetroPlan Orlando's original Freight, Goods and Services Mobility Strategy Plan in 2002, there have been significant developments and changes that impact the region. Some of these are regional in nature, like the development of SunRail, the shifting of CSX's freight trains from the A Line to the S Line, transitioning away from the shuttle program at Cape Canaveral and the subsequent development of an intermodal logistics center (ILC) in Winter Haven. Others relate to state initiatives, such as the 2060 FTP, the 2010 Strategic Intermodal System (SIS) Strategic Plan, the investment elements of the 2010 Rail and Seaport System Plans, the trade development strategies developed as part of the Florida Trade and Logistics Study, recent legislative actions, like the inclusion of logistics as a targeted industry, and ongoing reorganization of the Florida Department of Transportation (FDOT) to create an Office of Freight and Logistics.

All of these changes and developments have occurred as Florida has struggled to recover from the economic downturn and prepare itself for expanded opportunities in international trade – such as widening of the Panama Canal; the anticipated opening of trade with Cuba; and the latest free trade agreements with Columbia, Panama, and South Korea.

The Central Florida Regional Freight and Goods Movement Plan has been undertaken and includes an expanded examination of the current and future freight and goods movement needs and opportunities. The study area includes a seven-county region, each with its unique opportunities and challenges:

- MetroPlan Orlando's three-county region represents the most urbanized area and population base. It is home to the world renowned theme parks, making it one of the largest tourist destinations in the world. It is centered on Florida's Turnpike and I-4, and CSX and Florida Central Railroad. It is home to the region's largest freight hubs, such as the Orlando and Sanford International Airports, and CSX's existing Taft Yard.
- The Space Coast Transportation Planning Organization (TPO) is home to an ever-expanding Port Canaveral which has significant freight and passenger traffic, Canaveral Air Station/Kennedy Space Center, the county's leading space port, Melbourne International Airport, and is served by I-95 and SR 528. With the decommissioning of the shuttle program, Brevard County is working to prepare for the next generation of space service.
- Volusia TPO to the north is home to the Daytona Speedway. It is characterized by significant through traffic, given its location along I-95 and the Florida East Coast Railway (FEC). Its primary focus is on understanding and managing truck trip patterns and supporting industrial development

along key corridors, such as the I-4/44 intersection. It also has its own international airport that effectively serves a niche German market during the winter.

- To the northwest, the Lake~Sumter Metropolitan Planning Organization (MPO) is home to a diverse community. It is served by Florida's Turnpike and I-75, the Leesburg International Airport, the Florida Central Railroad, and CSX. It has a mixture of industrial sites, including at least one that the county intends to develop infrastructure to meet the state's ILC requirements. Sumter County borders Citrus County, which is home to a proposed new deepwater seaport.

Each of these subareas has established economic development initiatives designed to promote and grow their respective communities, and many of these initiatives focus on freight- and logistics-based development.

1.1 PURPOSE

Identifying and implementing improvements to accommodate increasing demand for freight and goods movement in the Central Florida region are critical to the region's economic vitality and quality of life. Maintaining the competitive edge in terms of its freight transportation system requires the region to integrate freight concerns into its planning process. The purpose of the study is to identify and prioritize improvements and strategies that accommodate and enhance mobility of both people and goods while mitigating negative impacts on congestion, safety, environment, and quality of life.

The Needs Assessment report is one in a series of reports to be developed as part of the study. The purpose of the Needs Assessment is to document existing conditions, forecast future demand, and assess freight transportation deficiencies and bottlenecks in three key areas: 1) Physical, which are related to the condition or capacity of the transportation infrastructure; 2) Operational, which relate to how the transportation system is being utilized; and 3) Institutional, which relate to the policy and regulatory environment. Findings from this task will lay the groundwork for developing solution packages and performance measures, which will be documented in the Strategies and Recommendations report, and ultimately, the final Central Florida Regional Freight and Goods Movement Plan.

1.2 METHODOLOGY

The framework for conducting the Needs Assessment provides the building blocks necessary to identify the key elements of Central Florida's freight transportation system and how they relate to one another and to the economy.

The needs assessment framework integrates five primary areas of research:

1. **Economic Structure.** Developing an understanding of which economic sectors generate demand for goods movement in the region, what their

growth prospects are, and what they contribute to the regional economy is a critical first step. This can include the international trade sector that simply moves goods through the region, as well as local industries. The goods movement systems of each of the critical industry sectors are defined so that the impacts of infrastructure investments, operational strategies, or regulatory approaches can be assessed from the users' perspective.

2. **Industry Logistics Patterns.** The industry supply chains and logistics patterns of each of the critical demand sectors are characterized. These logistics systems describe which modes are used, locations of major distribution facilities, key corridors that link to supply and distribution markets, and the performance characteristics of the infrastructure that matter most to the shippers. Understanding these logistics systems allows for the evaluation of system bottlenecks and improvements from a freight mobility perspective. It also assists in defining performance measures in the recommendation development task.
3. **Freight Infrastructure.** The critical infrastructure that comprises the goods movement system for each of the critical demand sectors is defined, and its current condition and performance are assessed against the industry needs. These systems are multimodal and they consist of terminals, mainline corridors, and connectors. The operational characteristics of these key infrastructure elements are defined. The Central Florida Regional Freight and Goods Movement Profile Report provides in-depth documentation of the freight system inventory, operational profile, and challenges.
4. **Commodity/Vehicle Traffic Flows.** In order to fully assess the performance of the critical infrastructure, the goods movement system demand must be converted to traffic estimates and forecasts by mode on the critical infrastructure. With traffic information, all of the key performance metrics, including recurrent delay, travel time reliability, throughput, and safety, can be determined in order to identify bottlenecks. Understanding industry logistics patterns also provides a sense of which carrier market segments serve the critical demand sectors, and what performance measures are important to the carriers in order to meet customer expectations. The Commodity Flow Analysis provides detailed information on freight flows while the Needs Assessment provides information on traffic levels and network performance.
5. **Organization and Public Policy.** The needs assessment framework recognizes that the goods movement system operates within a matrix of institutional and commercial relationships, regulations, and public policies that govern the decisions of all the players.

1.3 DATA COLLECTION

This needs assessment makes use of a variety of sources to detail the existing condition of the Central Florida regional transportation network, including the

Florida Trade and Logistics Study commodity flow database, the Central Florida Travel Demand Model, data from FDOT, information gleaned from interviews and surveys, and various previous reports.

Significant original data collection has been completed for the needs assessment. This includes global positioning system (GPS) data from trucks traveling within the Central Florida region, which provides information on travel times, speeds, routes, and delay and stakeholder input via interviews.

Private-Sector Outreach

During the spring and summer of 2012, an extensive outreach effort targeting private-sector freight stakeholders was conducted. Stakeholders included shippers, carriers, terminal and facility operators, logistics service providers, developers, and receivers. An outreach effort aimed at truck drivers was the placement of regional maps in the break rooms of area trucking companies, providing drivers an opportunity to identify bottlenecks and hot spots, as well as potential solutions. Also, interviews were conducted with private-sector stakeholders throughout the region, including local drayage operators, regional and national long-haul carriers, freight expeditors, developers, and regional and national manufacturing and retail shippers. The purpose of the interviews was to collect both qualitative and quantitative data regarding freight demand (current and future), operations, bottlenecks, recommendations, and the regional competitive position.

Public Sector Outreach

Various efforts to solicit input from elected officials and the local planning and engineering staff have been employed. This includes meetings in each of the counties in the study region and the larger municipalities.

1.4 ORGANIZATION OF THE REPORT

The report summarizes the data, information, and findings from the various elements in the Needs Assessment process used to identify existing and future goods movement needs at the regional level. The report is organized as follows:

- **Chapter 2 – Regional Goods Movement Overview.** This chapter presents a summary overview of regional commodity flow and the multimodal transportation systems used to transport those goods and represents a snapshot of existing conditions.
- **Chapter 3 – The Regional Freight Subsystem.** This chapter identifies and discusses the regional freight subsystem, which comprises roadway facilities in the regional transportation network that are most critical for freight and logistics activities.

- **Chapter 4 – Logistics Patterns of Key Industry Sectors.** This chapter profiles the logistics patterns of key industries, which provides insight into the freight transportation needs of a region's key industries, and how their operations impact the transportation system.
- **Chapter 5 – Freight and Land Use in Central Florida.** This chapter examines the interaction of freight and land use throughout Central Florida, and includes an analysis of the existing and future freight villages, industrial parks and ILCs in the region. This chapter also examines the potentially serious impacts of freight activity to the region's communities and natural environment.
- **Chapter 6 – Future Freight Demand and the Impact on the Region's Economy.** Economic growth, changes in international trade patterns, and supply chain practices will clearly impact the volume and way goods flow within the Central Florida region. This chapter presents the forecast of future freight volumes and traffic in the region, and discusses the economic impacts of that activity.
- **Chapter 7 – Needs and Deficiencies.** Freight mobility needs, both existing and future, were identified based on data, technical analysis, and private- and public-sector stakeholder input. The needs presented in this chapter focus on those of regional significance and on the regional freight subsystem.

2.0 Regional Goods Movement Overview

The Central Florida region, which includes Orange, Osceola, Seminole, Lake, Sumter, Brevard, and Volusia Counties, is home to vibrant and growing population and local and regionally significant businesses supported by an expanding multimodal transportation system. Figure 2.1 displays the region's multimodal goods movement system.

This chapter presents a summary overview of regional commodity flow and the multimodal transportation systems used to transport those goods. It draws from two previous technical reports – the Current Regional Freight and Goods Flow Profile, and the Regional Freight and Goods Movement Facilities Profile; both of which provide significantly more detail. The material presented here and the other two referenced reports represent existing conditions.

2.1 COMMODITY FLOW SUMMARY

In 2010, 201.5 million tons of freight moved into, out of, within, or through the Central Florida region. Approximately 38 million tons (19 percent) traveled inbound, 23 million tons (12 percent) traveled outbound, and 21 million tons (10 percent) traveled from one point within the region to another point within the region. Through freight accounted for 120 million tons or about 59 percent of the total. Every freight shipment can be categorized as moving in one of four directions – inbound, outbound, intraregional, or through. Figure 2.2 graphically displays the proportion of regional freight tonnage by direction.

Freight utilizes different modes of transportation: roadways, railways, water, and air. Mode share analysis enables better understanding of how the region's transportation infrastructure is impacted by freight movement. Figure 2.3 display the breakdown of total freight tonnage by mode for 2010. Clearly, trucks are the dominant mode of freight transportation throughout the region. About 95 percent of all freight tonnage were moved by truck in 2010. Rail transported nearly 4 percent of the freight tonnage, not including rail traffic that simply moves through the region. International waterborne freight through Port Canaveral accounted for 1 percent of the tonnage; and the remaining share of the region's tonnage, less than 0.1 percent, was air cargo.

Figure 2.1 Central Florida Regional Multimodal Freight Transportation System

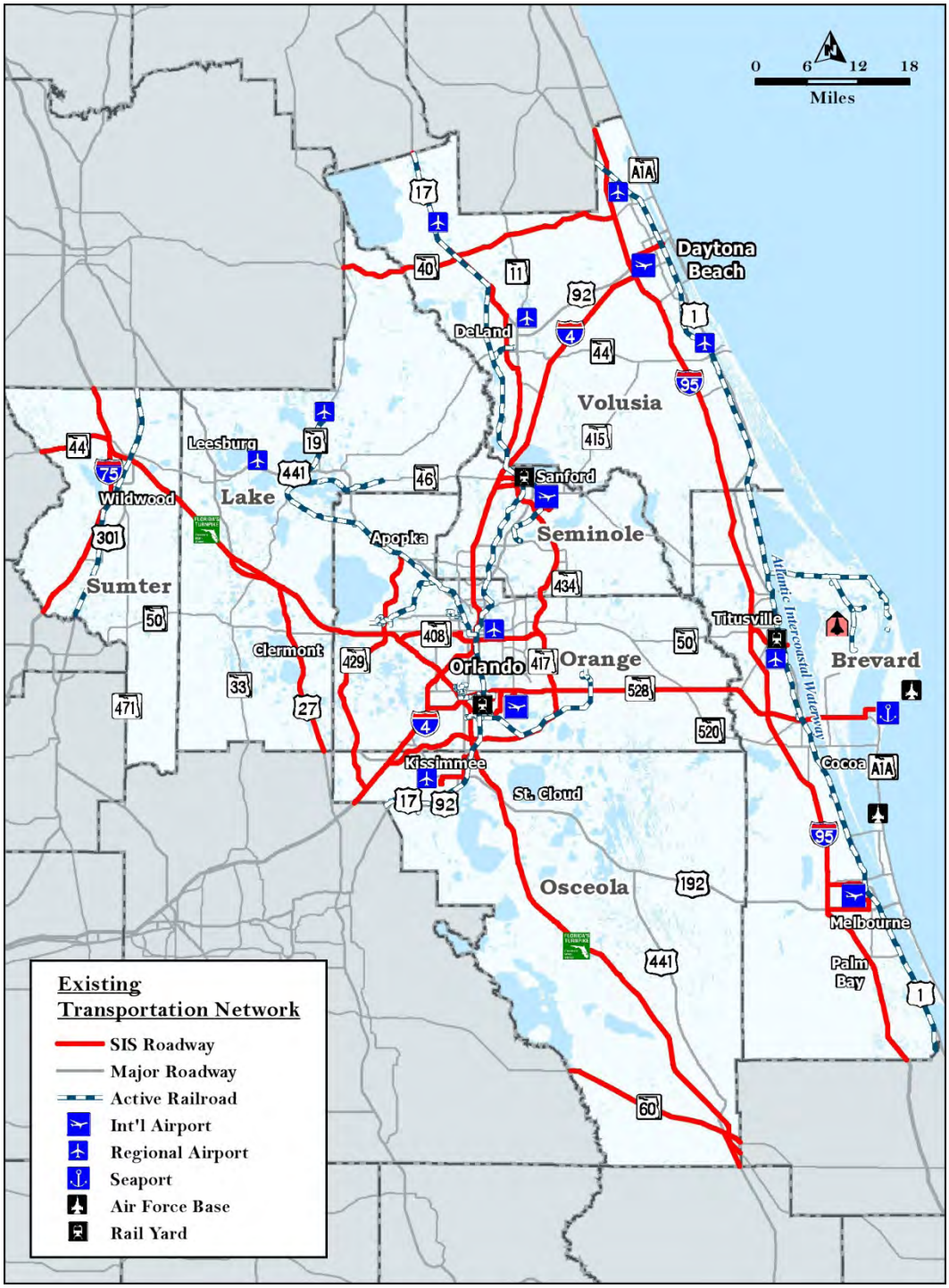
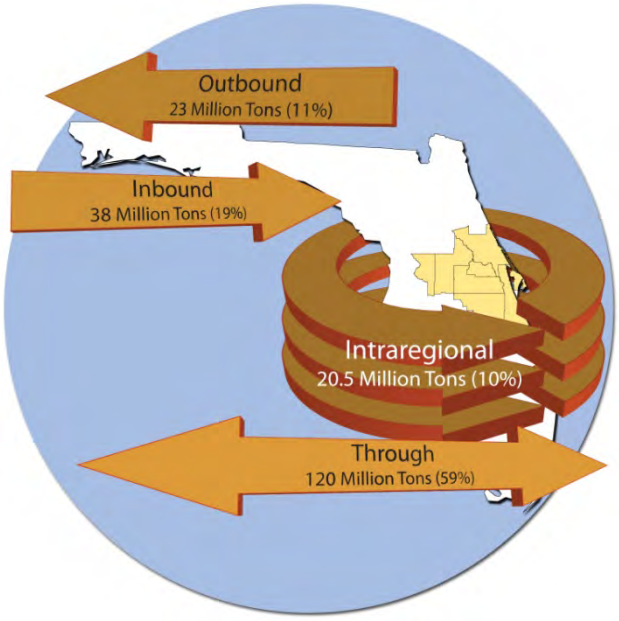
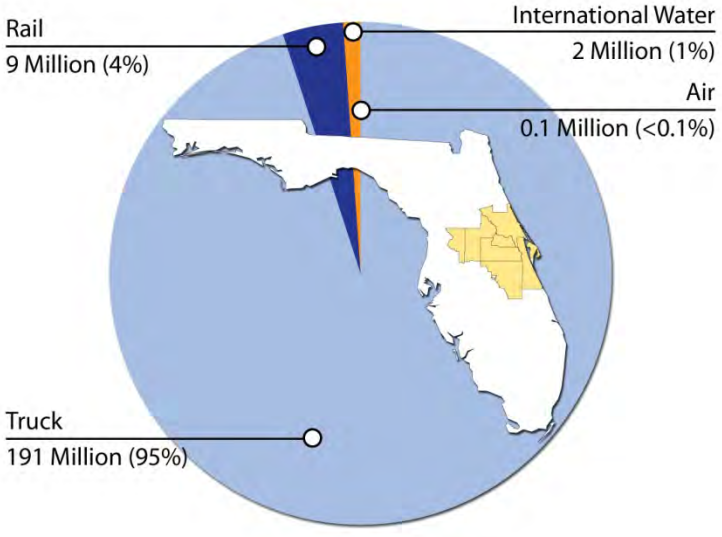


Figure 2.2 Direction of Total Freight Flows by Weight
2010



Source: 2010 FDOT Trade and Logistics dataset and 2009 full Surface Transportation Board (STB) Waybill dataset.

Figure 2.3 Mode Share by Weight – All Directions
2010 (Exclusive of Through Rail Tons)



Source: 2010 FDOT Trade and Logistics dataset and 2009 full STB Waybill dataset.

It also is important to understand the types of commodities being moved along the region's freight transportation infrastructure as it provides insight into modal choice. For example, shippers of basic materials, such as coal, tend to be more concerned with minimizing the cost of transportation rather than speed of delivery, while shippers of manufactured goods tend to emphasize travel times and reliability over per-ton mile transport cost.

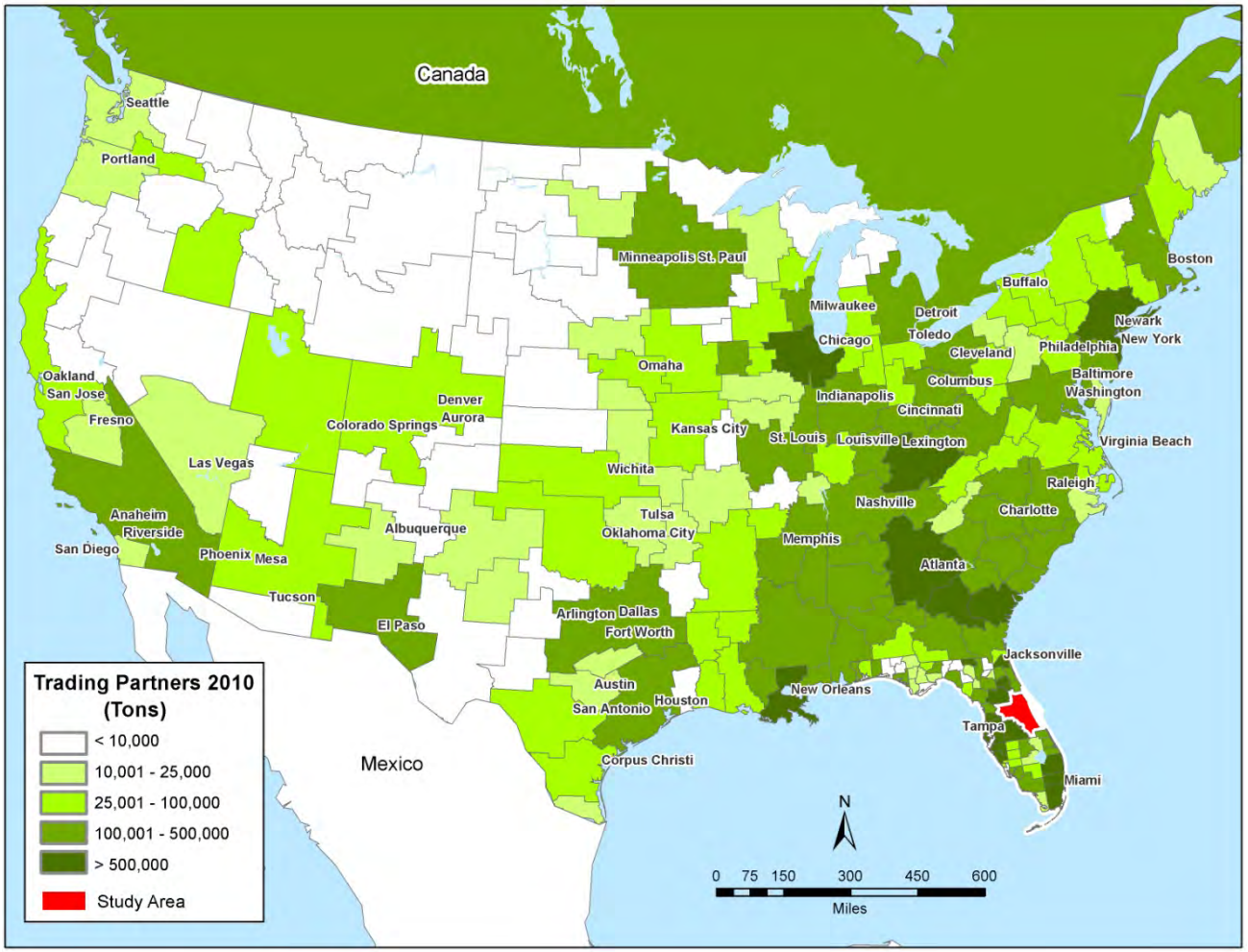
The top commodities by weight transported into, out of, and within the region are nonmetallic ores and minerals, clay, concrete, glass or stone products, and warehoused goods. Combined, they account for more than 70 percent of the total tons moved inbound, outbound, and intraregionally in 2010.

A better understanding of where the region's shipments are originating and terminating, the region's key trading partners, is a critical step to understanding length of haul, market penetration, and modal preference. Figure 2.4 displays the North American[1] trading partners for freight tonnage moving into and out of the Central Florida region.

The top three trading partners in 2010 were Miami-Dade County, Marion County, and Polk County. These Floridian counties accounted for 28 percent (17 million tons) of total inbound and outbound flows by weight. The fact that seven of the top 10 trading partners are other counties within Florida is evidence that the Central Florida study region is particularly important economically to the State of Florida.

[1] Flows originating or terminating in Canada or Mexico only include rail and waterborne movements.

Figure 2.4 North American Trading Partners by Weight
2010



Source: Cambridge Systematics with 2010 FDOT Trade and Logistics dataset and 2009 full STB Waybill dataset.

2.2 REGIONAL MODAL OVERVIEW

Four main modes of transportation – trucks, trains, ships, and airplanes – are available to freight users in Central Florida.[2] These transportation modes utilize the existing freight infrastructure, including the region's highways, rail network, airports, seaports, and support facilities (such as truck to rail transloading facilities and freight-oriented land use). Shippers and receivers generally decide on the appropriate mode to use with consideration for time, cost, convenience and flexibility, and reliability. While some modes have advantages for cost because of the high volume of commodities that can be carried by a single vehicle (i.e., rail or ship), tradeoffs may come in the timeliness of delivery and lack of flexibility at the receiving end. Alternatively, other modes such as airplanes may carry much lower volumes of goods on each flight, but are much more likely to be able to assure timely delivery at much higher costs.

The efficient movement of goods depends on a well functioning transportation infrastructure. Businesses and customers depend on trucks and highways, railroads, and airplanes to connect them to markets and grow the regional economy. Inventorying the freight transportation system in Central Florida and identifying areas of strength and weakness will help planners develop and maintain a system to support economic development. The following sections provide a high-level overview of all modes, including privately owned and operated facilities. Additional detail on the modes is provided in the Regional Freight and Goods Movement Facilities Profile.

2.3 HIGHWAY MODE

Generally the most flexible mode of freight transport in the United States, trucks are the dominant mode in Central Florida. Shippers can utilize trucks not only for short-, medium-, and long-haul truck trips, but also to provide the "last mile" link in the transportation chain, connecting commodities carried by other modes from intermediate destinations, such as seaports or rail terminals, warehouses, distribution centers, or manufacturing plants, to their final destinations.

Truck movement in Central Florida relies on the interstate system, state and U.S. highways, and local roadways. Freight trucks utilize the entire roadway system, whether it is providing access to residential areas for garbage collection or local warehousing and distribution functions; and play a critical role connecting Central Florida's businesses and consumers.

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[2] Although Spaceport is described in this report as a separate mode (within the seaports section), the discussion is mostly focused on the landside transportation connections to support space travel as opposed to the freight operations of space vehicles themselves.

The region is served by more than 17,900 centerline miles of roadways, of which approximately 520 miles are interstates or other toll expressways and approximately 1,094 miles are principal arterials. Trucks hauling goods share these roadways with commuters, as well as tourists and other visitors to the region.

Highway Freight Demand

In 2010, 191 million tons or 95 percent of the total freight tonnage moving into, out of, within, and through the region were transported by truck. Of that share, 62 percent were through traffic (i.e., had both an origin and a destination outside of the region), 15 percent were inbound, 12 percent were outbound, and 11 percent were intraregional traffic. The large share of through traffic can be attributed to the major inter-regional limited access facilities (i.e., I-75, I-4, I-95 and the Florida Turnpike) connecting the state's gateways to hinterland markets.

Based on weight, the leading regional truck commodities were nonmetallic minerals, clay, concrete, glass and stone, and warehoused (i.e., consumer) goods accounting for nearly three-quarters of the total truck tonnage. Food and petroleum products also played a major role, accounting for an additional 15 percent.

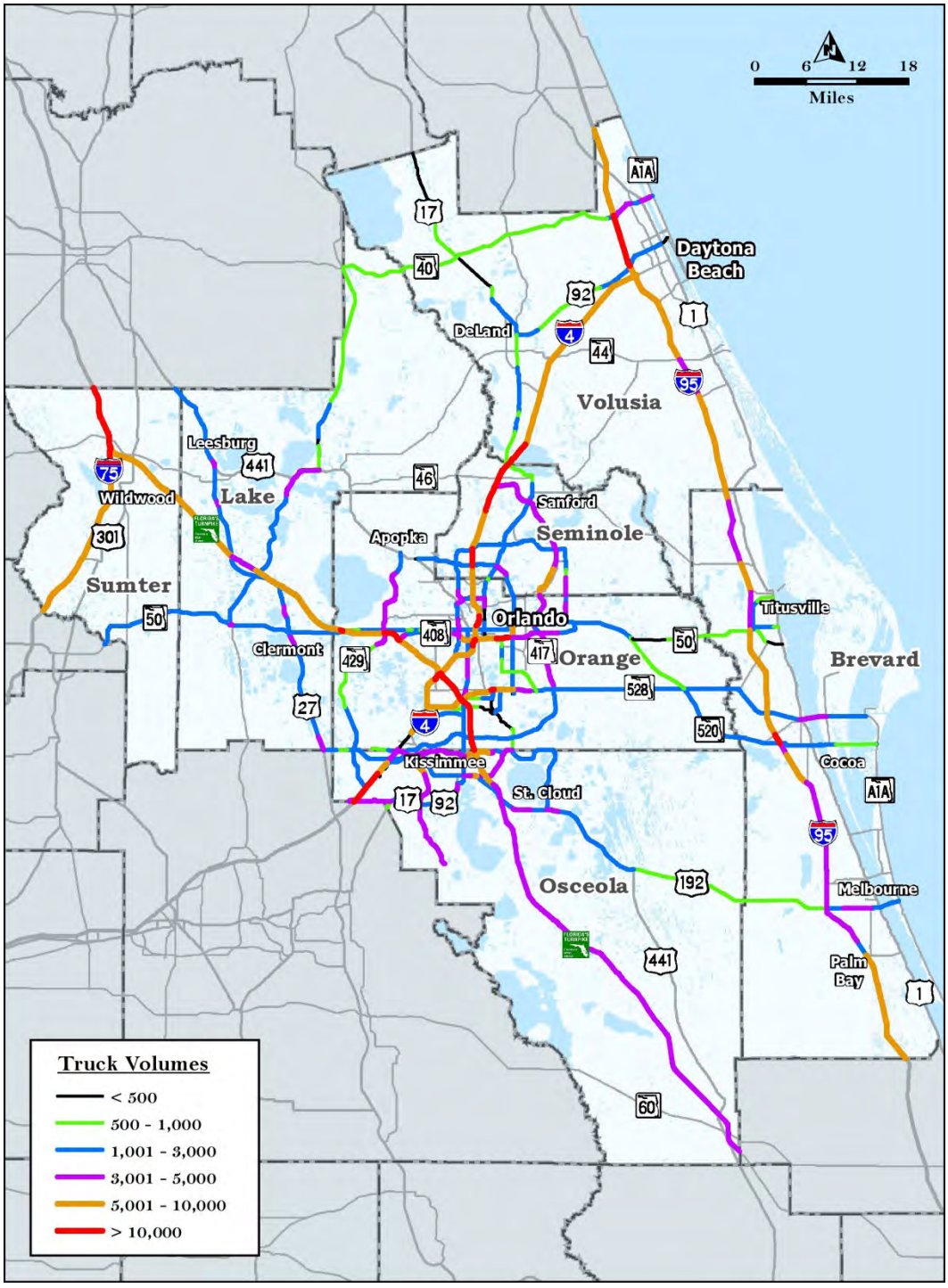
The current designated SIS highway network carries 55 percent of total traffic and more than 70 percent of all truck traffic, and the study area's roadway system experiences traffic volumes (including trucks) in excess of 98 million vehicle miles per day. Figure 2.5 displays the average annual daily truck traffic on the region's highway system. The major truck corridors in the region include I-4, the Florida Turnpike, north-south corridors I-75 and I-95, and east-west corridors SR 528 and SR 408; all carrying in excess of 10,000 trucks per day on many segments. A more detailed discussion of the region's primary freight roadway network is provided in Chapter 3.

Challenges

Overall, the trucking community reports good operating conditions on the region's major highway facilities; however, some operational constraints or bottlenecks were reported, including short-entrance ramps onto interstates, which create merging hazards; excessive merging and weaving required along major freeways; insufficient turning radii on major arterials; numerous at-grade crossings on major freight corridors; and lack of sufficient staging areas in and around freight terminals.

According to data from FDOT, the following state road segments have poor pavement conditions: I-95 from SR 46 to SR 528 in Brevard County and U.S. 17-92 from I-4 Ramps to CR 4047 (Marsh Road) in Volusia County; however, the segment of I-95 from SR 46 to SR 528 has programmed improvements to widen the freeway.

Figure 2.5 Average Annual Daily Truck Traffic (AADTT)
2011



Source: FDOT.

The number of "functionally obsolete" or "structurally deficient" structures (such as bridges) in the study area is approximately 10 percent of all structures in Brevard, Orange, Osceola, and Seminole Counties; and approximately 20 percent of all structures for Lake, Sumter, and Volusia Counties. Up to one-half of all "functionally obsolete" or "structurally deficient" structures in the study area may be restrictive to some truck movements.

A review of the crash history for a five-year period between 2006 and 2010[3] for all roads in the study area reveals that the number of truck-involved crashes in 2010 were approximately 36 percent less than in 2006, compared to a reduction of 4 percent for all crashes. The greatest concentration of crashes involving trucks occurs in the following areas: U.S. 17-92/441 between SR 50 and Orange/ Osceola County line and SR 423 (John Young Parkway) between SR 50 and SR 408.

Overwhelmingly, the major capacity concern for shippers and carriers of freight in the region is Interstate 4. Many users choose to avoid I-4, except in the early morning hours, and use toll roads with transponder-equipped vehicles to get around the region.

2.4 RAIL MODE

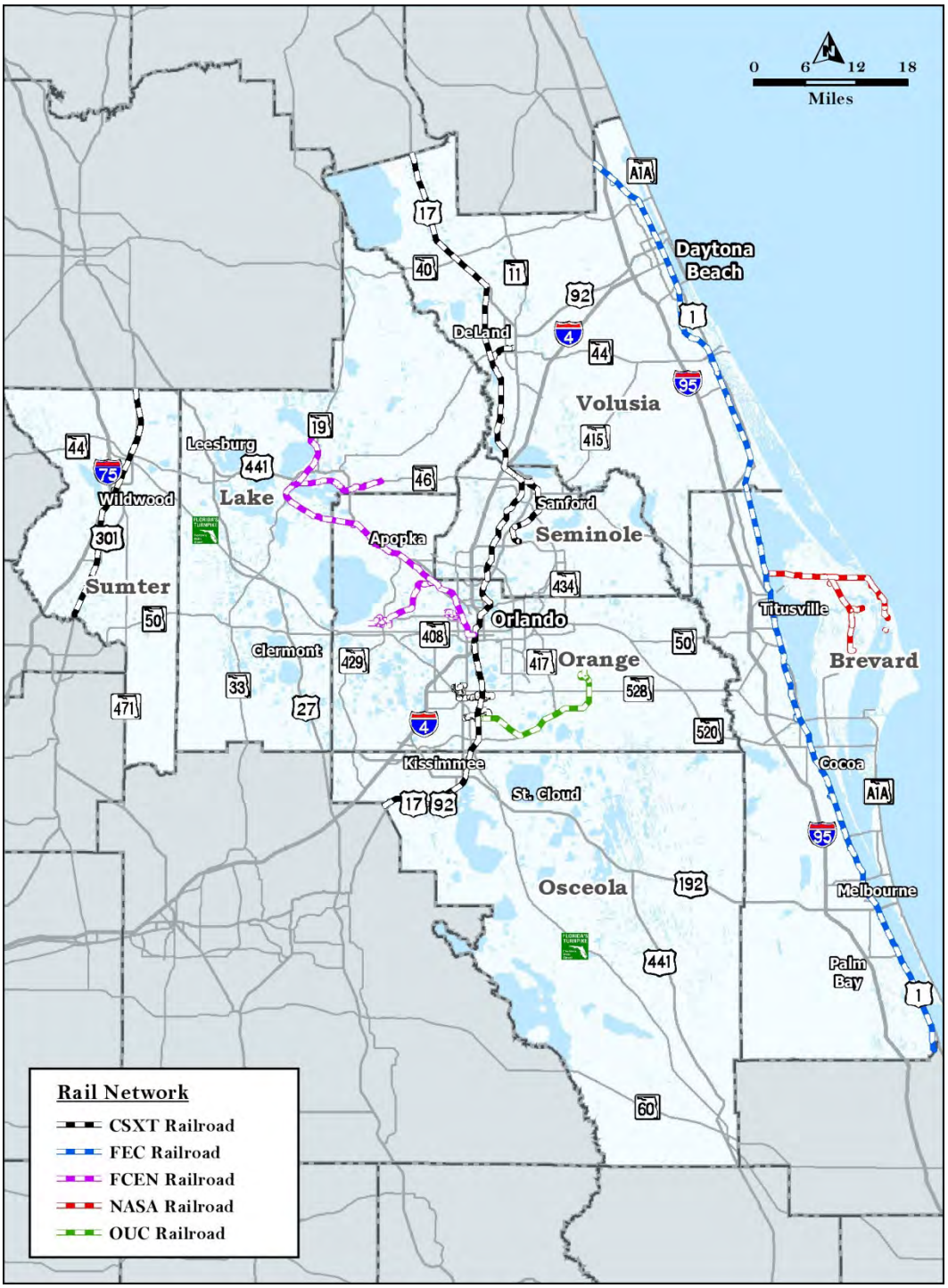
Central Florida is served primarily by three common carriers: CSX Transportation (CSXT), FEC, and the Florida Central Railroad (FCEN); and two private carriers: the National Aeronautics and Space Administration (NASA) Railroad and Orlando Utilities Commission Railroad. Rail carries about 9 million tons of freight annually in the region (close to 4 percent of the total freight tonnage) with exposure to 747 railroad crossings. The Central Florida's rail network is shown in Figure 2.6.

CSXT is a Class I railroad that operates 2,800 miles (1,508 route miles) of track in Florida; and both of CSXT's major north-south lines, the "A Line" and the "S Line", terminate in Central Florida. Currently, there are approximately 15 to 20 trains per day operating on the CSXT A Line, including Amtrak passenger trains. The FEC, a Class II railroad, operates approximately 115 miles of track within the study area, and interchanges with both CSXT and Norfolk Southern Railway (NS) in Jacksonville. FEC provides carload service and moves commodities, such as aggregate (crushed rock), automobiles, bulk liquids, building materials, orange juice, and electronics. The FCEN, a Class III railroad, operates approximately 66 miles of track in the study area and interchanges with CSXT in Orlando. The NASA railroad is a small rail line owned by the United States Government and serves the Kennedy Spaceport, and connects to the FEC at Jay, just north of Titusville. The Orlando Utilities Commission (OUC) Railroad

[3] FLHSMV Traffic Crash Statistics Report 2010.

connects the OUC power plant in east Orlando with CSXT railroad just south of Taft. Coal is delivered to the power plant several times per week.

Figure 2.6 Central Florida Rail Network



Source: FDOT.

Challenges

Central Florida has a fairly limited freight rail network, and only the existing CSXT A Line and the FEC line service the urban population center of the region, where much of the growth is expected over the next several decades.

Operational changes are expected to occur in the near future with the initiation of the SunRail passenger service on the CSXT A Line. As a result, a portion of the current rail freight traffic will be rerouted to the CSXT S Line to the relocated rail terminal facility in Winter Haven, Florida (from the CSXT Taft Intermodal Terminal). Earlier studies determined approximately 42 percent of the truck traffic in/out of the Taft facility were destined for the study area market with additional percentages to destinations requiring truck traffic to pass through the study area. Consequently, it is expected that the relocation of the rail terminal facility will require longer truck trips on a portion of the study area highway network utilizing the major highway freight corridors.

Several stakeholders currently indicate that their reliability concerns with rail and the lack of competitive rail service providers make usage of rail less attractive to many study area businesses that could use rail, but choose to use trucks. One of the major obstacles to making rail freight more competitive with highway modes is the lack of any significant backhaul out of Florida.

2.5 REGIONAL AIR CARGO SYSTEM

The region's air cargo airports, including Orlando International Airport (MCO), Orlando-Sanford International Airport (SFB), Melbourne International Airport (MLB) in Brevard County, and Daytona Beach International Airport (DAB), collectively have 18 on-airport cargo buildings with more than 800,700 square feet of space for sort and consolidation activity. These airports handle more than 190,000 tons of domestic and international air freight annually; most of it loaded in the bellies of passenger carriers. The most prominent airport for air cargo in the region, Orlando MCO, reported service by 27 separate airlines, connecting directly with 84 domestic destinations and 33 international destinations in 2011.

Challenges

Air cargo demand in the region is adequately met by current infrastructure capacity. Access to the airports is reported to be very good to excellent, particularly when compared to competing gateway airports, Atlanta-Hartsfield International and Miami International. Some freight forwarders serving the airports report issues arising once drivers leave the immediate airport environs, including eastbound access to I-4 via Tradeport Drive and Taft Vineland Road, at-grade railroad crossings near the MCO airport, congestion at the SR 528 toll booth near the junction of SR 436, and the lack of an interchange between the SR 417 Beltway and the Florida Turnpike.

Freight forwarder traffic originating or terminating in study area is often transited to Atlanta-Hartsfield International and Miami International Airport versus the region's airports due to several factors, including greater range of destinations; frequency; capacity at the competing airports; block space arrangements with carriers (i.e., guaranteed prepurchased space on aircraft); greater concentration of support services; and less seasonality/fluctuations of lift capacity.

2.6 SEAPORT

Port Canaveral, the regions' only seaport, largely deals in bulk and breakbulk cargo, with just a small proportion of containers. In 2010, the Port handled about 3.2 million tons of bulk and breakbulk cargo, with more than 60 percent accounted for by petroleum products.[4] International waterborne freight through Port Canaveral accounts for about 1 percent of the total freight tonnage moving through the Central Florida region. Central Florida businesses also are served by several alternative seaports, including Jacksonville, Tampa, Miami, Port Everglades, and the Port of Savannah in Georgia.

Port Canaveral is located in Brevard County on the Atlantic Coast of Florida. The Port has nine dedicated cargo berths, ranging from 400 to 1,000 feet long, with depths ranging from 35 to 40 feet (MLW). It is served by several major highways, connecting the Port area to Central Florida, as well as markets to the north and south. Port Canaveral is not directly served by any rail line; however, there are private terminal access connections to the FEC and connections between the Port and the Class I rail network at NS' Titusville terminal (about 25 minutes north of the Port by truck). Figure 2.7 shows the transportation connections to the Port.

[4] Port Canaveral web site.

Figure 2.7 Port Canaveral Transportation Connections

Source: Port web site.

Challenges

The Port is actively working to diversify its business, from expanding bulk facilities (i.e., a recently opened petroleum tank farm) to exploring opportunities for expanding its handling of containers.[5] The Port currently is undergoing a project to widen its shipping channel from 400 to 500 feet, and is planning to widen and deepen the west turning basin (WTB) and entrance to nearly 1,800 feet (at a depth of 39 feet) by reworking bulkheads, utilities, and roads and dredging the basin. The channel widening project is necessary to accommodate larger (next generation) ships – such as larger cruise ships, tankers, and general cargo ships. With the funding support received from the State of Florida in August 2012, the project is expected to begin construction in 2013, with completion in fall 2014.

Port Canaveral would be interested in improved rail access, and port staff are tracking opportunities for bulk cargo to the Port carried by rail. There currently is no rail bridge across the intercoastal waterway. Rail needs at the Kennedy Space Center (discussed in next section) may help promote projects that would improve access to both Spaceport and Port Canaveral. A recent proposal would expand the northside cargo berths into a multi-modal terminal and logistics

[5] The Port is interested in further expanding the capacity of its petroleum tank farm to 32 tanks, but the expansion would require land acquisition. There is a long-term goal of a pipeline running from the Port to MCO.

center, initiate a railcar barge service and develop an inland center with FEC rail access.

The Canaveral Port Authority has held discussions with FDOT (District 5 ISD Office, Central Office Freight Logistics and Passenger Operations and the Central Office Office of Bridge Maintenance permitting office) and other agencies (such as the U.S. Army Corps of Engineers, Coast Guard and Space Coast TPO) on the SIS connector roadway, SR 401 and potential deficiencies of the (movable) bridge. Recently, the military stopped ferrying loads exceeding design capacity of the bridge; however, the Port has concerns that the bridge may not meet future growth needs and is not necessarily a reliable access point for port operations.

2.7 SPACEPORT

Space Florida, an independent special district of the State, is home to one of the premier spaceports in the United States. Dozens of space launch activities are hosted annually for NASA, as well as private companies, United Launch Alliance and SpaceX, among others at the Kennedy Space Center, Cape Canaveral Air Force Station, and Space Florida Spaceport.

Spaceport Facilities

The Kennedy Space Center site is located on Merritt Island, directly east of Titusville. The use of Kennedy Space Center as home to NASA's Launch Service Program affects the freight transportation system in the region in unique ways. For many years until its retirement in 2011, the Space Shuttle program provided a means for NASA to perform many missions to space, including servicing the international space station.

The Cape Canaveral Air Force Station (CCAFS) is an installation of the Air Force Space Command's 45th Space Wing (45 SW), headquartered at Patrick Air Force Base on the southern tip of the Cape. Some of the launch vehicles that have operated from CCAFS include rockets from the Athena, Atlas, and Delta programs.

The key infrastructure at Spaceport, which provides the opportunity for space launches, is the launchpad. It acts like a runway for airports providing available launch capacity. Spaceport currently has three active launch pads and two inactive pads. They are pursuing additional customers to activate the remaining pads and build the business at the facility.

The Cape Canaveral area (including Spaceport) is served by several major highways, connecting the area to Orlando, as well as markets to the north and south. Rail has been used for very heavy shipments in the past (such as for the space shuttle launch vehicle), and the Kennedy Space Center does have a rail connection to Titusville. With the retirement of the shuttle program and little alternative demand, the rail connection may require maintenance for regular

operations. This may be necessary for carrying next generation NASA launch vehicles in the near to long term. The Space Center and NASA recently repaired a railroad bridge in Titusville, presumably to support future operations.[6] There is little market for rail use at the site currently but restrictions or limitations on rail access and use could impede future opportunities.

Challenges

Spaceport currently is undergoing a major shift in the type and nature of user of its facilities. Historically, space launches have been almost an exclusively government market, and Spaceport is working to identify additional opportunities for expansion and diversification including tourism and private sector R&D. Spaceport is expecting substantial growth over the next five years, mostly due to private-sector expansion (through organizations such as the United Launch Alliance and SpaceX which are among the first). Infrastructure both on and off the Spaceport property will be key to accommodating that growth.

2.8 SUMMARY

The regional freight transportation system is multimodal and comprises:

- More than 17,900 centerline miles of roadways, of which approximately 520 miles are interstates or other toll expressways, and approximately 1,094 miles are principal arterials carrying nearly 200 million tons of goods annually.
- A Class I railroad – CSXT– operating 2,800 miles (1,508 route miles) of track in Florida and carrying more than 9 million tons of local freight annually; the FEC, a Class II railroad that operates approximately 115 miles of track within project study area and interchanges with both CSXT and NS in Jacksonville; and the FCEN, a Class III railroad that operates approximately 66 miles of track in the study area and interchanges with CSXT in Orlando, Florida.
- One deepwater port, Port Canaveral, which handles more than 3 million tons of freight annually plus Space Florida, a major spaceport on the East Coast.
- Air cargo facilities at MCO, SFB, MLB, and DAB that handle more than 190,000 tons of domestic and international air freight annually.

Anticipated growth on the regional transportation will likely result in increasing pressure on the regional transportation system in the following ways:

- **Capacity Constraints and Operational Issues.** The increasing growth and development of the region will require continued infrastructure

[6] Interview with Spaceport staff.

improvements, especially on the highway system where several major truck corridors already experience high levels of congestion. Other key issues include routing challenges associated with deficient bridge structures and the relocation of the A Line rail traffic to the S Line, which will likely affect shippers throughout the region.

- **Expanding Infrastructure to Target New Markets.** Infrastructure providers ranging from the railroads, airports, Spaceport, and Port Canaveral all have expressed interest in expanding their markets and developing new facilities to accommodate additional freight demand. For example, Port Canaveral is seeking expanded container service, as well as increasing shipment of petroleum products through its new tank farm.
- **Community Impacts.** Goods movement is essential to supporting the region's economy and quality of life. However, growth in goods movement activities (from manufacturing to truck traffic) also gives rise to negative community impacts. In addition to safety and air quality concerns, these activities can cause excessive noise and vibration along significant freight corridors. As population continues to grow outside the urban core, especially in the northern and western portions of the region, so will commercial centers, leading to more widespread dispersion of freight-intensive impacts such as truck traffic.

3.0 The Region's Freight Subsystem

Roadway corridors are part of a multimodal transportation system. This means they have two aspects to be identified for goods movement: carriage of wholly over-the-road shipments; and road connection for marine and waterway, air, pipeline, and railroad intermodal shipments. A complete system of freight corridors encompasses the routes by rail and other modes, as discussed in Chapter 2.

Identification of a regional freight subsystem enables investments and policies to be focused on improving the facilities whose performance matters most to overall regional freight performance. This is desirable because:

- It fosters better and more sustainable freight service, which in turn promotes economic vitality;
- It supports productive use of limited public resources by directing them to critical requirements; and
- It leads to greater public safety because freight operations are improved on significant routes, and the improvement encourages freight to stay off other roads.

An efficient freight subsystem needs to: 1) provide connectivity to the greater Central Florida region and gateways; 2) accommodate goods that simply pass through the region; and 3) emphasize routes that allow freight to travel efficiently from one part of the region to another. The intraregional routes are sometimes referred to as "cross-town" routes, and they correspond to the "stem" routes that freight carriers utilize on their way to points and pockets of pickup and delivery. In addition, these routes need to reach the districts where freight is produced and consumed currently and in the future.

3.1 IDENTIFYING THE FREIGHT SUBSYSTEM

Projecting the future pattern of freight, goods and services movements throughout the seven-county study area was conducted by the consultant team in coordination with MetroPlan Orlando and FDOT District 5 through an analysis of the 2040 Truck forecasts prepared by the MetroPlan Orlando modeling consultant. The 2040 forecast was developed from the FDOT District 5 regional travel demand model (CFRPM) using the spatial freight origin and destination inputs completed as part of the Central Florida Freight Flow profile

and using the model to assign this truck forecast over the future highway network. The results of the model freight flows were screened and organized to evaluate corridors projected to carry the greatest volumes of heavy truck traffic.

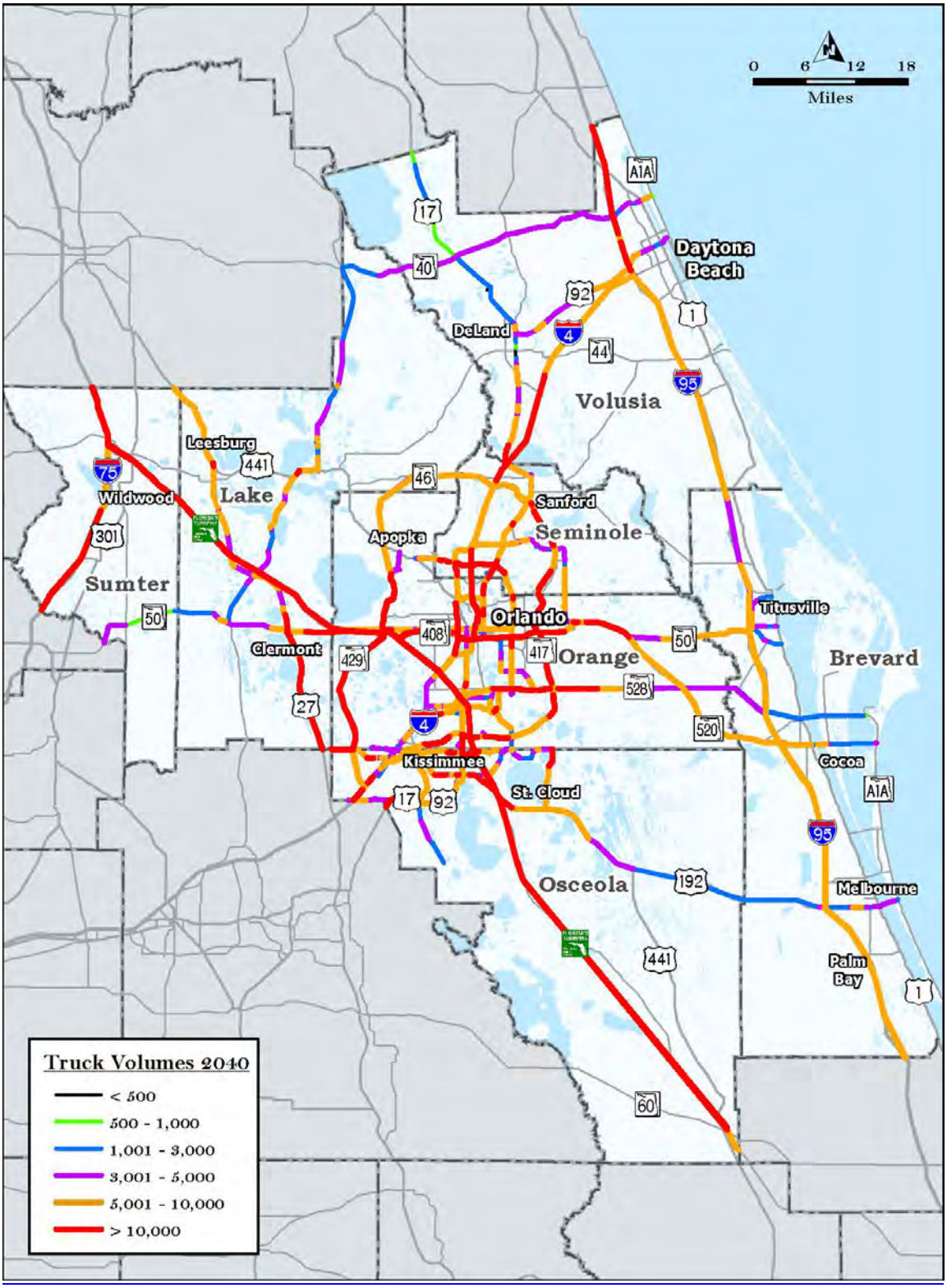
The model produced highway network truck volumes for light trucks and heavy trucks. It is noted that the 2040 highway network used in the CFRPM is an *approximated network* that reflects the currently adopted highway projects in the applicable long range transportation plans of the composite MPO/TPO study area. A long range plan update is underway by MetroPlan Orlando that will revise and refine the adopted plan.

The 2040 truck forecast by AADTT (average annual daily truck traffic) truck volume range is shown in Figure 3.1. Data represented in this figure reflects post-processed truck forecasts that was necessary to adjust assignment irregularities such as zero volume highway links or imbalanced daily truck flows.

Freight Corridors

As reported in the highway profile section of the *Regional Freight and Goods Movement Facilities Profile Report, July 2012*, a list of primary freight routes was developed using current truck volume (>3,000 trucks per day) as a screening criteria. These routes were validated with trucking companies, drivers and shippers who also helped to prepare this list and also identify other important freight corridors in the region. These primary routes were again evaluated for projected heavy truck use using the forecast data output from the CFRPM model. Additional roadways have been added to this list based on the 2040 forecast as shown in Table 3.1.

Figure 3.1 2040 Forecasted Truck Volumes



Source: CFRPM 2040 Truck Model, Analysis by HDR.

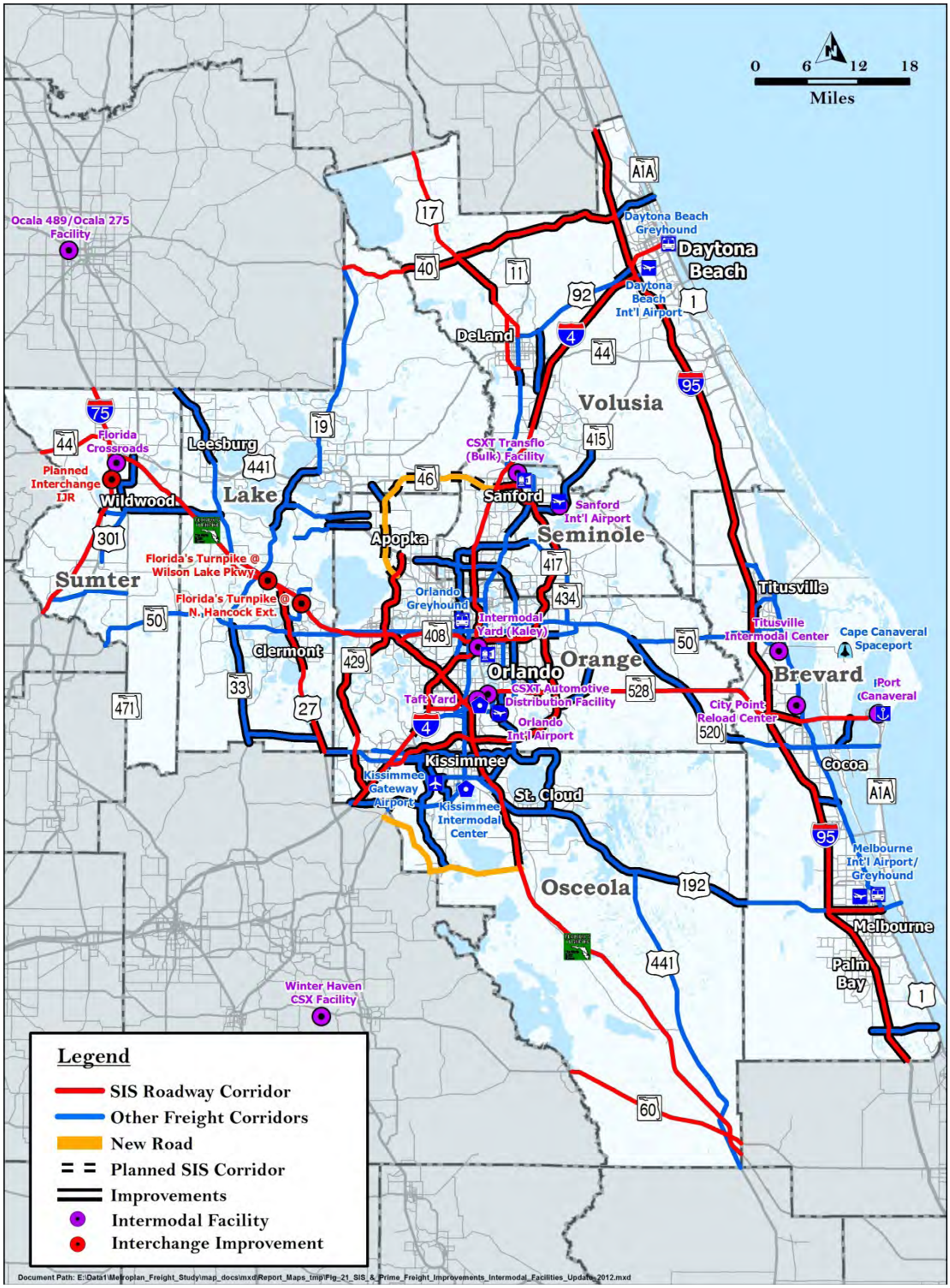
Table 3.1 Initial Freight Corridors

Roadway	2040 Truck Volume
I-4	>10,000
Florida's Turnpike	>10,000
I-75	>10,000
I-95	>10,000
SR 528	>10,000
SR 408	>10,000
SR 417	>10,000
Poinciana Boulevard	>5,000
US 192	>10,000
Osceola Parkway	>10,000
SR 436 (Semoran Boulevard)	>10,000
US 27	>10,000
SR 423/John Young Parkway	>10,000
SR 434	>5,000
Osceola Polk Line Road (CR 532)	>3,000
SR 429	>10,000
SR 19	>5,000
SR 40 (Granada Blvd)	>3,000
US 17/92	>10,000
SR 50	>5,000
SR 429/Wekiva Parkway	>5,000

Source: CFRPM 2040 truck volumes on current (as of 2012) adopted LRTP networks.

This regional highway truck forecast was also reviewed against the currently adopted long range transportation plans of MetroPlan Orlando, the Lake-Sumter MPO, Volusia County TPO and the Space Coast TPO to reveal where regional transportation needs had been previously identified on these primary truck routes. The overlay analysis of primary routes with adopted LRTP projects was reviewed with traffic engineering and/or public works representatives with the City of Orlando, Orange, Osceola, Seminole, Lake, Sumter, Brevard, and Volusia Counties to evaluate the forecast findings and identify other areas of concern on the local network that may have not been captured in the regional modeling effort. The areas identified by the agencies were generally areas of frequent maintenance due to heavy truck usage, areas of observed truck congestion and areas for which the County received periodic complaints due to trucks. These areas also included emerging freight subsystems that were identified due to expected changes in land use activity (i.e. Monarch Ranch ILC in Sumter County, new interchange on interstate highways). The routes and facilities identified through the stakeholder and system user interviews were added to the initial list of freight corridors. Figure 3.2 displays the resulting highway freight subsystem components.

Figure 3.2 Proposed Regional Freight Subsystem



Source: Stakeholder and System User Interviews Connectivity to Intermodal Facilities

In addition, the stakeholder interviews identified policy and operational needs that will be considered in the development of the plan. These issues were introduced in the regional highway profile report and recaptured here in developing the regional needs:

- Federal driver hours of service regulations can impact long haul carriers and distribution centers servicing the panhandle of the state. These also impact service industry drivers such as cement mix trucks that may need to make multiple runs on time sensitive projects such as a big building foundation or concrete bridge – once the job starts the cement must keep pouring continuously which may require drivers to extend beyond the regulated hours of service).
- Driver time limits were also cited as an local concern. A specific impact resulting from these limits is overnight parking and the lack of adequate facilities for overnight or extended truck parking. Specifically, Volusia County pointed out that no designated rest facilities exist on either I-4 or I-95 in Volusia County. During peak events such as Daytona 500 or Spring Break – the limited interstate hotels in this area are unable to accommodate trucks which has created a safety concern for the County.
- Vehicle weight restrictions (impact trucks that "weigh out" before they "cube out" such as truck hauling citrus produce) putting more trucks on the road and increasing transport costs. These issues were specifically identified by the citrus industry because of the weight of citrus produce causes their industry to put more trucks on the road due to the weight restrictions. Florida di d pass a "10% rule" enabling permitted five-axle vehicles enabling permitted five-axle vehicles weighing up to 88,000 pounds to haul divisible loads on non-posted state roads. The provision went into effect on July 1, 2010.
- Toll roads are attractive from a safety, convenience and reliability perspective but are costly to use. Nearly all major carriers that operate in the Orlando urban area report that they use toll roads, especially to avoid I-4, but identify this as a significant cost.

Connectivity to Intermodal Facilities

One of the principal functions of roadway corridors is to create connection for other modes. Seaport traffic needs to be carried inland; and rail and air shipments need to accommodate off-rail and off-airport customers. Each of these modes also may require connection to one of the others, and roads are a common way this is accomplished. Roadways are thus a foundation for the multimodal freight system, and their linkage to intermodal facilities is vital.

Figure 3.2 depicts the relationship of the stakeholder-defined road network to the chief intermodal facilities in the region, among them the major seaports, the airports with reported cargo activity, the rail transfer points for containers, trailers, and automobiles, and a variety of pipeline and other private terminals.

Each intermodal facility has connector roads that join it to the surrounding system and constitute essential extensions of the network of significant corridors.

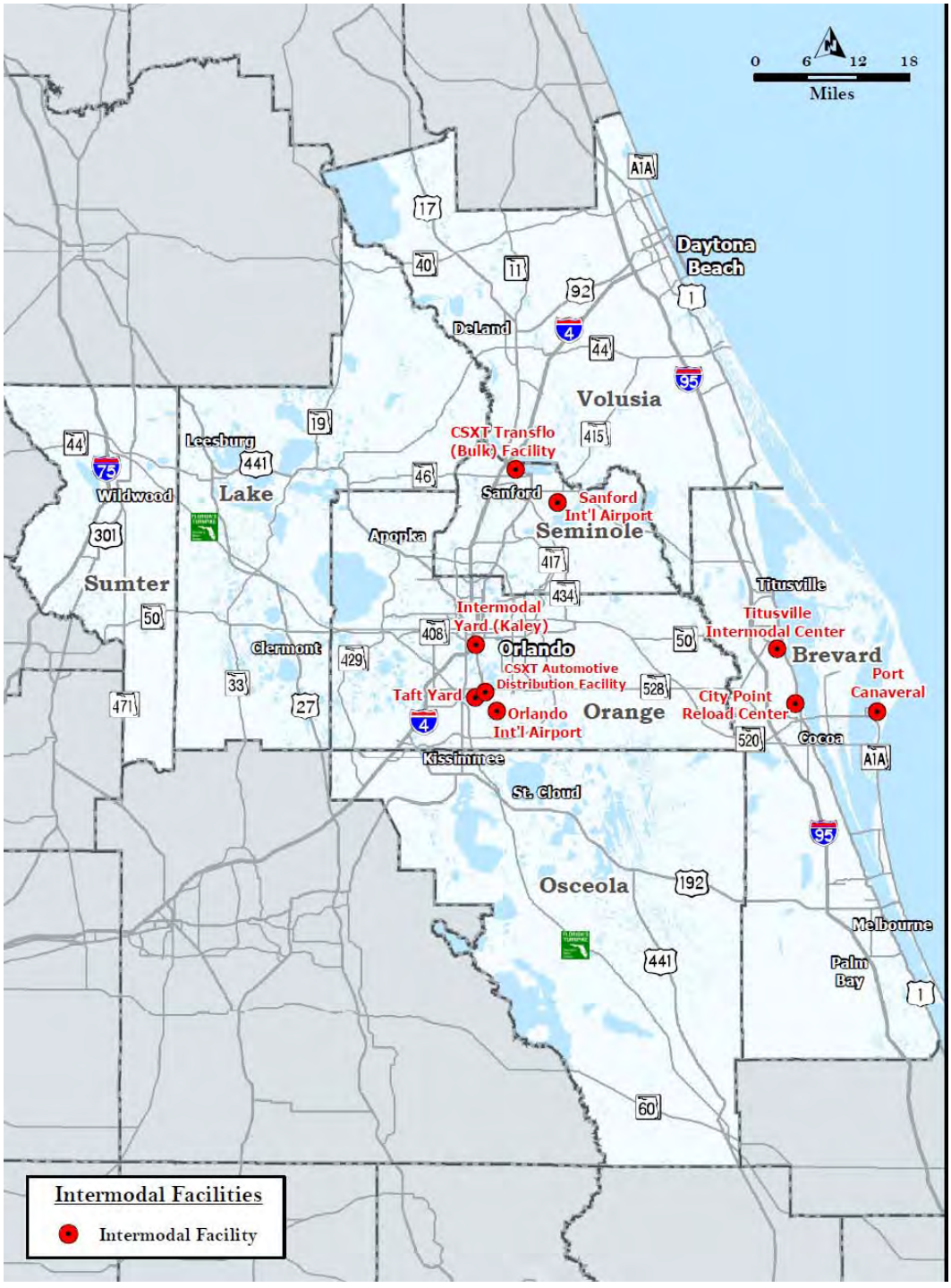
Intermodal facilities already are substantial generators and consumers of freight and their contribution to carriage is expected to grow. Trade activity at Port Canaveral and rail transfers in long-standing and new operations create continuing and emerging pressures on connectors themselves and the arteries they feed. Moreover, if rail traffic is able to grow beyond the economic forecast with greater diversion from interstate truck traffic to rail, the ability of roadways to absorb connection volume becomes more critical still.

In 2008 FDOT District 5 prepared a Strategic Intermodal System Connector Study that examined the connections and linkages to the Strategic Intermodal System (SIS). The SIS is made up of a number of components including Commercial Airports, Spaceports, Seaports, Passenger Terminals, Rail Freight Terminals, Passenger Rail Corridors, Freight Rail Corridors, Waterways and Highways that meet system criteria. These facilities are structured into a network though a series of Hubs, Corridors and Connectors. Connectors are roadways, waterways or rail facilities that connect SIS intermodal facilities to the SIS highway system. It should be noted that the Department's Level of Service (LOS) for all SIS highway connectors is "D."

The Strategic Intermodal Syste, Connector Study focused exclusively on highway connectors within FDOT District 5 boundaries. Connectors can be classified as SIS or Emerging SIS, depending on the classification of the hub that they serve. Emerging facilities meet lower designation criteria thresholds and generally serve fast growing economic regions and rural areas of critical economic concern. The function of the highway connectors is to provide safe, secure, efficient, reliable, and direct access between hubs and corridors.

This regional freight plan update builds upon the SIS Connector study and expands upon the SIS facilities to also include freight hubs that are significant to the Central Florida region, including planned intermodal centers. Transportation improvement plans and adopted long range transportation plans were reviewed to identify projects for each of these facilities. The prior SIS study identified project needs through year 2030. These phased project recommendations developed from the SIS connector study have been updated to reflect the current year to year 2025 as Phase 2 and year 2025 to 2040 as Phase 3.

Figure 3.3 Location of Intermodal Facilities



Source: HDR.

As can be seen, the region's intermodal facilities are clustered in center and southeastern portion of the region. When comparing the proposed regional freight subsystem to the location of the intermodal facilities, there is a strong correlation with all of the facilities being located in close proximity to one or more of the freight subsystem corridors.

3.2 FREIGHT SUBSYSTEM CORRIDOR ANALYSIS

Regional freight movements often depend on a series of freight-critical highway corridors. The travel time between two points on such corridors can vary significantly by time of day, particularly in major metropolitan areas. While an extra 20 minutes to complete a four-hour trip along such a network may not seem like a noteworthy delay, when extrapolated to a large population of trucks over time, the costs can be significant.

In cases where there is flexibility in trip departure time, anecdotal experiences often serve as a guide for planning a particular trip. While these experiences are valuable, analysis based on real-world truck data can be utilized to more reliably and adequately inform complex decision-making and planning.

As part of the Central Florida Freight, Goods and Services Plan and Evaluation, the American Transportation Research Institute (ATRI) conducted an analysis of travel times on 15 key corridors that represent the primary freight corridors in the seven-county study area most often cited by stakeholders as being unreliable or having bottlenecks. The corridors include:

- Interstate 4,
- Interstate 75,
- State Route 528,
- State Route 91,
- State Route 408,
- State Route 429,
- State Route 44,
- State Route 60,
- State Route 436,
- State Route 50,
- State Route 417,
- State Route 15,
- State Route 405,
- U.S. Highway 192, and
- U.S. Highway 92/17.

Methodology

ATRI utilized its truck GPS database to identify and measure travel times on the 15 high-priority freight corridors within the study area. As background, the ATRI truck GPS database compiles anonymous trucking operations data from several hundred thousand trucks. Each truck used in a performance measurement analyses has a regular position read (generally every 1 to 15 minutes) and contains a vehicle speed. At a given highway location,

1) historical truck position datasets can be compiled, 2) average truck speed trends can be tracked, and 3) corridor travel times can be determined.

The first step in this analysis was to select a dataset within the nine-county area. The dataset selected covered truck positions on weekdays for 12 months, January through December 2012.

Next, the dataset for the area was further narrowed to include just data points that fell along the 15 freight corridors. These data were then organized into roadway segments which were generally one mile in length.

The data for each roadway segment was analyzed by hour of day, and aggregated average speed profiles were created for each. Thus, each segment has 24 possible average speeds, one for each hour of the day. These average speeds were then converted to travel times based on the length of the segment. For example, consider a trip starting at 1:00 p.m. If the average speed for the first segment on a corridor was 60 miles per hour (mph) at 1:00 p.m. and the segment was 1 mile in length, then the average travel time for that segment would equal 1 minute.

Travel time is then calculated for 1:00 p.m. on Segment 2, and the 1-minute travel time of Segment 1 is added to the travel time for Segment 2. When a trip reaches 60 minutes in duration, the average hourly speed will convert to the next hour. In this example, when the trip starting at 1:00 p.m. has accumulated 60 minutes in travel time, the travel time for the next segment is determined using the average speed value from the 2:00 p.m. hour-bin, and so on. This methodology continues sequentially until the last corridor segment. The aggregate travel times of all segments on a corridor represent a travel time for the entire corridor based on the hour the trip started.

This process was completed considering direction of travel, by hour of the day, for each corridor. Thus, the equation was conducted 720 times (15 corridors × 2 possible directions of travel × 24 possible hourly trip start times), generating a table showing the average time based on hour of departure (e.g., 12:00 a.m.: 1 hour and 3 minutes, 1:00 a.m.: 1 hour and 15 minutes, etc.) for each corridor. The table highlights the best and worst hours to start a trip for a particular corridor.

Results

Figures 3.2 through 3.17 contain a snapshot of the results for each of the 15 corridors. Each snapshot includes the following charts and measures:

- Context map;
- Average travel time for each direction;
- Best travel time by time of day for each direction;
- Worst travel time by time of day for each direction;
- Best/worst travel time variability (an indicator of reliability); and

- A chart depicting travel time by time of departure for each hour of the day by direction.

Examination of the results indicates that there is no general time of day where the majority of corridors are operating most efficiently. For example, it is often thought that off-peak hours, typically between 9:00 p.m. and 5:00 a.m., would be the optimal time for truck travel. However, for 5 of the 15 corridors in this analysis, the worse travel time in at least one direction falls within this off-peak time. The implication of this is that it could be difficult for shippers and carriers to devise routes that will avoid the heaviest traffic on all corridors.

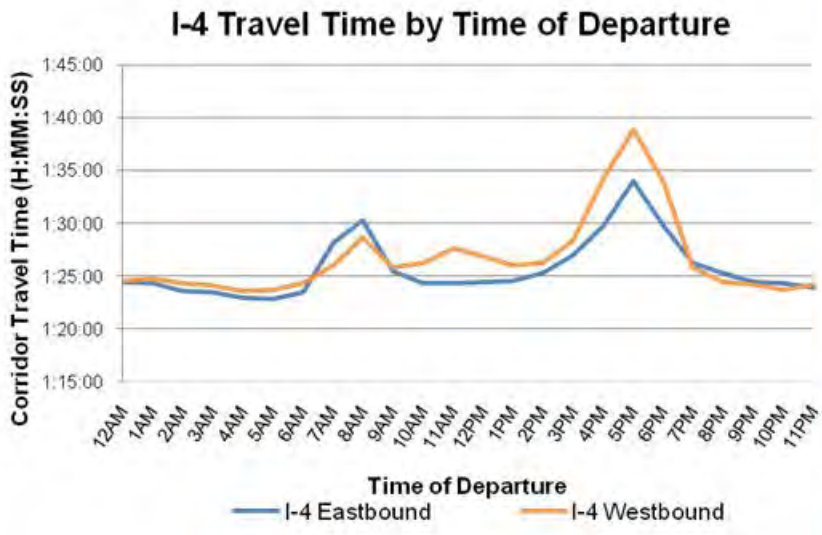
The results also indicate that reliability may be an issue for some of the region's most significant freight corridors. Reliability, measured by the reliability in travel time, impacts a shipper or carrier's ability to meet pick-up and delivery schedules, optimize vehicle velocity or number of turns achievable during a day, and maximize driver productivity given the hours of service regulations. The ATRI analysis of truck travel data indicate that 9 of the 15 corridors studied experience greater than 10-percent variability between the best and worse travel times with SR 405 and SR 436 exhibited the greatest degree of variability in travel times.

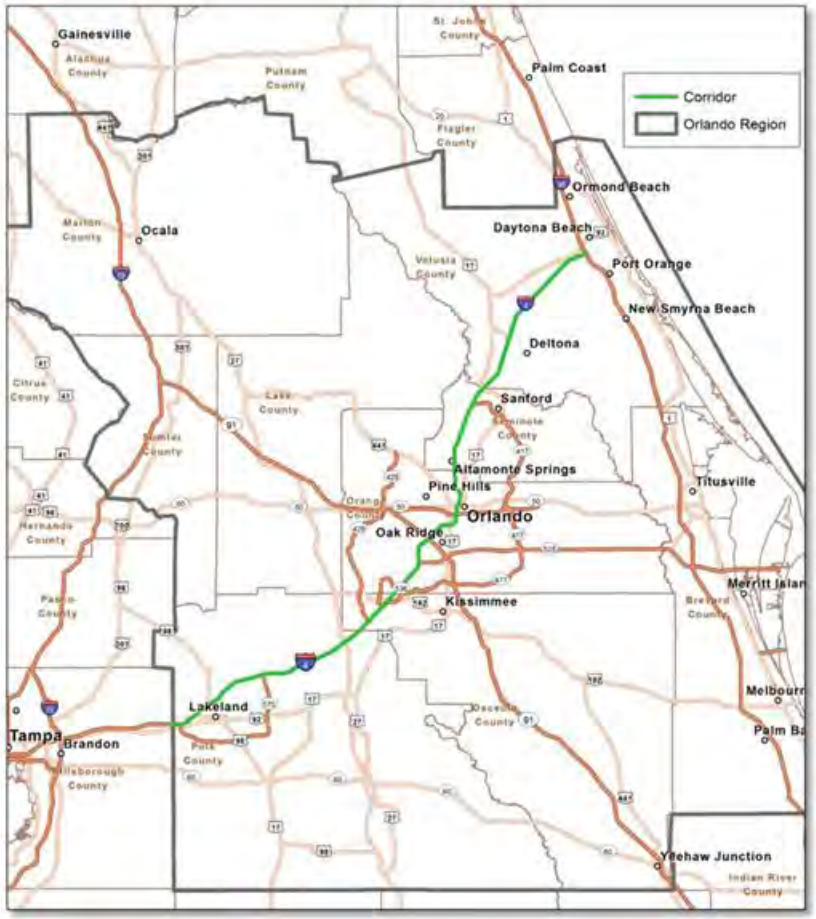
Figure 3.4 Travel Analysis for I-4

Interstate 4

Eastbound
Average Travel Time: **1 Hour, 26 Minutes**
Best Travel Time: **1 Hour, 23 Minutes** (5 AM)
Worst Travel Time: **1 Hour, 34 Minutes** (5 PM)
Best/Worst Travel Time Variability: **14%**

Westbound
Average Travel Time: **1 Hour, 27 Minutes**
Best Travel Time: **1 Hour, 24 Minutes** (4 AM)
Worst Travel Time: **1 Hour, 39 Minutes** (5 PM)
Best/Worst Travel Time Variability: **18%**





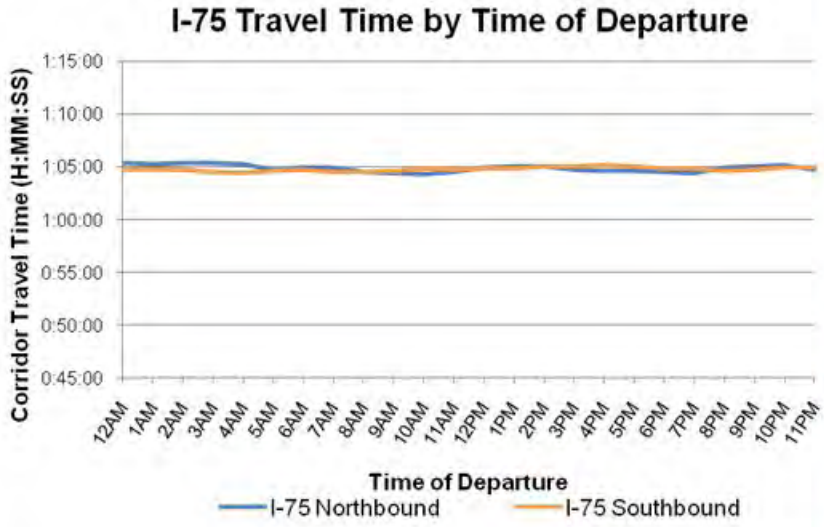
Source: ATRI.

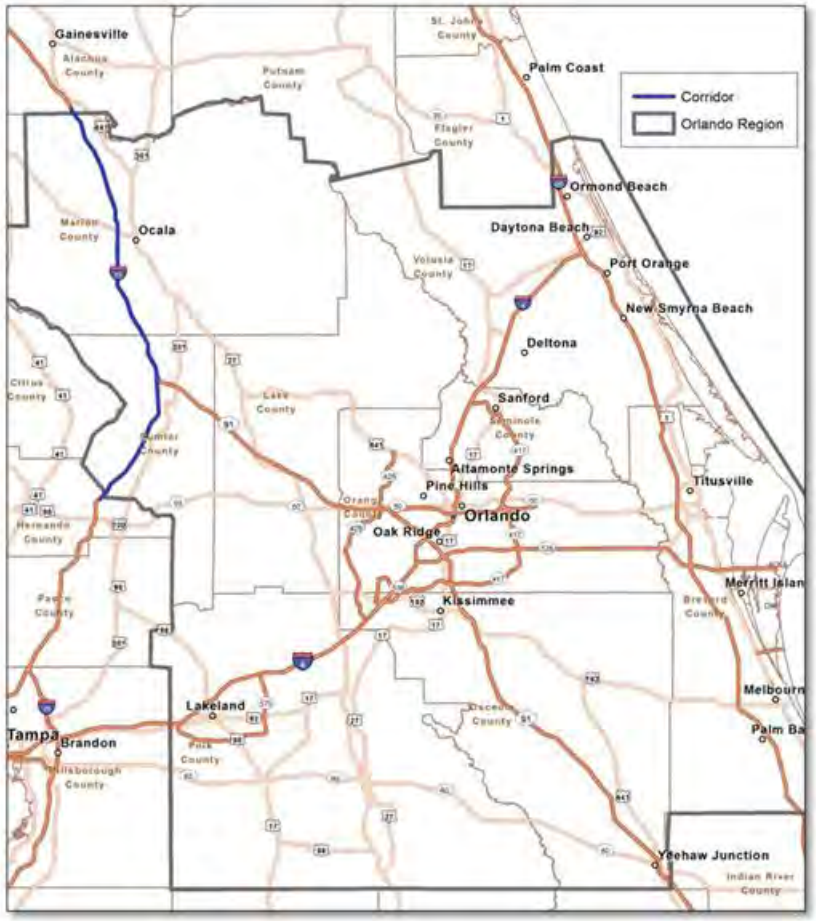
Figure 3.5 Travel Analysis for I-75

Interstate 75

Northbound
Average Travel Time: **1 Hour, 5 Minutes**
Best Travel Time: **1 Hour, 4 Minutes** (10 AM)
Worst Travel Time: **1 Hour, 5 Minutes** (3 AM)
Best/Worst Travel Time Variability: **2%**

Southbound
Average Travel Time: **1 Hour, 5 Minutes**
Best Travel Time: **1 Hour, 4 Minutes** (4 AM)
Worst Travel Time: **1 Hour, 5 Minutes** (4 PM)
Best/Worst Travel Time Variability: **1%**





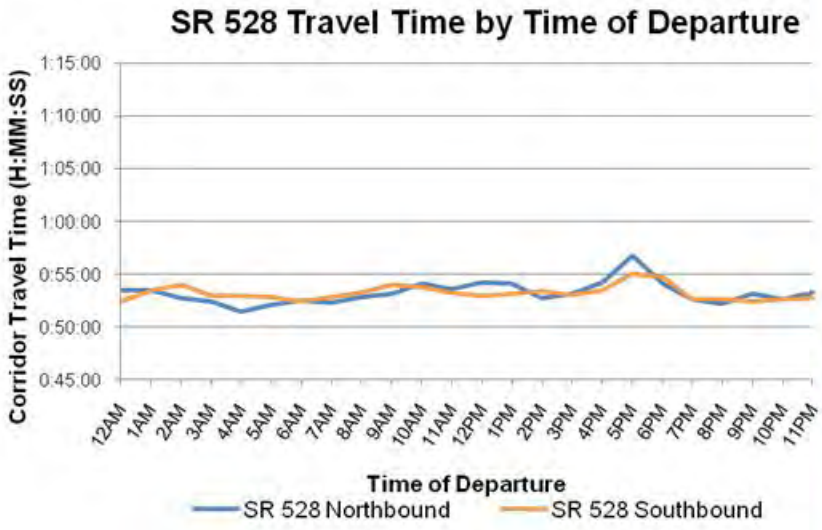
Source: ATRI.

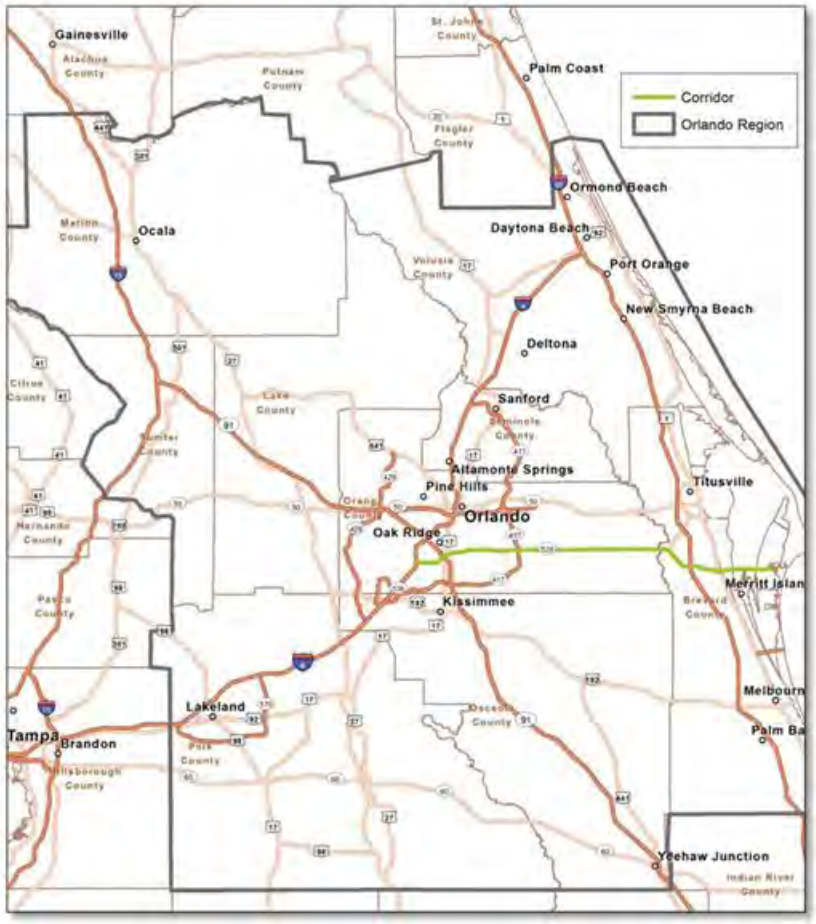
Figure 3.6 Travel Time Analysis for SR 528

State Route 528

Eastbound
Average Travel Time: **53 Minutes**
Best Travel Time: **52 Minutes** (4 AM)
Worst Travel Time: **57 Minutes** (5 PM)
Best/Worst Travel Time Variability: **10%**

Westbound
Average Travel Time: **53 Minutes**
Best Travel Time: **52 Minutes** (12 AM)
Worst Travel Time: **55 Minutes** (5 PM)
Best/Worst Travel Time Variability: **5%**





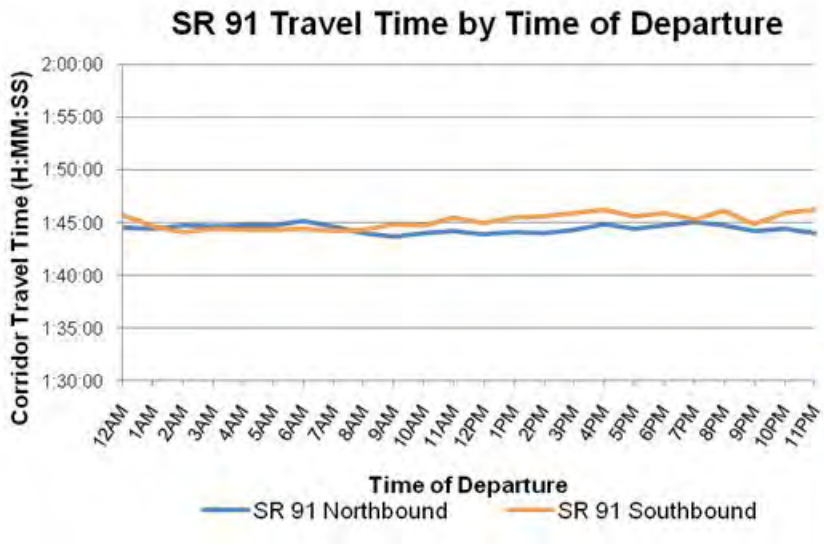
Source: ATRI.

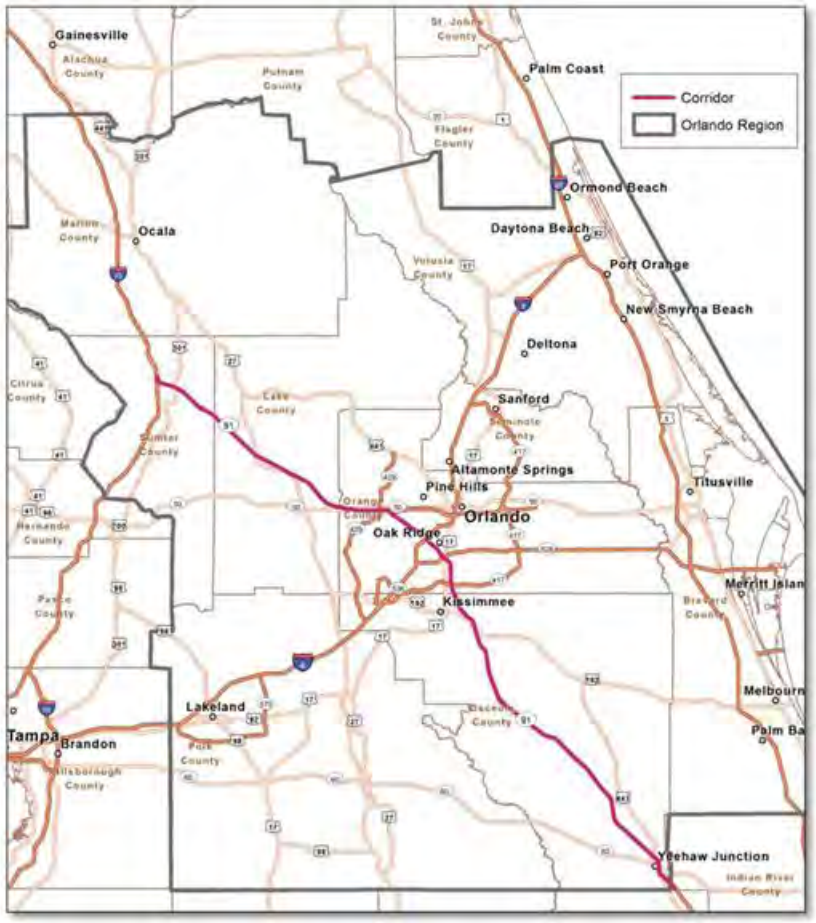
Figure 3.7 Travel Time Analysis for SR 91

State Route 91

Northbound
Average Travel Time: **1 Hour, 44 Minutes**
Best Travel Time: **1 Hour, 44 Minutes** (9 AM)
Worst Travel Time: **1 Hour, 45 Minutes** (6 AM)
Best/Worst Travel Time Variability: **1%**

Southbound
Average Travel Time: **1 Hour, 45 Minutes**
Best Travel Time: **1 Hour, 44 Minutes** (2 AM)
Worst Travel Time: **1 Hour, 46 Minutes** (11 PM)
Best/Worst Travel Time Variability: **2%**





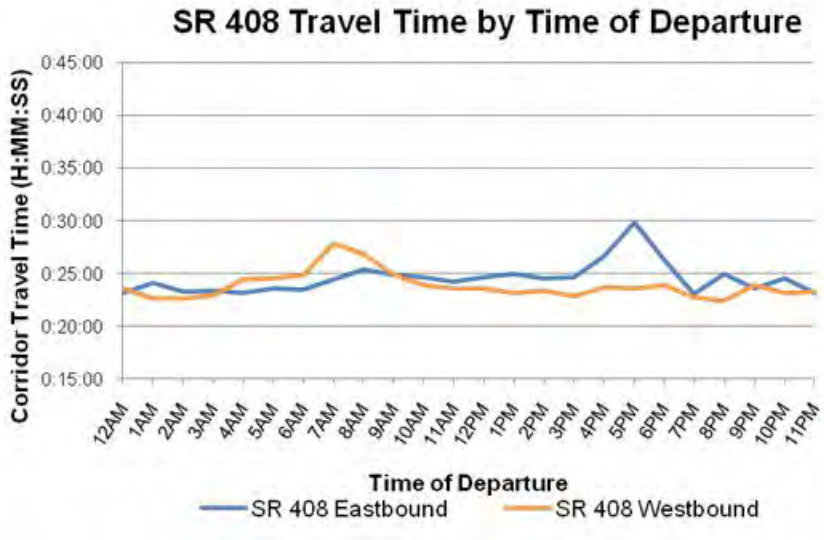
Source: ATRI.

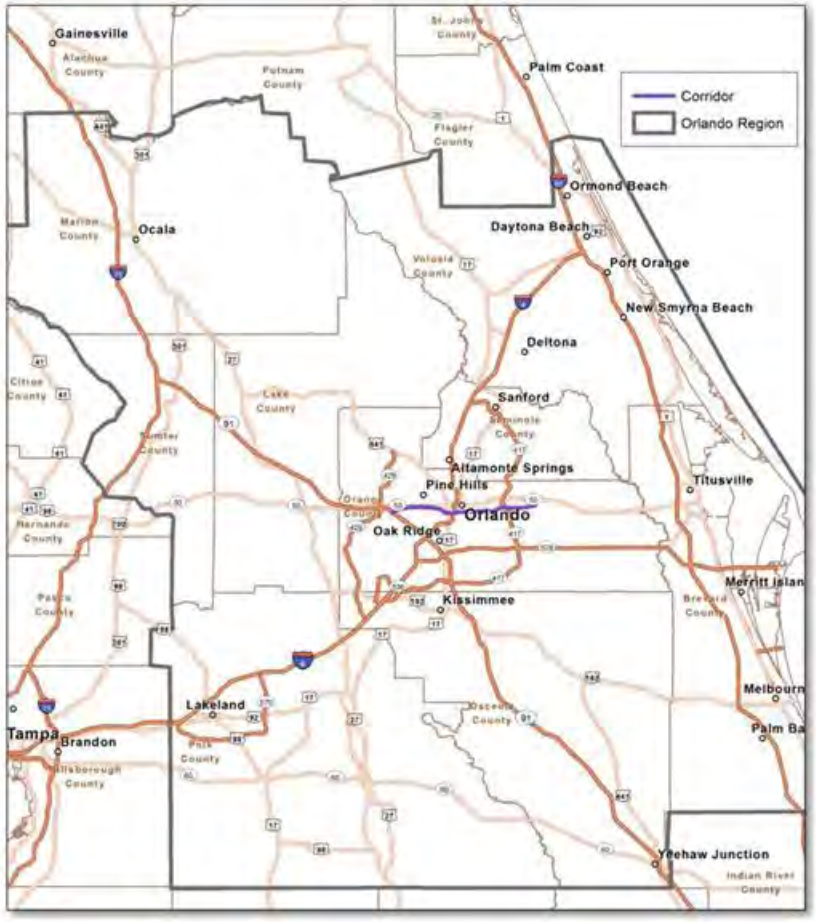
Figure 3.8 Travel Time Analysis for SR 408

State Route 408

Eastbound
Average Travel Time: **25 Minutes**
Best Travel Time: **23 Minutes** (7 PM)
Worst Travel Time: **30 Minutes** (5 PM)
Best/Worst Travel Time Variability: **29%**

Westbound
Average Travel Time: **24 Minutes**
Best Travel Time: **23 Minutes** (8 PM)
Worst Travel Time: **28 Minutes** (7 AM)
Best/Worst Travel Time Variability: **24%**





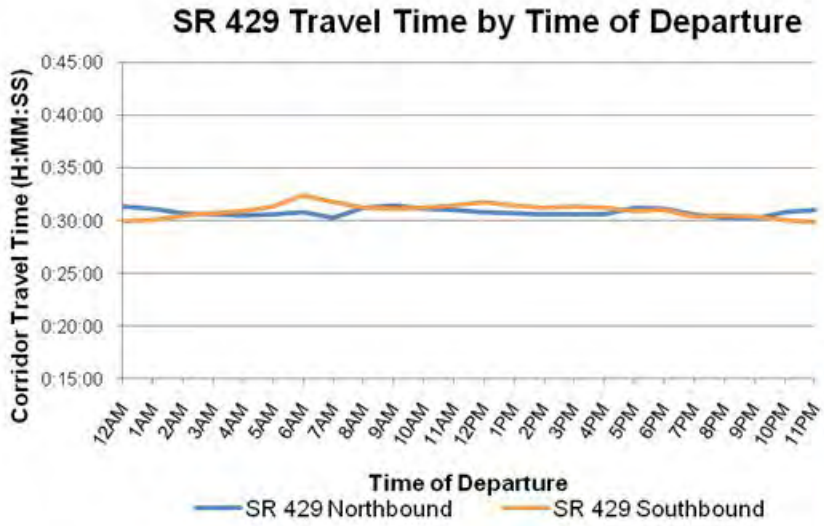
Source: ATRI.

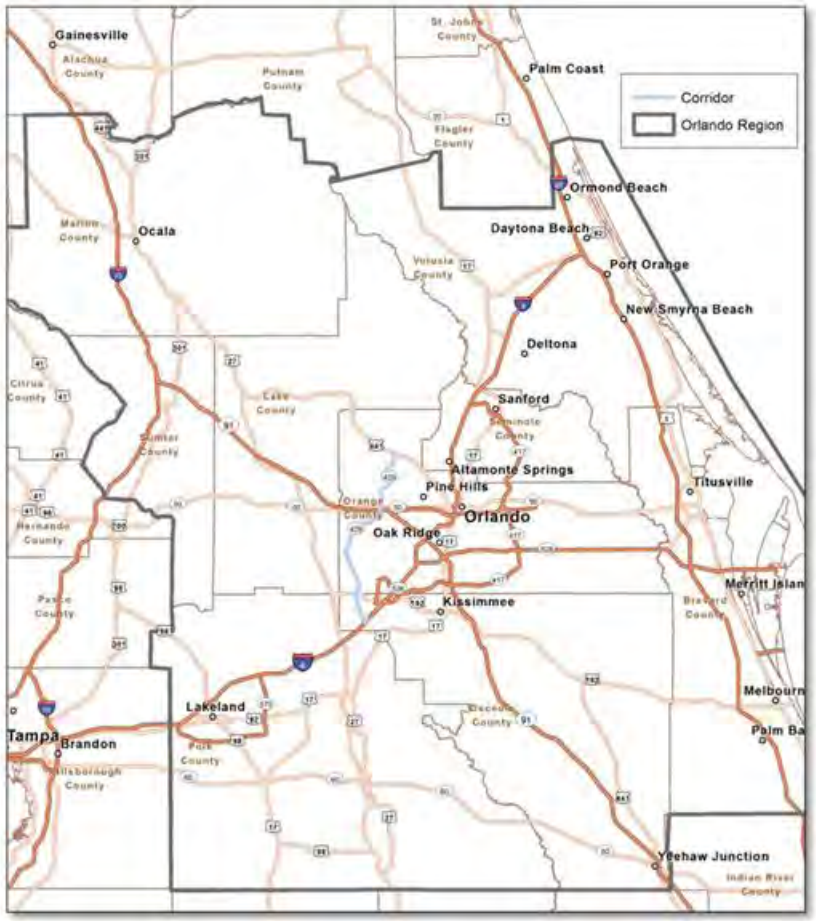
Figure 3.9 Travel Time Analysis for SR 429

State Route 429

Northbound
Average Travel Time: **31 Minutes**
Best Travel Time: **30 Minutes** (9 PM)
Worst Travel Time: **31 Minutes** (9 AM)
Best/Worst Travel Time Variability: **4%**

Southbound
Average Travel Time: **31 Minutes**
Best Travel Time: **30 Minutes** (11 PM)
Worst Travel Time: **32 Minutes** (6 AM)
Best/Worst Travel Time Variability: **9%**





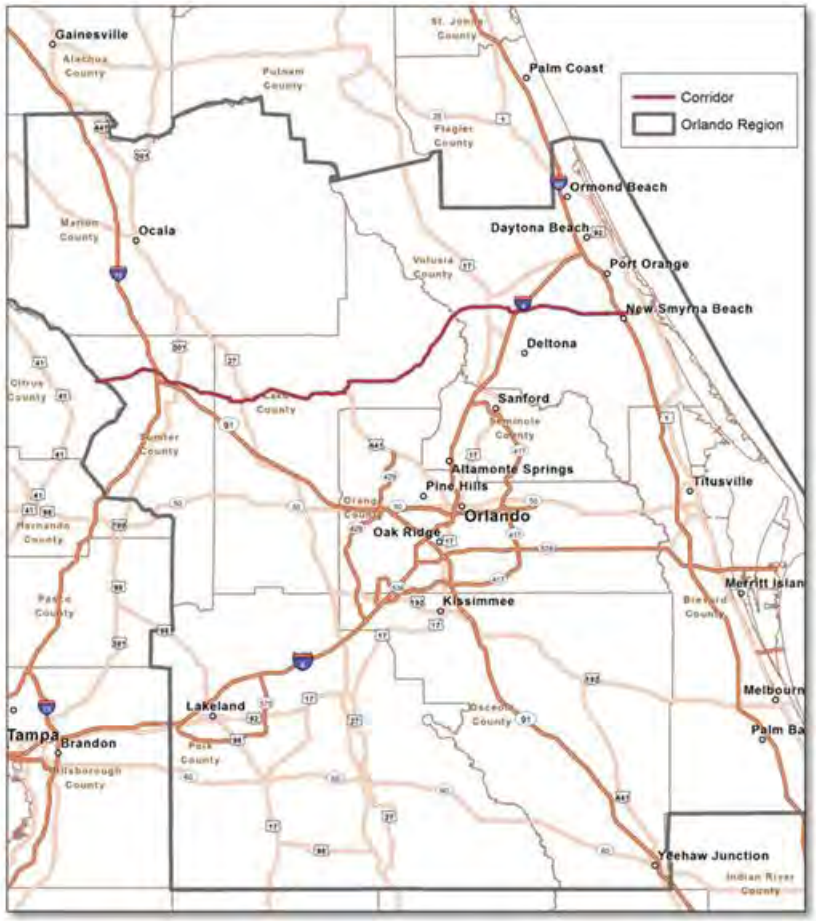
Source: ATRI.

Figure 3.10 Travel Time Analysis for SR 44

State Route 44

Eastbound
Average Travel Time: **2 Hours, 10 Minutes**
Best Travel Time: **2 Hours, 0 Minutes** (11 PM)
Worst Travel Time: **2 Hours, 16 Minutes** (1 PM)
Best/Worst Travel Time Variability: **14%**

Westbound
Average Travel Time: **2 Hours, 8 Minutes**
Best Travel Time: **1 Hour, 59 Minutes** (11 PM)
Worst Travel Time: **2 Hours, 15 Minutes** (2 PM)
Best/Worst Travel Time Variability: **13%**



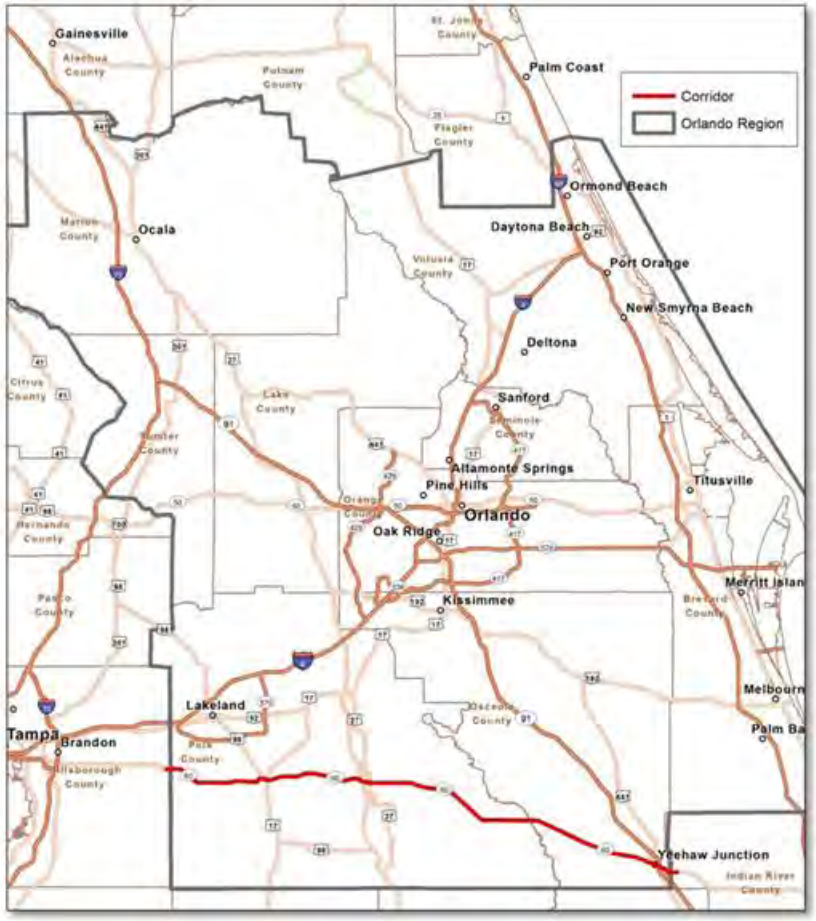
Source: ATRI.

Figure 3.11 Travel Time Analysis for SR 60

State Route 60

Eastbound
Average Travel Time: **1 Hour, 31 Minutes**
Best Travel Time: **1 Hour, 28 Minutes** (4 AM)
Worst Travel Time: **1 Hour, 34 Minutes** (3 PM)
Best/Worst Travel Time Variability: **7%**

Westbound
Average Travel Time: **1 Hour, 30 Minutes**
Best Travel Time: **1 Hour, 25 Minutes** (3 AM)
Worst Travel Time: **1 Hour, 33 Minutes** (7 AM)
Best/Worst Travel Time Variability: **9%**



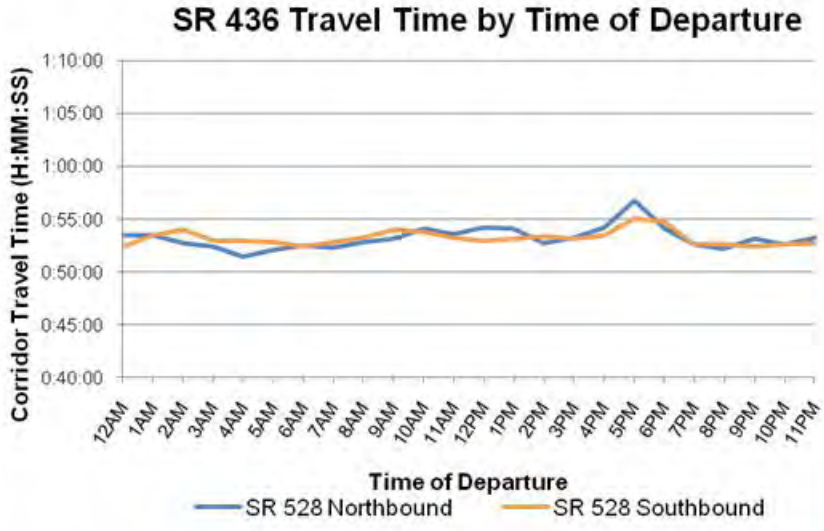
Source: ATRI.

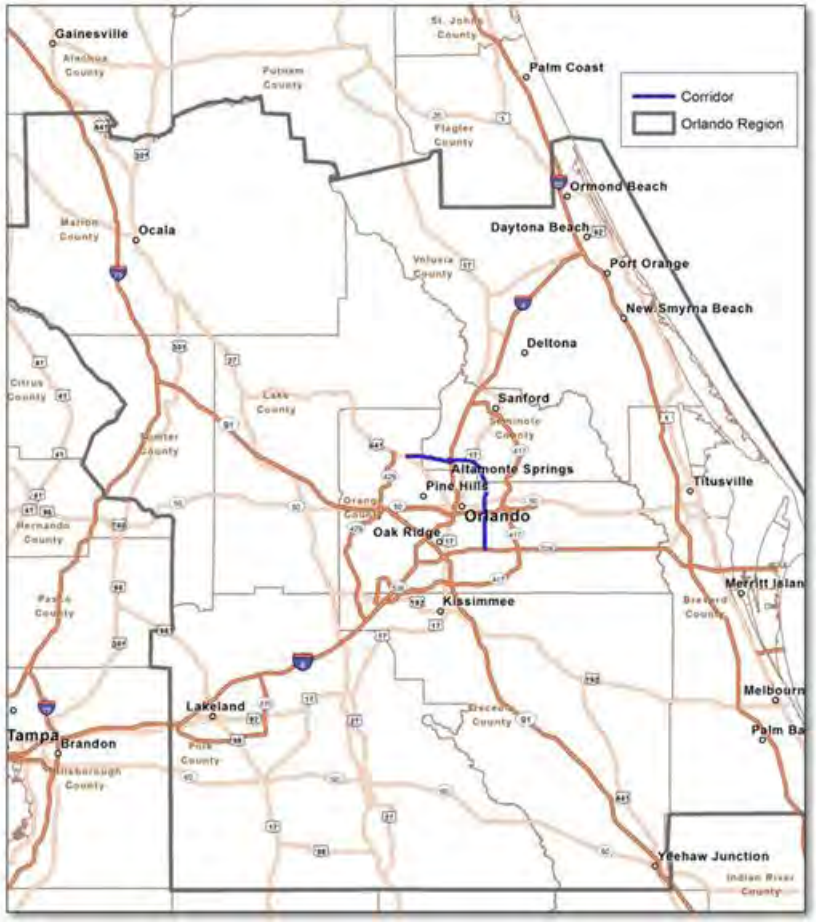
Figure 3.12 Travel Time Analysis for SR 436

State Route 436

Northbound
Average Travel Time: **52 Minutes**
Best Travel Time: **42 Minutes** (3 AM)
Worst Travel Time: **1 Hour, 1 Minute** (2 PM)
Best/Worst Travel Time Variability: **47%**

Southbound
Average Travel Time: **49 Minutes**
Best Travel Time: **42 Minutes** (3 AM)
Worst Travel Time: **56 Minutes** (4 PM)
Best/Worst Travel Time Variability: **34%**





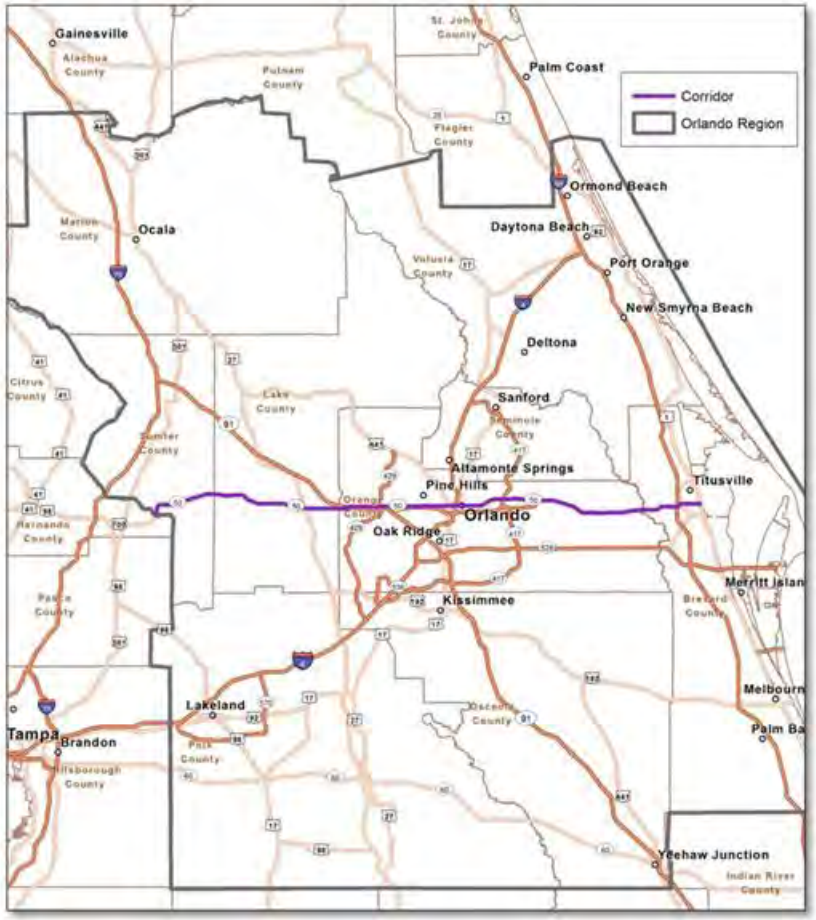
Source: ATRI.

Figure 3.13 Travel Time Analysis for SR 50

State Route 50

Eastbound
Average Travel Time: **2 Hours, 17 Minutes**
Best Travel Time: **2 Hours, 7 Minutes** (12 AM)
Worst Travel Time: **2 Hour, 31 Minutes** (4 PM)
Best/Worst Travel Time Variability: **19%**

Westbound
Average Travel Time: **2 Hours, 17 Minutes**
Best Travel Time: **2 Hours, 6 Minutes** (10 PM)
Worst Travel Time: **2 Hours, 25 Minutes** (4 PM)
Best/Worst Travel Time Variability: **15%**



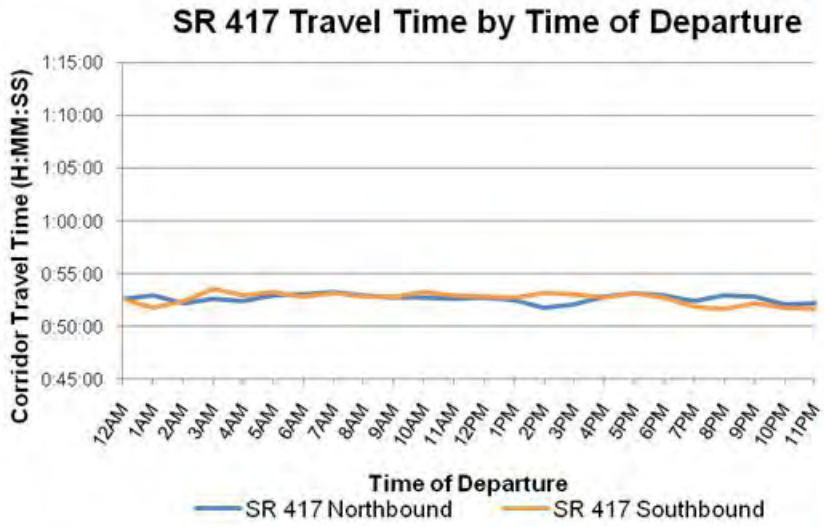
Source: ATRI.

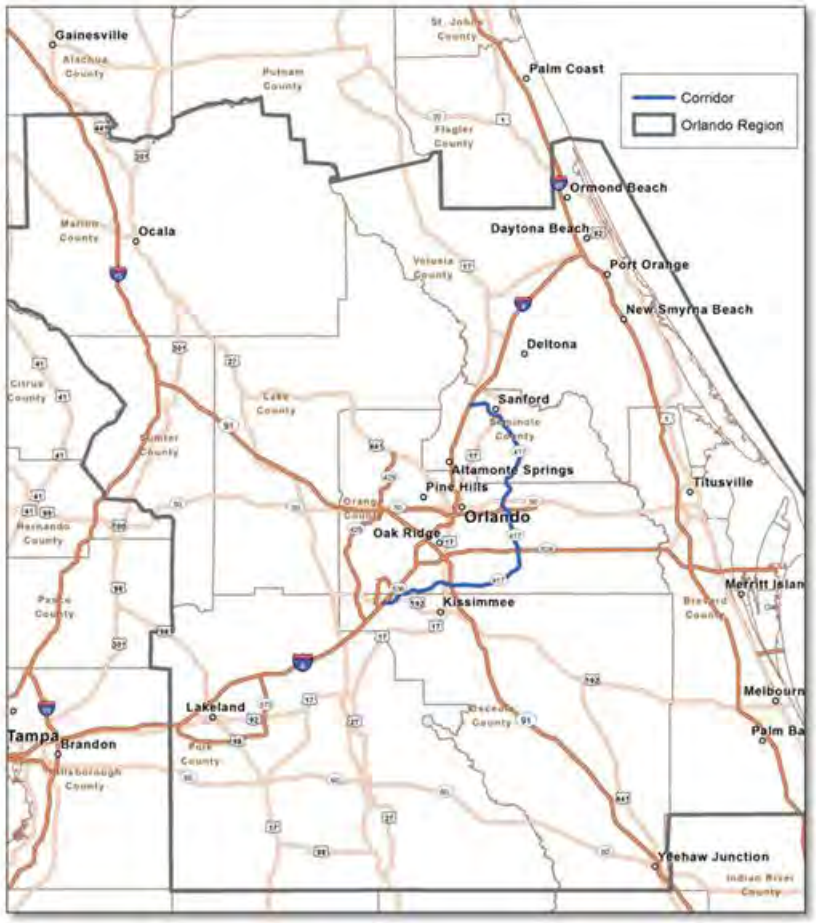
Figure 3.14 Travel Time Analysis for SR 417

State Route 417

Northbound
Average Travel Time: **53 Minutes**
Best Travel Time: **52 Minutes** (2 PM)
Worst Travel Time: **53 Minutes** (6 AM)
Best/Worst Travel Time Variability: **3%**

Southbound
Average Travel Time: **53 Minutes**
Best Travel Time: **52 Minutes** (11 PM)
Worst Travel Time: **54 Minutes** (3 AM)
Best/Worst Travel Time Variability: **4%**





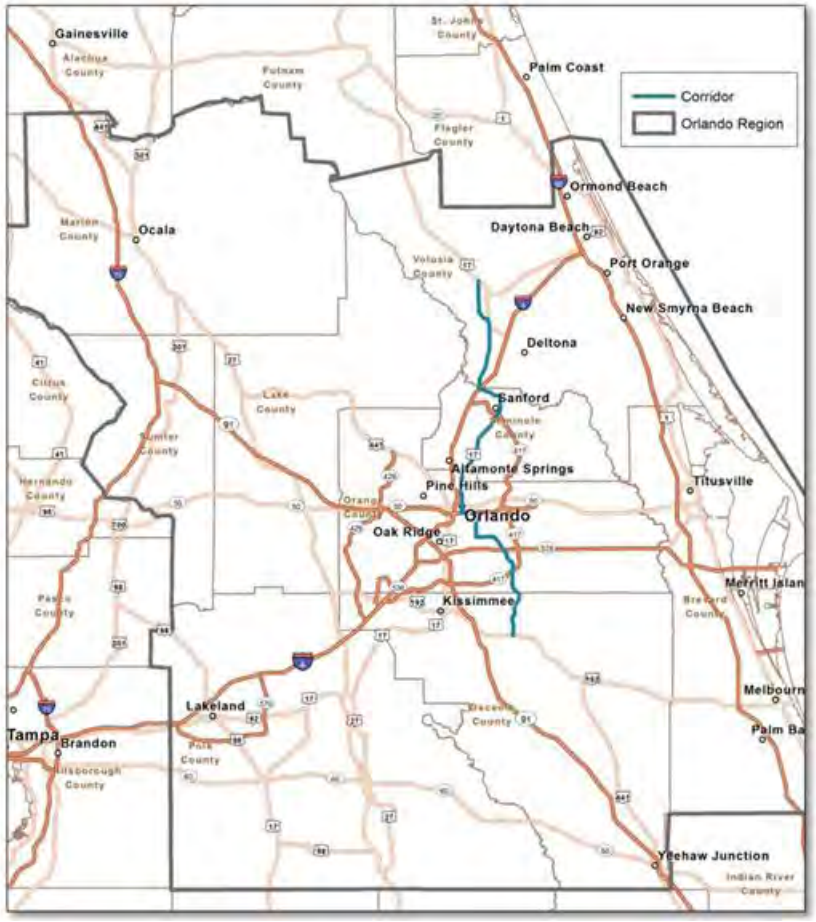
Source: ATRI.

Figure 3.15 Travel Time Analysis for SR 15

State Route 15

Northbound
Average Travel Time: **2 Hours, 17 Minutes**
Best Travel Time: **2 Hours, 6 Minutes** (12 AM)
Worst Travel Time: **2 Hours, 24 Minutes** (4 PM)
Best/Worst Travel Time Variability: **14%**

Southbound
Average Travel Time: **2 Hours, 12 Minutes**
Best Travel Time: **1 Hour, 57 Minutes** (2 AM)
Worst Travel Time: **2 Hours, 24 Minutes** (2 PM)
Best/Worst Travel Time Variability: **23%**



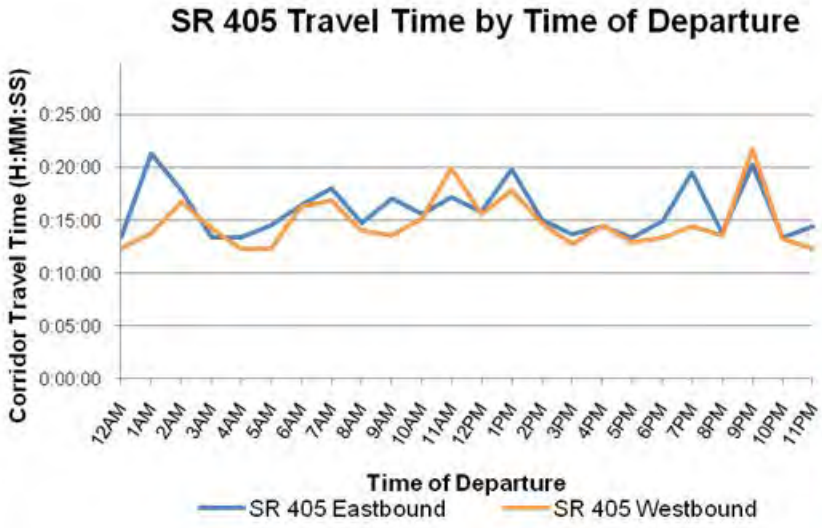
Source: ATRI.

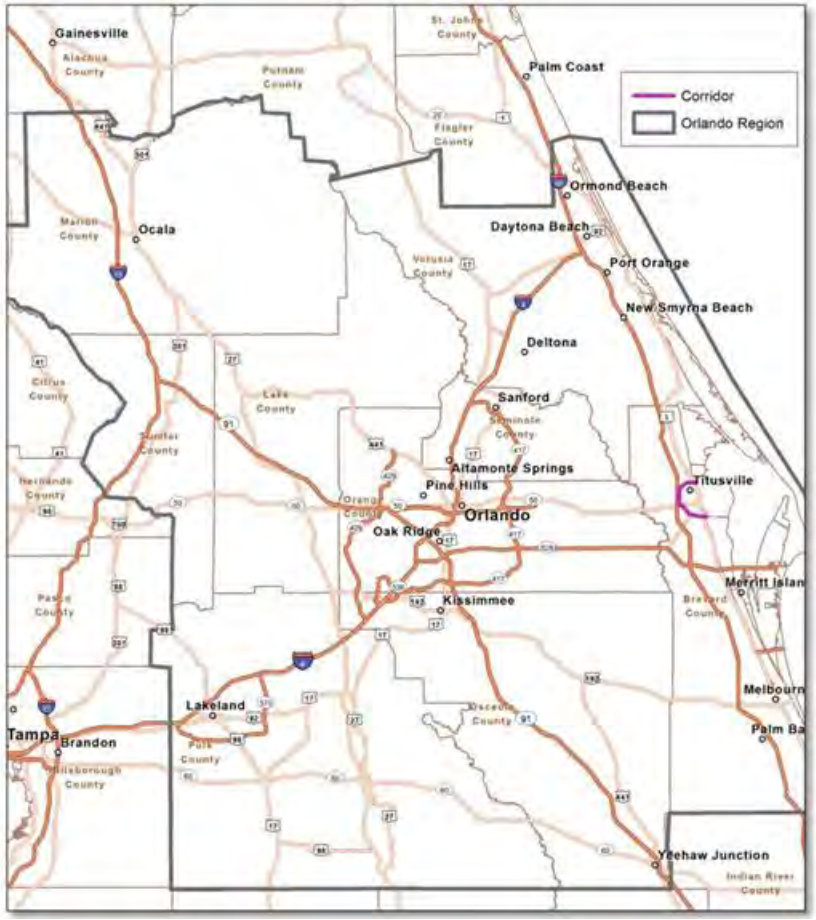
Figure 3.16 Travel Time Analysis for SR 405

State Route 405

Northbound
Average Travel Time: **16 Minutes**
Best Travel Time: **13 Minutes** (4 AM)
Worst Travel Time: **21 Minutes** (1 AM)
Best/Worst Travel Time Variability: **60%**

Southbound
Average Travel Time: **15 Minutes**
Best Travel Time: **12 Minutes** (5 AM)
Worst Travel Time: **22 Minutes** (9 PM)
Best/Worst Travel Time Variability: **77%**





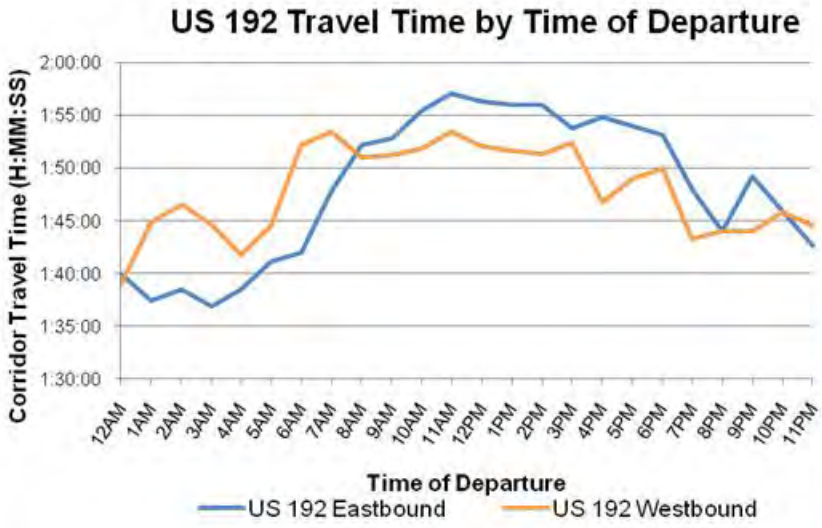
Source: ATRI.

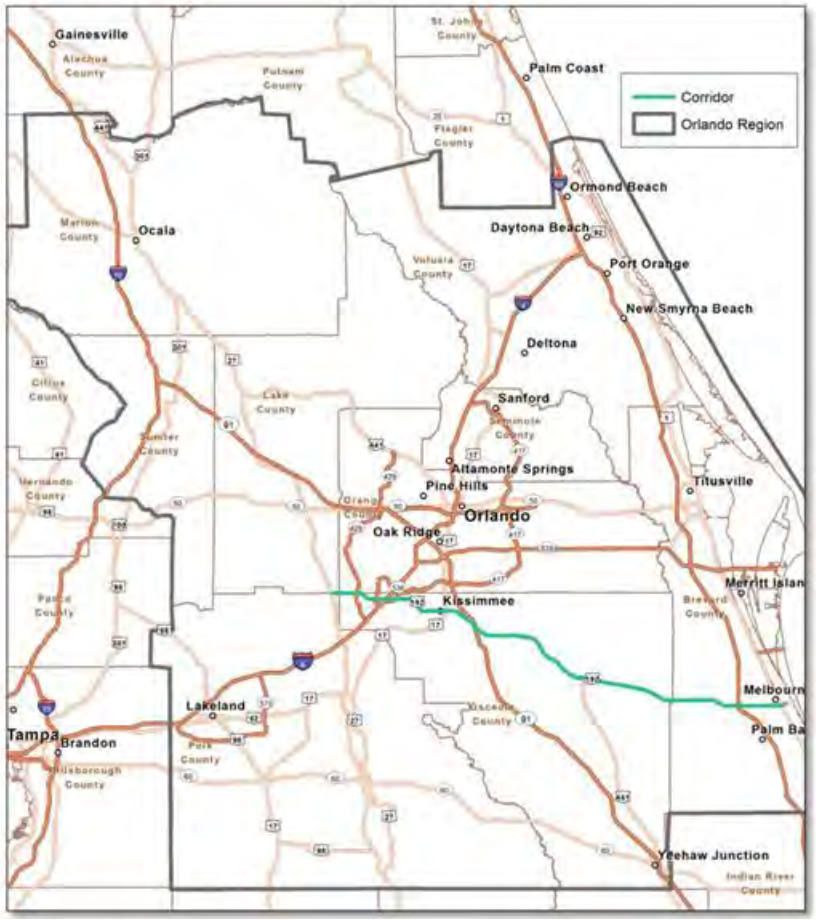
Figure 3.17 Travel Time Analysis for U.S. 192

US Highway 192

Eastbound
Average Travel Time: **1 Hour, 48 Minutes**
Best Travel Time: **1 Hour, 37 Minutes** (3 AM)
Worst Travel Time: **1 Hour, 57 Minutes** (11 AM)
Best/Worst Travel Time Variability: **21%**

Westbound
Average Travel Time: **1 Hour, 48 Minutes**
Best Travel Time: **1 Hour, 39 Minutes** (12 AM)
Worst Travel Time: **1 Hour, 53 Minutes** (11 AM)
Best/Worst Travel Time Variability: **15%**





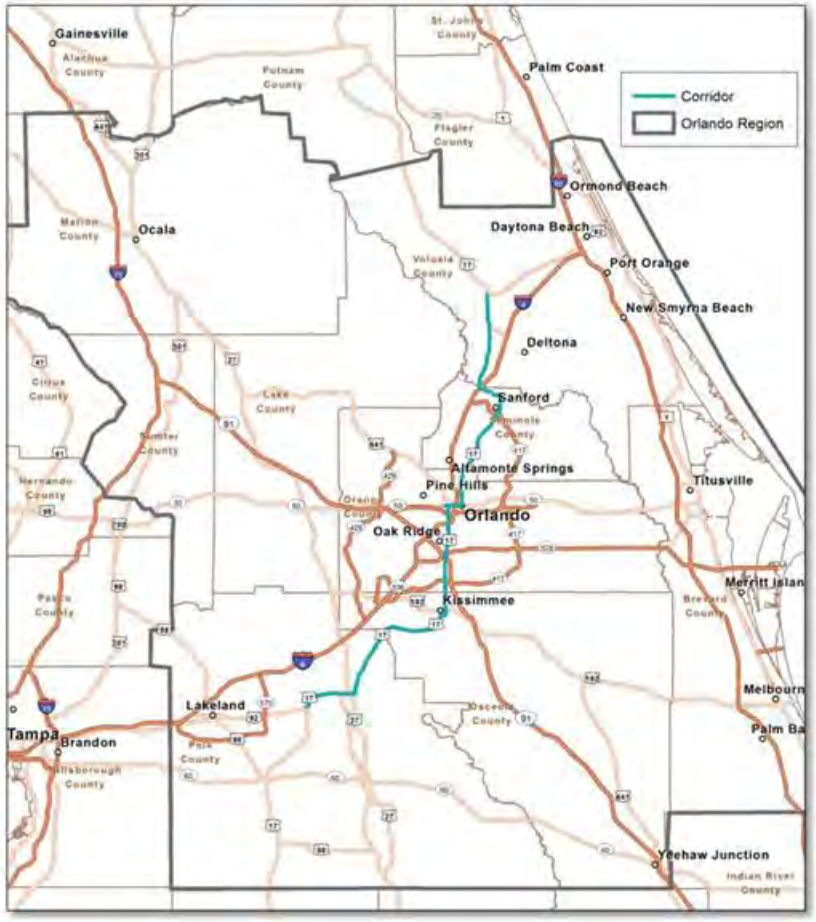
Source: ATRI.

Figure 3.18 Travel Time Analysis for U.S. 192/17

US Highway 92/17

Northbound
Average Travel Time: **2 Hours, 59 Minutes**
Best Travel Time: **2 Hours, 43 Minutes** (4 AM)
Worst Travel Time: **3 Hours, 12 Minutes** (3 PM)
Best/Worst Travel Time Variability: **17%**

Southbound
Average Travel Time: **3 Hours, 13 Minutes**
Best Travel Time: **2 Hours, 41 Minutes** (2 AM)
Worst Travel Time: **3 Hours, 45 Minutes** (6 AM)
Best/Worst Travel Time Variability: **39%**



Source: ATRI.

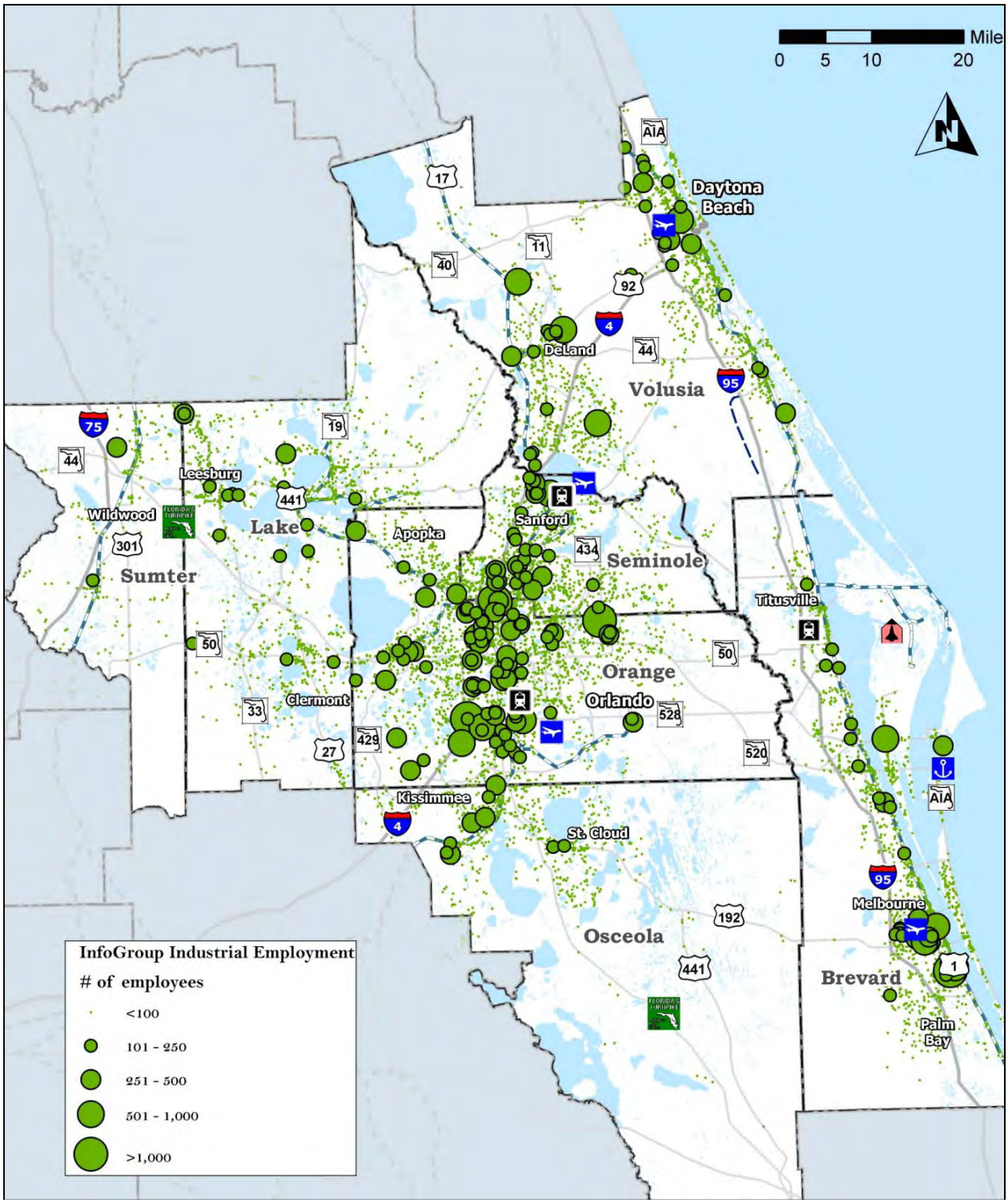
4.0 Logistic Patterns of Key Industry Sectors

Profiling the logistics patterns of key industries can help establish the freight transportation needs of a region's key industries, and how their operations impact the transportation system. The transportation infrastructure in Central Florida supports the regional economy by providing a means for goods to be brought into the region for consumption by regional users and goods produced by the region's businesses to be transported out, providing revenue to support local and regional businesses. Understanding the transportation linkages between Central Florida and outside areas can provide insight into individual firm's operations, as well as strengths and weaknesses in a regional economy and logistics system and business and economic trends, such as clusters of national and international growth and national transportation facilities that may have a competitive advantage to serve certain industries. Some key industries in Central Florida that can help illuminate these linkages and trends in Central Florida include the following:

- **Transportation and Warehousing** (developed based on interviews with Service Trucking, Rooms to Go, Publix, Sysco, Carroll Fulmer Logistics, Saddle Creek Logistics, Lowes, and FedEx Freight);
- **Food Production and Distribution** (developed based on interviews with Florida's Natural Orange Juice, CKS Plastics, Service Trucking, Publix, and Sysco);
- **Convention and Tourism – Hotels** (developed based on interviews with Disney, the Orange County Convention Center, GES, the Hyatt Regency Grand Cypress, Sysco, the Amway Center, and waste collectors: Waste Management and Waste Pro);
- **Construction** (developed based on interviews with Florida Rock and Cemex); and
- **Spaceport Operations and High-Tech Manufacturing** (developed based on interviews with Spaceport, SpaceEx, FedEx Freight, and Freight Forwarders).

Traditionally, industrial activity with jobs in sectors, including manufacturing, warehousing and distribution, and construction activities, is the primary driver of goods movement activity. There are several major clusters of industrial employment within Central Florida, including the City of Orlando; the MCO airport area; near Sanford in Seminole County; near Deland and Daytona Beach in Volusia County; and smaller pockets in the Leesburg, Kissimmee, and Melbourne areas. Figure 4.1 displays the agglomeration of industrial employment within the study area by number of jobs.

Figure 4.1 Industrial Employment Locations (All Sectors)



Source: InfoGroup Data provided by FDOT.

Note: Business locations with only one employee were omitted for map clarity. Due to the methods for collecting the data, all business locations may not be shown.

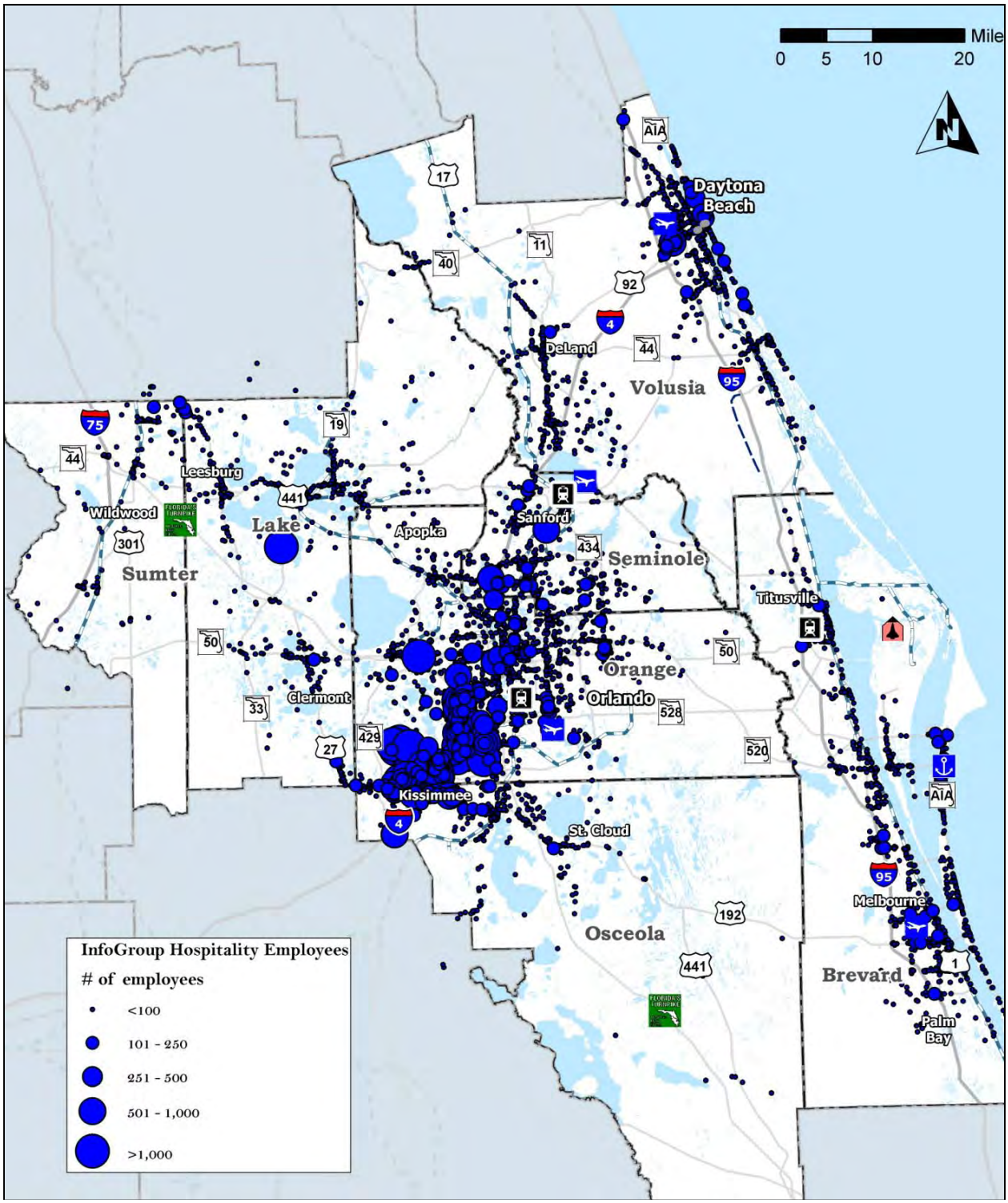
While industrial activity is often the main driver of freight transportation flows within a region, in Central Florida, hospitality and tourism – a major part of the regional economy – is also a large contributor to regional goods movement activity. The logistics patterns for this sector are different from those associated with industrial activity (i.e., warehousing, manufacturing). Major activity centers for hospitality and tourism within the study area include the southern part of Orange County and the northern part of Osceola County (the Kissimmee area), the western part of Seminole County, and the coastal communities of Daytona Beach and Melbourne and along the I-95 corridor. Figure 4.2 displays the agglomeration of hospitality and tourism employment within the study area, by number of jobs.

4.1 CONSUMER PRODUCTS

The transportation and warehousing industry in Central Florida plays a major role in both receiving and distributing goods and services to customers throughout both Central Florida and the southeast region. Transportation and warehousing activities also support several additional sectors of major importance in the region, including the tourism industry, retail trade, and healthcare. This section generally describes the behavior and logistics patterns of some sample firms involved in wholesale warehousing and distribution center (DC) operations (largely associated with consumer products). The project team interviewed firms in the transportation and logistics business, including, among others, Rooms to Go, Carroll Fulmer Logistics, Lowes, and Saddle Creek Logistics Services. These firms provided a snapshot of their logistics patterns and operations in Central Florida, and allowed the study team to gain a better understanding on how these patterns influence not only the performance of the regional transportation system, but the economic system as well.

This section will talk about the major points of origin and key destinations for regional consumer products. Although there are several large DCs in the Orlando area, much of the product that is handled by these DCs and many of the customers that the DCs serve are not located within the seven-county Central Florida Regional Freight Study area (including Orange, Osceola, Seminole, Lake, Sumter, Brevard, and Volusia Counties). Warehousing facilities and large DCs in Central Florida range in size from a few thousand square feet to several million, and based on that size, serve catchment areas of customers ranging from only within the study area to serving both South and Central Florida, to serving the entire State, or the southeast region as far north as Georgia and Tennessee and as far west as Texas.

Figure 4.2 Hospitality and Tourism Employment Locations (NAICS2 71 and 72)



Source: InfoGroup Data provided by FDOT.

Note: Business locations with only one employee were omitted for map clarity. Due to the methods for collecting the data, all business locations may not be shown.

Figure 4.3 displays a typical supply chain for warehousing and distribution in Central Florida overlaid on a map of the study area. The figure demonstrates the key transportation modes for serving warehousing and DC facilities. As described in the Regional Freight Facilities and Goods Flow Profile, trucks and the highway mode play a dominant role in regional commodity flows and supporting the freight industry in Central Florida with well over 90 percent of the market.[7] Interviews with industry have substantiated those figures; however, some regional DCs also receive product by other modes, including through the ports, rail yards, and airports. These goods also are transported by truck to their final destination.

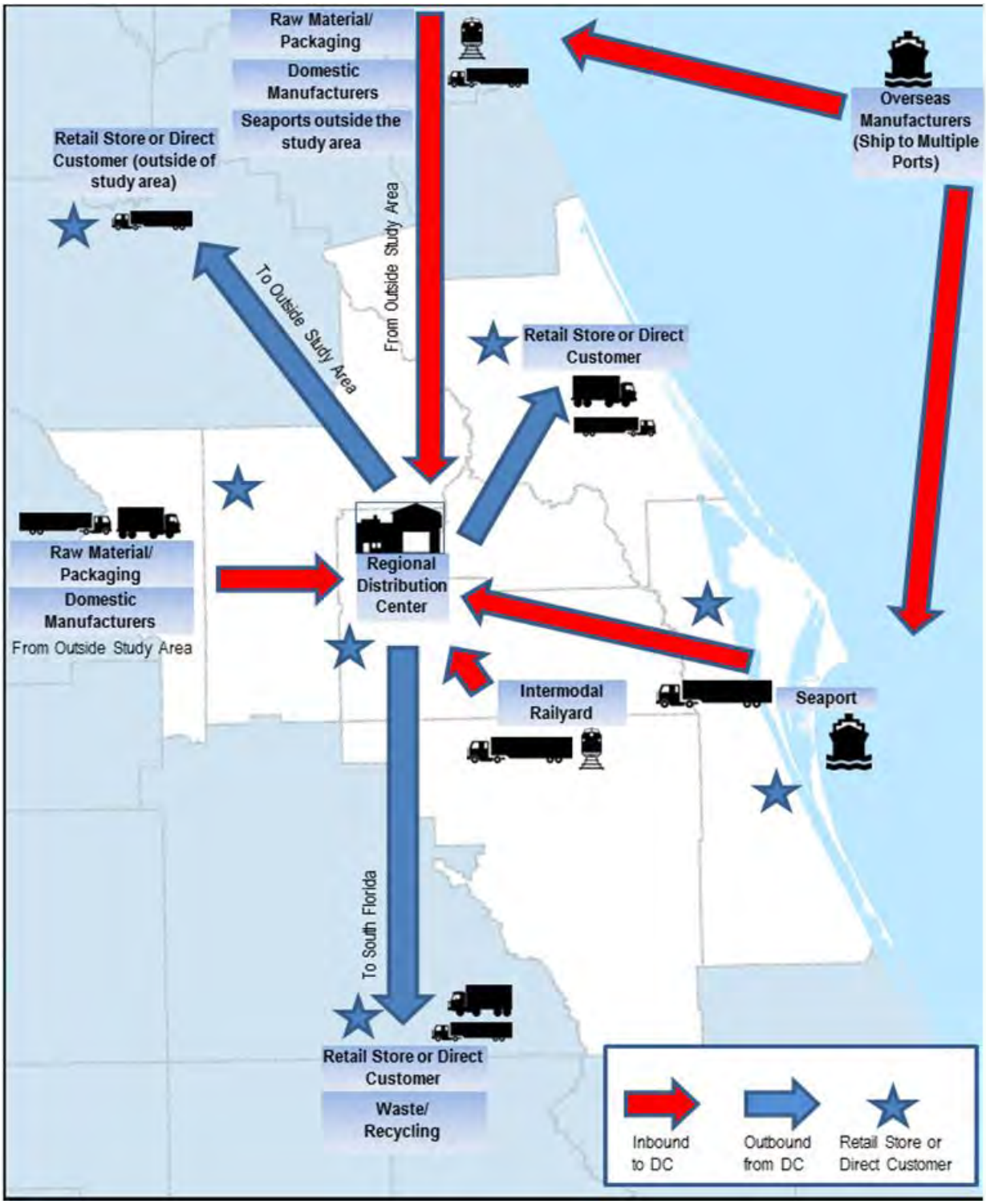
Services and Customers

Central Florida is home to a large number of regional DCs. Several of the major ones provide products to customers throughout Central Florida, with some serving customers throughout the State and even the Southeast region. One large DC for a major home improvement retailer in Osceola County is one of over a dozen in their network and the only one in Florida. This particular facility services 128 stores in the Southeast and the State of Florida. Other similarly sized DCs in the region serve several states – generally in the Southeast. Much of the product for consumer product-oriented DCs comes from both overseas and domestic manufacturers in either shipping containers (40 feet) or dry van trucks (53 feet). The product generally comes from one of several different ports in the State of Florida, the Southeast (such as the Port of Savannah), or one of nation's other large container ports (such as the Port of Long Beach). For product shipped into Savannah or to ports in North or South Florida, the container is either collected and sent directly to the DC, or the containers contents are transshipped (also known as crossdocking[8]) into trailers and sent to the DC. If the product comes from a further distance away from Central Florida (i.e., greater that a couple hundred miles), it may be trucked by a long-distance carrier or sent by intermodal rail (i.e., rail to truck) cross-country and transloaded to truck somewhere in the Southeast or Northern Florida.

[7] Central Florida Regional Freight Study, Current Regional Freight and Goods Flow Profile, Cambridge Systematics, 2012.

[8] Transshipping or cross-docking is the act of unloading the contents from ocean containers (often 40 feet or forty-foot equivalent units) and loaded into a 53-foot dry van truck, allowing for a larger volume in one shipment.

Figure 4.3 Typical Supply Chain for Wholesale Warehousing and DC Operations in Central Florida



The volumes of cargo can be quite large for a major regional DC. For example, one operator reported about 20,000 loads per year being brought from the Port of Savannah to the DC in the Orlando area, averaging about 200 trips per day. Another had about 12,000 of the companies' 30,000 total containers coming through Florida ports, with a very large number into Jacksonville. DC operators in Central Florida do utilize the ramps for CSXT at Taft and the NS/FEC ramps in Titusville and Jacksonville for intermodal shipments.

Most DC operators in the region utilize several different truck carriers for their operations and may have their own fleet as well. For collecting product or shipments from the port or rail yard, they may use drayage carriers (one or several different ones) who often specialize in doing several short trips in a day. For outbound deliveries (to final customers, stores, or smaller DCs), it is likely that a different set of carriers would be used. One DC operator noted that, since most of the outbound shipments are to customers and stores within 50 to 100 miles, and many delivery vehicles have to extensively use local streets, they will use smaller trucks (28-foot dry vans) to do the outbound deliveries. In the DC, they have loading docks optimized for 53-foot trailers and ocean container offloading cargo and loading docks on the other "side" of the DC optimized for sending out smaller trucks for local delivers.

The inbound shipments often travel a much further distance than the outbound shipments, making the larger trucks more practical for these moves. If the deliveries are a short distance away, a driver may be able to make several turns per day, returning to the DC to collect and distribute another load before the end of the day. This may also include a "backhaul", which allows the driver to collect a shipment from a customer for delivery back to the home area. The number of loads is contingent on the delivery and receiving schedules of customers, but also on regulations for the number of hours a particular driver can operate in a particular day. Sometimes the distances to physical stores (i.e., from an Ocoee DC to Tallahassee) may not allow for multiple daily trips for a single driver; however, many companies that set up regional DCs arrange them to maximize drivers' efficiency.

Many DCs in Central Florida operate on a just-in-time delivery model. In other words, they hold enough inventory to provide relatively immediate (within a day or two) delivery upon ordering. One furniture DC operator reported that 80 percent of customers can have their furniture the next day. The company does keep inventory on hand in the DC, but can replenish the facility in five days with new inventory. Beyond the staff and internal fleets of the DCs themselves, specialized logistics providers play a major role in the supplying of these facilities. One major logistics provider, located in Lake County, operates over 300 trucks, with a logistics brokerage arm to collect and distribute products to DCs and other storage facilities throughout Central Florida. This particular provider serves 48 states, but hauls a large volume of regional and local shipments. Their terminal in Lake County (which handles about 2,000 loads per week) acts as their base of operations and proximity to major customers in the

greater Orlando area is a great advantage. Unlike the dedicated fleets for DC operators, these logistics providers serve customers throughout the region and may even make deliveries to DCs of competing companies. They manage their supply chains based on the locations of customers in different markets around the County. For example, the company will make an outbound delivery of bottled water products to a customer in the Georgia, and return with a load of appliances for a home improvement retailer. These companies find success in a diverse offering of customers, which allows them to "match" loads throughout the Country and avoid legs of their trip where they are not hauling any cargo. With the average length of the haul averaging up to 1,000 miles, it is very important to identify customers for both legs of the trip.

Routing and Transportation Issues

One major issue that the transportation, warehousing, and distribution industries in Central Florida deal with is the toll roadways. One large DC operator noted that the tractors in their dedicated fleet spend approximately $10,000 to $12,000 per month on tolls. Drivers are generally willing to pay tolls to avoid congestion, but especially for owner-operators of trucks can be up to the discretion of the driver to sit in traffic or pay the toll. Primary routes to serve the DCs in the greater Orlando area include I-4 (traveling northeast to southwest), connecting to I-95 and I-75 to travel outside the region. Since DCs are located throughout the study area, major regional access highways, such as U.S. 17-92 and U.S. 27, are major routes for truckers. Truckers reported that, unless they need to access a specific customer, they tend to avoid the smaller local roads and stay on the larger highways.

Some DC operators reported that they feel that fuel cost and availability will continue to be a big driver of logistics decisions made by trucking firms and logistics providers. Converting the fleets to alternative fuels is something that some larger-scale operators have explored, as well as the increased use of tolls described previously. Others have concerns with local access to their facility – since many of the DCs in Central Florida are very large and receive a lot of truck traffic – they require road and highway improvements (larger turning radii, dedicated turn lanes) to accommodate them. Improved access to large industrial parks, which sometimes house these facilities, is a major priority for many DC operators in the region.

4.2 FOOD PRODUCTION AND DISTRIBUTION

Food production and distribution in Central Florida are focused on both the growing and processing of raw materials (especially citrus, but also milk products and other specialty beverages), as well as the processing and distribution of packaged foods and beverages to individual customers, as well as hotels, theme parks, stores, etc. The project team conducted interviews with shippers and carriers involved in this industry, including Florida's Natural,

Service Trucking, Sysco, CSK Plastics, and the Florida Distributing Company (a beer distributor). This section highlights the distinct roles of each user of the transportation system in the region and the modes that are utilized. Figure 4.4 displays a typical supply chain for the food production and processed food distribution industry in Central Florida. Much of the processed food in the region is hauled using trucks from warehouses either in Central Florida or in the Southeast region. Perishable commodities would be brought into the region by air or refrigerated trucks or trains. Many other food products (such as milk or juice) are produced in Central Florida and distributed within the study region – likely through a warehouse or DC or sent out of the region by truck.

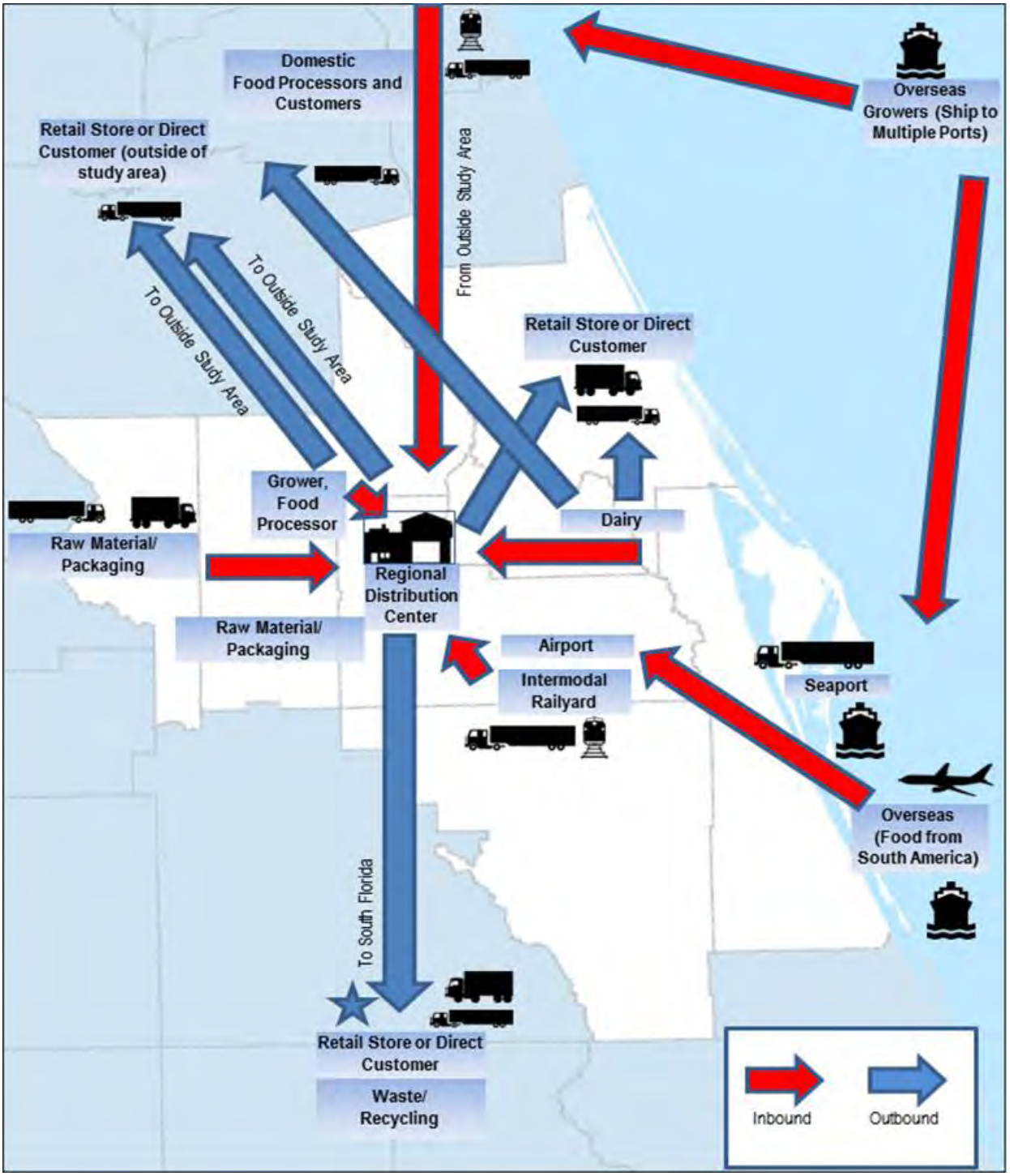
Services and Customers

Central Florida has a long legacy of food production, especially related to the citrus industry. While some components and producers in this industry have shifted operations to other areas in Florida and other areas throughout the United States, citrus still plays a major role in Central Florida's regional economy. The region also hosts several other types of firms associated with the food production industry, including processing and packing facilities and dairies.

As an example of the logistics associated with the citrus industries' operations, a major shipper was interviewed, along with a key supplier of packaging material, and an important truck carrier. One major citrus shipper in Central Florida operates two plants in Lake Mary (Seminole County) and in Umatilla (Lake County). The plants focus on processing oranges into juice for distribution to the local, regional, national, and international markets. To serve crops at the orchard, trucks might bring in fertilizers as well as harvesting equipment. The transport of the oranges from the orchard to the processing plant is done by trucks. In Central Florida, nearly all of the oranges (about 95 percent) are processed into orange juice.[9] For this shipper, fruit is processed and stored at one of their two facilities. The growers collect the fruit and are responsible for transporting the fruit from their groves to the processing plants. Once the juice is processed, tankers take the juice out from the plant to be packaged. Packaging materials (boxes, cartons) is brought into the plants via truck and packaged products distributed (mostly by truck) to customers throughout the United States.

[9] The citrus shipper interviewed produces fresh orange juice and grapefruit juice not from concentrate. It prepares the juice and packages it at the Polk County site, and distributes it nationally from this location along U.S. 27 in Polk County.

Figure 4.4 Typical Supply Chain for Food Production and Distribution in Central Florida



One of the major suppliers of packaging materials for the juice industry has a manufacturing plant in Orlando and supplies plastic bottles and containers for liquid products and food (including orange juice and dairy products).[10] This company imports raw material and packaging, and sends out finished products to distribute them to customers. Apart from the plant in Orlando, they have three others in the State and do not deliver to any customers outside of Florida. They import materials, such as cardboard and resins (used in milk containers), to their plant using both truck and rail (their Orlando plant is located on CSX's line). These products are imported from all over North America with cardboard supplied from Alabama, and the various resins used in the manufacturing process delivered by either rail car or truck from Canada or domestic providers. Since the company provides packaging materials to several different types of users throughout the State of Florida (including the fruit juice industry, dairies, the health care sector, and beauty sectors), they generally do several deliveries per day by truck from their Orlando facility. The company owns trailers, which are loaded at the plant, with most of the drivers and tractors contracted in from trucking companies. The Orlando plant averages about 65 to 75 loads per week and receives approximately 3 to 4 rail cars.

Once the juice (or other related food products) is packaged, they are collected by a trucking carrier to distribute product to customers. One carrier located in Lake County focuses a large amount of their business (about 80 percent – consisting mostly of lemonade and fruit punch) on hauling both foods processed in the region and packaged food from outside the region. Juice products from Central Florida are sent to customers several hundred miles away to serve Midwestern, Southeastern, and Northeastern markets. For carriers that have equipment to transport perishable products (such as refrigerated trucks), this can be a great advantage to secure a backhaul. Packaged food suppliers (such as Sysco) often provide a "backhaul" into Central Florida from outside the region. Shippers generally do the packaging and the fully packaged product collected by the carrier. Final deliveries are made by truck to stores; grocery warehouses (i.e., Kroger, Wal-Mart); and other large customers.

Beyond shipping packaged products by truck, some food and juice producers in Central Florida also send exports out of the country through the Seaports in both containerized and bulk shipments. Exports are sent out by truck to the Ports of Jacksonville, Savannah, and Miami generally for containerized shipment overseas. One shipper reported bulk juice products sent overseas via Port Canaveral. Rail has a relatively minor role in the greater Orlando area's juice industry (the famous Tropicana Juice Train running from the Tampa area to the Northeast, notwithstanding[11]) due in large part to the shelf life of the product; however, a byproduct of the processing of the juice is cattle feed which can be

[10] Interview location: CKS Packing, Inc. plant on Michigan Street, Orlando.

[11] http://www.tropicana.com/#/trop_home/home_intro.swf.

loaded on rail. Florida's Natural does not use rail for the juice products; however, a byproduct of the operation is cattle feed which is put on rail.

Packaged Food Distribution

Packaged (i.e., not fresh) food products are brought into the region generally by the same companies serving or operating the regional DCs described in the previous section. One major distributor of packaged food products operates a major DC in the Orlando area that serves all of Florida, except the panhandle, up to Savannah, Georgia. This particular facility receives up to 70 trucks per day, including 20 to 25 freezer trucks, 20 to 25 dry, and 15 to 20 cool, with another 60 to 70 trucks departing the facility, with each truck making between 1 and 22 stops. Larger national customers with larger loads constitute the single-stop deliveries (located throughout Florida); smaller customers constitute the "street deliveries" (generally only within the study area). This particular shipper operates a large DC further north in Florida (such as Alachua, north of Gainesville) to provide service to the Southeast outside of Florida. Major customers for packaged food products in the study area include the Amway Center, Disney World, as well as many other "institutional users", such as hotels, hospitals, universities, and government agencies. These customers require large-scale deliveries at specific times to serve their customers needs.

Although the many institutional users of food products in Central Florida utilize prepackaged food deliveries in bulk, traditional grocery stores also have a major presence in the region. The logistics for the distribution of foods to grocery stores have some key differences to the packaged food industry. One example of the differences includes the distance of haul – most grocery store DCs serve stores within a 100-mile radius due to time restrictions for drivers to make deliveries and to ensure freshness of the food. One example of a major grocery store chain operating throughout the Southeast has hundreds of stores, as well as a major DC within the study area. This particular company is an all-truck business – they do not use rail[12] and operate roughly 500 trucks. This company, similar to many others who deal with perishable products, utilizes a just-in-time (JIT) business model. Although they are an "all-truck business" for deliveries, certain products (such as bananas from South America and berries and seafood) arrive in Central Florida by water and air, respectively. These products would be collected at the port or airport, and transported to the DC by truck for onward shipment to stores and smaller DCs.

[12] Interviews with the company reported that rail was utilized previously for certain intermodal inbound shipments (such as pet food), but was not seen to be a reliable option to truck.

Routing and Transportation Issues

For both food producers and distributors in Central Florida, most truck traffic traveling into and out of the region utilizes the main north-south trunk lines of I-75 and I-4 and I-95. They use the ports, but generally only for inbound product from overseas (such as inbound bananas from South America). Truckers report that congestion as big of an issue in Central Florida as it is in many other regions; however, moving into the metropolitan core during peak periods does cause some problems. Some other routes that exhibit congestion for the food distribution industry include SR 436 near Altamonte Springs and the Daytona Beach area during major events. Similar to carriers of many other products, inbound and outbound drivers both intentionally avoid the toll roads or intentionally use them. The toll roads in the Orlando area can provide a means to get around the urbanized areas with less congestion, but at a higher cost. Owner-operators of vehicles tend to avoid the tolls; whereas, fleet drivers are often encouraged to use them to provide a better opportunity for additional deliveries. One carrier reported that their Orlando area trucks are the only ones that are allowed to utilize the toll roads.

Other major issues reported by carriers of food products include weight limits for carriers on highways (trucks sometimes "weigh out" before "cubing out"[13] for heavy loads of juice and milk); and local land use regulations (i.e., landscaping requirements on the side or median of roadways) that do not take into consideration the needs of trucks. Trucks can cause damage to their vehicle and the landscaping. Another major issue most often associated with local delivery includes noise ordinances restricting delivery times. As described above, rail does not play a huge role in the distribution of food products due to the lack of refrigerated railcars to meet demand.

4.3 CONVENTION AND TOURISM (INCLUDING HOTELS)

Intimately connected to the food and consumer products industries described previously, the hospitality industry in Central Florida is a major contributor to the regional economy. Much of the freight required to support the hospitality industry comes from outside Central Florida, but is brought into the region by trucks, trains, ships, and airplanes. At hotels, resorts, and convention centers, some of the products include food for restaurants, stocking of the curio shop,

[13] The cube refers to the space within a truck and the weight is the maximum allowable mass for trucks on the Federal roadway system without additional permitting for overweight vehicles of 80,000 pounds. Trucks carrying very heavy, dense, or bulky products might find themselves only able to fill a fraction of the inside of the truck before hitting the 80,000-pound weight limit.

soaps and toiletries, laundry materials, and linens that might be sent out for cleaning, as well as disposal of the waste generated by guest and other operations. The products utilized by these facilities, many of which are produced outside the region, might be transported to the container Ports of Savannah, Everglades, or Jacksonville; offloaded from a ship; and loaded onto a truck. Air cargo might be used to bring in time-sensitive or very valuable products, with rail playing a small role in bringing in intermodal consumer products from very long distances.

Hospitality services exhibit much the same supply chain as the warehousing and distribution since most of the product comes from those distribution centers described earlier in this report. Extremely expensive or time-sensitive materials traveling long distances would likely be sent by air.

Services and Customers

The hospitality industry falls into several different categories in Central Florida, catering to short-or long-term tourist visitors; or in the case of the Convention Center or Amway Center, to a specific client for a particular event. The needs of the facilities may vary by the products they are receiving and the timeliness of deliveries. For example, a facility like the Amway Center may have most of their deliveries focused around regular food and beverage service for nightly or bi-nightly events. Most of what comes into these facilities is either brought in by air (for time-sensitive or very expensive materials) or truck from the regions' many warehouses and DCs.

The hospitality facility operator may arrange the trucks for delivery of product, or they may work through a broker or third-party logistics provider. These carriers or logistics providers have contracts with the vendors and/or the facilities themselves to provide delivery services. An example of a typical supply chain for a large resort operator in Central Florida involves first a delivery of containers to the Port of Jacksonville. This shipper imports about 2,000 containers per year, with about one-half from international locations.[14] The containers are offloaded at the Port and trucked down to the Orlando area to their own warehouse to be transloaded for local delivery. From the warehouse they have a private fleet with their own drivers. Most of the local truck traffic is vendor deliver to the warehouse. For time-sensitive products, they are brought into the region by air to Orlando MCO airport or another regional airport and trucked to their final destination. For other time-sensitive products, they do utilize UPS and FedEx, which have their own supply chain operations focused on regional and transcontinental flights and consolidation activities in the FedEx and UPS hubs. Rail is not seen as a reliable alternative for their products.

[14] http://jacksonville.com/news/florida/2012-06-19/story/disney-use-jacksonville-ports-ship-orlando-parks.

For deliveries to an event-oriented facility, such as the Amway Center or Convention Center, product is delivered, generally at prearranged delivery times (i.e., Monday, Wednesday, Friday, 9:00 a.m. to 11:00 a.m.). Goods might come from Sysco or another of the region's packaged food DCs, and also from regional distributors of beer and soda (i.e., PepsiCo, Florida Distributors). These types of facilities might receive 10 trucks per day or even more for major shows. Many of these sites have warehousing and storage on site for product to last at least several days (or two to three events). A major issue for all operators in this sector is the collection and disposal of waste products. There are several large waste product operators in Central Florida that either dispose of the trash in the immediate area (most counties in Florida promote the use of their own landfills for waste disposal), or at a facility determined by the waste collector. Much of the raw waste product is recycled and some of the recycling (i.e., scrap metal) packaged and sold overseas.

Routing and Transportation Issues

Traffic issues for the hospitality industry often relate to the access for trucks during certain predefined delivery times. For facilities that have uniform operations throughout the year, they can manage a standard delivery schedule; however, for those facilities that operate different events (such as the Amway Center or Convention Center), delivery schedules can sometimes be a challenge – conflicting with peak commute times. Other concerns for these shippers is the cost of shipping, sometimes resulting from the rising cost of conventional fuels, and managing inventory to ensure an adequate supply of products during periods of peak use.

4.4 CONSTRUCTION

The construction industry in Central Florida, still, despite the recent economic downturn, a very important industry in the region, utilizes materials brought in from all over the State, as well as materials from outside Florida and the United States. Some of materials included in the production, trade, and processing of the construction industry include stone, aggregate (from mines), timber, and steel. Many of these materials are available locally (such as sand in Lake County), or via a nearby port.[15] The construction industry utilizes nearly all the transportation modes in its logistics operations. For example, stone and rock for a foundation might be quarried at mines in Southern Florida and either transported by truck or train to Orlando area. These types of materials might also come into the region to Port Canaveral or the Port of Tampa and trucked to

[15] Port Canaveral does a large business in bulk products, including aggregate, sand, cement, steel beams, lumber, and stone. The Port of Tampa also has a large bulk cargo operation.

their destination. These destinations could be worksites for home or business construction, roadway work, or construction of another type of facility (such as an airport runway). Figure 4.8 displays a typical supply chain in Central Florida, with some major sources of materials highlighted.

Services and Customers

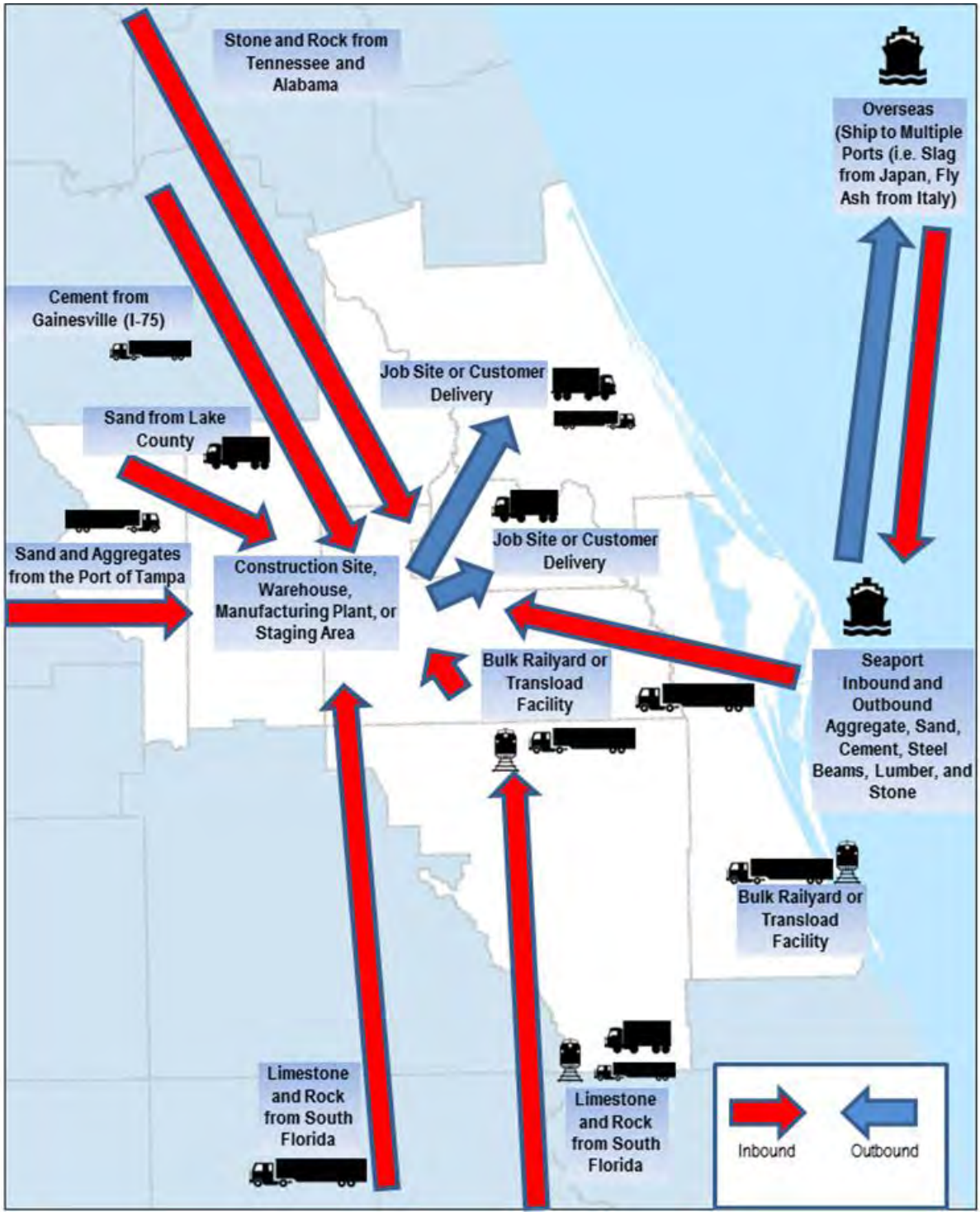
The construction industry utilizes the truck, rail, and port modes in its logistics operations. Rail is very important for the construction industry, especially in hauling heavy, dense, or bulky products, such as rock and stone from outside Central Florida. Trucking connects the rail and port modes to shippers and receivers. Shippers with very time-sensitive deliveries (such as concrete) have to locate close to job sites and assume a reliable transportation system.[16] The timeliness of deliveries, as well as the cost and weight of materials, also contributes to relatively short hauls of materials by truck (with longer hauls handled by rail). For complex construction jobs, companies might receive input materials from a variety of places around the world, including Gainesville (cement), Miami (limestone) Japan (slag), Italy (fly ash), and Lake County (sand).[17] Other more specialty rock and aggregate materials are brought into Central Florida from outside the State. For example, quarries in Alabama provide granite for superpave as well as light gravel, river rock comes from Tennessee, and lightweight aggregate concrete is brought into the region from North Carolina. Both truck and rail play a role in bringing in these products, with rail playing a major part. The FEC Railway and CSX both provide extensive service to the construction material firms in the region.

Due in part to the decline of new housing, many construction material firms are focusing more on mega-projects (such as road, airport, or power plant construction). An example of the volumes associated with such a project is a power plant project in Tampa with materials from Center Hill (in Sumter County), an 87-mile haul, one way, which requires about 150 trucks per day to that site. Most often, construction companies use their plants as terminals for trucks and head to job sites from the plants – strategically located throughout the region. Although freight shipments are generally more expensive coming into the Orlando market due to the fact that there is little change for a backhaul, most of the trucks do not dead head back to the terminal. Many have to work hard to find loads, and many companies are expanding into brokerage to help manage both their inbound and outbound loads.

[16] Florida Rock reported that they generally only have a 45-minute window for cement delivery (30 minutes for DOT jobs), which requires extreme precision in delivery logistics.

[17] Based on interview with Florida Rock and New Line Transport (Cemex).

Figure 4.5 Typical Supply Chain for Construction in Central Florida



Routing and Transportation Issues

For this industry, since some of the work is completed (or deliveries made) in the early morning or overnight, the primary trucking routes vary by time of day. For one key shipper of construction materials (rock, aggregate, etc.), a typical day might involve traveling to a sand mine in Davenport, Florida (in Polk County about 40 miles south of Orlando) to pick up a load of sand to transport to a construction site in the Titusville/Melbourne area (Brevard County). To travel between the two areas provides some highway options, but this shipper would likely take 17/92 to 192 in the morning to Melbourne.

Challenges reported by the industry include the number of truck routes in the region for which there is little alternative and heavy congestion. This, coupled with the high cost of tolls (although a large percentage of the growth in traffic is on the toll roads), makes traveling within the Orlando metropolitan area difficult. Major truck routes for construction vehicles throughout the region include SR 528 and SR 417. In the eastern part of the study area, I-95 is a major route traveling north/south. Other routes identified by shippers and carriers where transportation issues, including congestion, safety, and other concerns should be mitigated, including U.S. 27/SR 192 due to its congestion and SR 33 for safety concerns. Congested truck routes include U.S. 17/92, SR 441, John Young Parkway, and I-4.

4.5 HIGH-TECH MANUFACTURING AND SPACEPORT OPERATIONS

One somewhat unique industry in Central Florida is the space technology industry, centered around the Kennedy Space Center and Air Force Base launch facilities on Cape Canaveral. In addition to the facilities themselves, a large cluster of high-tech manufacturing and production has grown in Brevard County, with aerospace, security, and electronics the focus of their operations. Since many of the materials used by these manufacturers are generally very low weight and high value, air cargo is a key mode for the shipping and distribution of the materials. Materials may be shipped by air to the region using one of several means, including belly freight to one of the international airports in the region, FedEx or UPS flight, or truck forwarded from one of the other major airports in the Southeast such as Miami or Atlanta. As described in the Regional Freight Facilities Profile, this forwarding system is responsible for much of the air freight that enters the Orlando market. Figure 4.9 displays a typical supply chain for high-tech manufacturers in the Spaceport area.

Figure 4.6 Typical Supply Chain for High-Tech Manufacturing and Spaceport Operations in Florida

Services and Customers

Major customers for freight in this sector include defense and high-technology industries in Brevard and Volusia Counties and the City of Orlando. These industries require inputs of electronic components, computer parts, and other time-sensitive or very expensive products. FedEx and UPS play a large role as a carrier for these industries, both in their air freight deliveries, but also the connections to their own delivery truck fleets and those of freight forwarders in Central Florida.

The Spaceport, one of the unique facilities in Central Florida, has been experiencing a renaissance of sorts, with the growth of privately funded space technology. Many of these companies (such as SpaceX and the United Launch Alliance) operate launch and research facilities in the Cape Canaveral area, which have contributed to their increasing freight needs in the region. These companies operate very complex supply chains to prepare for a major launch and some components (and where they arrive in the region from) include Booster vehicles from Alabama (on barge via intracoastal waterway 8 to 10 per year) or from California by truck, electrical and mechanical components from Colorado (truck), solid rocket boosters from Utah and California, and satellites generally sent by air to the site on C-17s. Launch components and materials are also brought in to the Space Florida area by freight forwarders or small package deliveries (by FedEx and UPS). One freight forwarder operating near MCO reported that over 95 percent of their customers are located in the Central Florida region with their primary customers being defense contractors and the U.S. Department of Defense – they are a preferred forwarder for sensitive defense-related traffic. A lot of this traffic originates in Brevard County.

Deliveries for these types of activities must be arranged several weeks or months in advance, but components can also be needed immediately. The flexibility of the air cargo industry, coupled with the use of trucks best serves this industry. Although there was use of rail during the space shuttle days, most current rockets and other support vehicles do not require the use of rail. Using trucks for oversize/weight vehicles has been the preferred option.

Routing and Transportation Issues

For the Spaceport area specifically, surges in freight activity and deliveries can occur near the prelaunch period, with trucks bringing substantial volumes of liquid oxygen, nitrogen, and helium trucked in from multiple out-of-state locations. Rail is available, but not currently used (after the shuttle program ended). There may be rail required for future NASA launches with larger launch vehicles. Business growth will depend on future defense spending. There are worries that projected military budget cuts will slow business, but currently the industry is bullish on future growth and opportunity. Transportation issues highlighted by users include direct access to the Cape Canaveral area using the drawbridges (SR 401 and SR 405 – that have oversize/weight restrictions).

Maintaining these facilities will be critical to continuing the use of the Cape facilities for space activities.

4.6 SUMMARY OF FINDINGS

The carriers interviewed generally hauled a large proportion of their freight outside the Orlando region, and many focused on serving one or two large shippers for inbound cargo to the region. Trucks serving the Orlando market generally charge higher rates because of the difficulty of obtaining a backhaul out of the region. Truck carriers locate terminals in Central Florida based largely on its central location (not only to Florida, but also to the SE region), while others are located in Central Florida due to a combination of legacy/history and proximity to key customers.

Shippers interviewed utilize a variety of Seaport facilities in the region, including JaxPort, Tampa, Miami, and Savannah (in Georgia). For example, Disney utilizes both the Ports of Savannah and Jacksonville to import consumer products (although they are moving toward more into Jacksonville), while Florida's Natural largely uses JaxPort and Savannah for exports. Although it is located within the study area, shippers seem to utilize Port Canaveral less for both inbound and outbound cargo due to its capacity, total number of ship calls, and ability to handle certain types of cargo. Port Canaveral handles very little containerized cargo (the main method for shipper consumer products, food, and other goods); and does not receive the largest ships from Asia and other overseas markets.

Larger shippers interviewed utilize both truck and rail with rail used mostly for inbound cargo. The catchment area for the operators of several large DCs is generally about 50 to 150 miles – which provides for serving customers in the central part of the State and sometimes Southern Florida. The Florida panhandle and other customers in the Southeast region of the United States are often served by DCs further north in Florida (such as the City of Alachua – near Gainesville, where there is another large concentration of DCs in the State). For the waste generated from manufacturing and consumer activities, disposal facilities are located throughout the State; however, waste providers will sometimes truck the collected refuse very long distances to utilize their own disposal facilities and landfills. Permitting new facilities closer to population centers is a challenge. In Florida, most jurisdictions prefer to have their waste disposed of in their own landfills. Waste Management operates a landfill in southern Florida (Lake Okeechobee area), where a lot of waste is trucked. Recycled materials, often exported to Europe or Asia, continue to grow in importance, which may reduce future pressures on landfills.

Although there are several active rail lines in the region, rail use by shippers generally is only focused on low cost, bulk products with little time sensitivity. For example, Florida's Natural uses rail for byproducts of juice production for

use in cattle feed, and Florida Rock for stone and aggregate from local and regional production plants.

Deliveries

For many shippers, deliveries occur in the early morning hours, especially daily food and drink deliveries. Many receivers interviewed, such as Amway, Disney, and Orlando Health, maintain warehouse space for on- or near-site inventory. Disney and Orlando utilize their own fleet for warehouse-to-site delivery. Most of the major shippers interviewed utilize contract truck carriers, sometimes several different carriers, and not their own fleets. Many large shippers operating regional distribution facilities also utilize different sized vehicles – smaller vehicles for local store delivery and large vehicles for longer-haul deliveries (i.e., to stores in the Southeast outside Florida). For a consumer products distributer like Sysco, noncompany drivers tend to choose highway routes that avoid tolls, which may lead to longer/slower routes. This is consistent with carrier reported information from the first round of interviews. Traffic for special events causes congestion and routing challenges.

Important Truck Routes

Most interviewees indicated that the highway system in the Orlando region generally functions well (i.e., has enough capacity, rush hour excepted); however, certain highways, such as I-4 through Orlando and some smaller roadways in the region, cause delays for shipments due to congestion and construction. Long-haul carriers are concerned with improving north-south truck lines, more so than local access roadways. Most carriers interviewed utilize their own fleets and drivers in addition to using owner-operators of trucks (who own their own vehicles – independent contractors). Truck driver capacity is becoming more of an issue in the Orlando area, with some carriers fearing that the lack of driver availability may cause shipping prices to rise in the future. Using toll roads for either local or regional deliveries can cost drivers over $5,000 and up to $10,000 per year, which can seriously impact earnings, especially for owner-operators. Many carriers, as well as shippers with their own fleets, encouraged or required the use of the toll roads for more direct routing and to save fuel and improve safety. Owner-operators sometimes avoid using the toll roads to save money, and sometimes reported using them to save time and fuel.

Regulatory issues, including allowing oversize/weight trucks, truck hours of service, and local land use regulations for industrial development, were highlighted by several interviewees. For example for the oversize/weight truck issue, railroads were generally not supportive of heavier trucks for safety reasons, while many shippers, especially of heavy products, such as Florida Rock or Florida's Natural, were in favor of allowing heavier trucks to reduce overall truck traffic.

5.0 Freight and Land Use in Central Florida

The 2002 Freight, Goods and Services Mobility Strategy Plan recommended the use of Freight Villages as an innovative approach to improving mobility and efficiency. The following description was provided in the 2002 Plan:

- **Freight Villages.** Clustering "[Warehousing and logistics]" activities in specific areas, and providing sufficient infrastructure and by developing facilities based on specific code, provides the basis for the development of "freight villages."

The current study advances the accomplishments in the 2002 study by updating the freight villages concept in three important ways:

1. Updating the analysis on the original freight villages to assess the degree to which the areas still qualify as freight intensive;
2. Expanding the analysis to include Brevard, Lake, Sumter, and Volusia Counties; and
3. Expanding the concept to include differing magnitudes of freight-focused land uses to include developments ranging from industrial parks to intermodal facilities to fully integrated logistics centers.

5.1 LAND USE OVERVIEW

Table 5.1 summarizes existing commercial and industrial uses in the study region. There are several industrial land use clusters in the seven-county study area. Orange County has approximately 45 percent of the Industrial land acreage in the study area, followed by Brevard County with 17 percent. Lake, Volusia and Seminole Counties share approximately 30 percent of the market with the remaining 7 percent of the market in Osceola and Sumter Counties. Orange County and Seminole facilities are generally more constrained by existing land use so growth potential may be higher in counties with less constrained sites, such as Lake County, Sumter County, and Osceola County.

Table 5.1 Existing Acres of Commercial and Industrial Uses

Acres	Industrial	Retail/Office	Mining
Orange	12,569	26,291	
Brevard	4,736	11,276	
Lake	3,527	9,522	770
Volusia	3,058	11,760	
Seminole	2,630	6,739	8
Osceola	1,073	5,679	
Sumter	854	2,328	992
Total	28,447	73,595	1,770

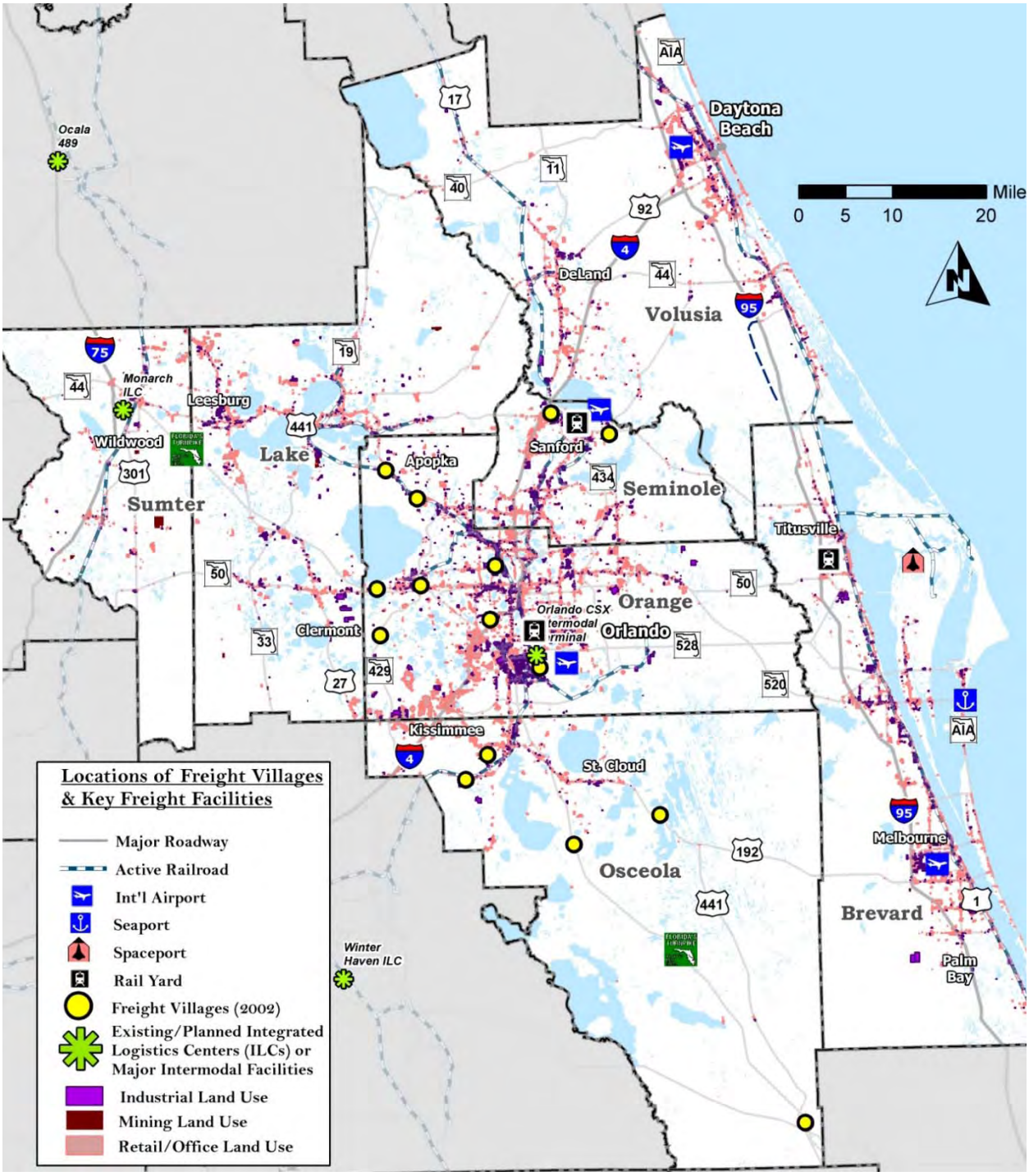
Source: FGDL 2010 Parcel data for FDOT District 5.

The largest acreage agglomeration in the study area is the Landstreet area west of Orlando International Airport. Following that, the next largest clusters of existing industrial acreage are Silver Star Road and the Lockhart area (U.S. 441 and SR 414) in Orange County, adjacent to Melbourne International Airport in Brevard County, and the American Industrial Center in Seminole County at SR 434. Figure 5.1 displays the freight-oriented land use in the study region, and Table 5.2 displays population and employment by county.

Additional areas with a high count of industrial jobs are the spaceport at Cape Canaveral, the Port of Sanford, the environs of the University of Florida, and the Research Park, as well as the City of Ocoee. Figure 6.2 displays the relationship between freight-oriented land use and employment density within the study area.

As part of the Freight Mobility technical report in the 2030 LRTP, proposed Freight Villages were identified within the three MetroPlan Orlando counties (shown in Figure 5.1). Many of these correspond to existing freight land use clusters within the three counties, and several were new proposed locations based on transportation network opportunities. Table 5.3 presents the proposed freight villages from the 2002 study. A summary of the current and future status of these freight villages is provided in the following section.

Figure 5.1 Existing Freight-Oriented Land Use (Industrial, Commercial, Mining) within the Study Area



Source: Canin Associates.

Table 5.2 Existing Jobs and Population
2005 Long-Range Transportation Plan (LRTP) Data

Jobs	Industrial Jobs	Commercial Jobs	Service Jobs	Hotel/Motel Population	Population
Sumter	3,504	3,256	8,523	1,224	66,447
Osceola	9,604	22,118	45,697	76,381	243,501
Lake	19,808	24,283	57,493	7,220	263,642
Volusia	30,772	47,268	118,746	45,411	494,631
Seminole	34,917	56,760	122,811	4,896	422,630
Brevard	60,761	54,209	162,616	20,016	526,920
Orange	94,210	168,417	544,730	202,250	1,052,479
Total	253,576	376,311	1,060,616	357,398	3,070,250
Polk	4,694	5,536	11,936	1,746	80,158
Marion	27,552	28,444	63,143	12,894	305,661

Source: 2005 Zdata from FDOT 5 district-wide model. Nonstudy-area counties are in *italics*.

Table 5.3 Proposed Freight Village Locations
From 2002 Study

Name	County	General Location
Boggy Creek Road	Orange	Southwest of OIA (Boggy Creek Road at Ringhaver Drive)
Horizon West Towncenter	Orange	SR 429 at New Independence Parkway Interchange
Landstreet Vineland	Orange	U.S. 441 (S. OBT) at Turnpike
Oakland	Orange	West Colonial Drive (SR 50) at Turnpike
Ocoee	Orange	West Colonial Drive (SR 50) at SR 429
Hermit Smith-Hogshead Road	Orange	Hermit Smith at Hogshead Road (South of U.S. 441)
Taft	Orange	Orange Avenue (SR 527) at Landstreet Road
Zellwood	Orange	U.S. 441 (N. OBT) at Laughlin Road
SR 417 Southern Extension	Osceola	Turnpike south of Deer Run Road (Green Island DRI)
Kissimmee Gateway Airport	Osceola	West of the Kissimmee Gateway Airport
Poinciana Boulevard	Osceola	Poinciana Boulevard at U.S. 17-92
Harmony Research Park	Osceola	U.S. 192 (east of the Hickory Tree Road)
Yeehaw Junction	Osceola	SR 60 at Turnpike
Orlando Sanford International Airport	Seminole	Southeast of Sanford International Airport (East Lake Mary Boulevard)
Port of Sanford	Seminole	East of Interstate 4 between SR 46 and U.S. 17-92

5.2 FUTURE LAND USE

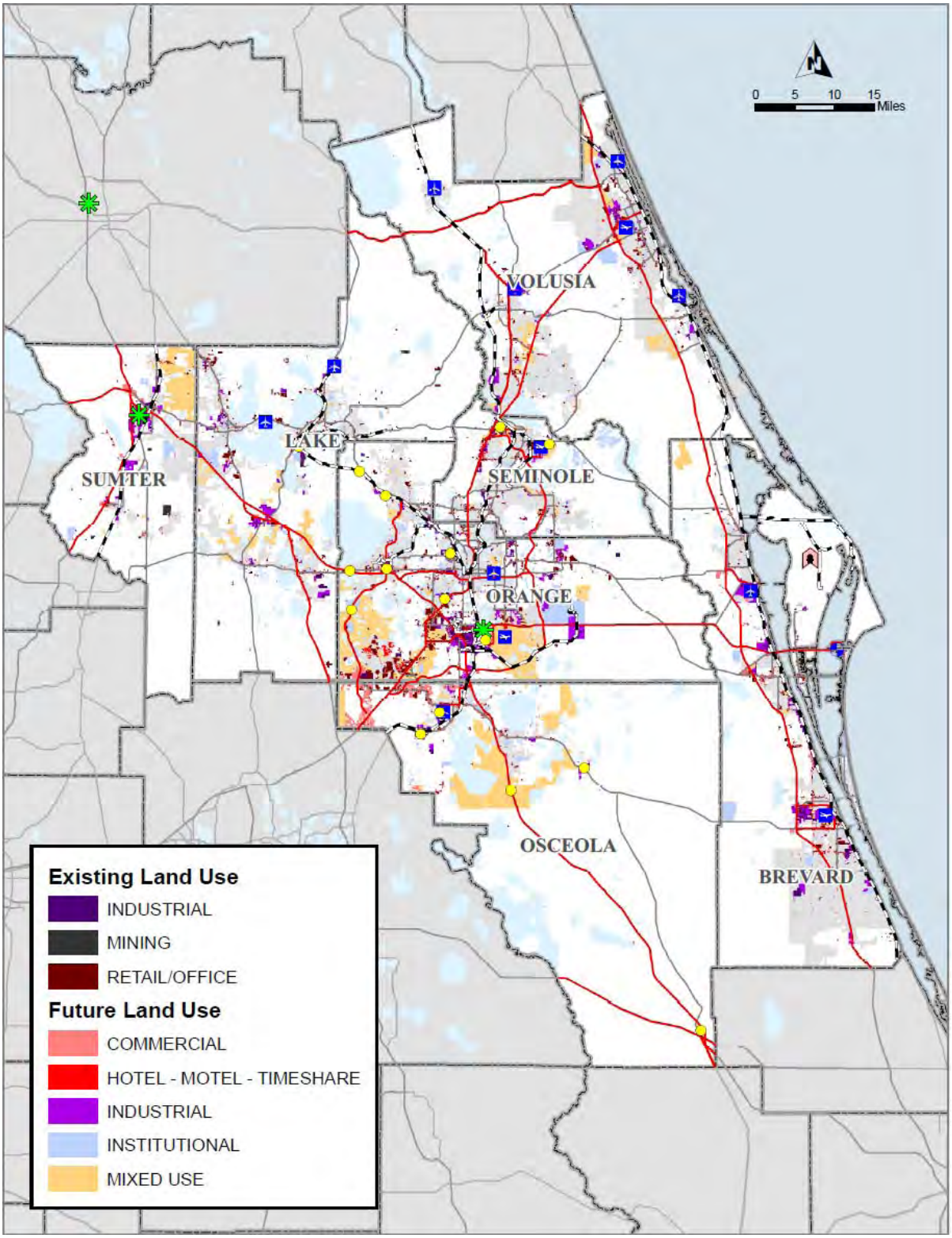
In the future land use plans for the study area (shown in Figure 5.2), existing industrial areas are maintained. Few existing industrial areas within Seminole and Orange Counties see major expansion in acreage, though they are maintained and may see some intensification. The Taft/Landstreet area's future land use anticipates conversion of some enclave land uses to industrial. International Corporate Park in East Orange County appears in the future land use as future industrial acreage; however, the owners have applied to convert the land use to mixed use. Osceola County has several undeveloped or industrial areas slated for additional industrial development that are detailed in the freight village discussion below.

Several industrial areas along the I-4 corridor in Seminole County have additional acreage for industrial uses. In Sumter County, the area near the Monarch development, which has been designated as an Intermodal Logistics Center, has over 4,000 acres slated for industrial development, and there are additional commercial and industrial development opportunities along I-75. Lake County's largest area designated for future industrial development is Ford Commerce Park and its environs at the intersection of the Florida Turnpike, U.S. 27 and SR 19. Volusia County has industrial clusters with additional capacity on the U.S. 17-92 corridor and U.S. 92 near Daytona Beach. There is capacity for expansion of industrial clusters within the future land use in Brevard County along the I-95 corridor.

The most notable change in the future land use is the inclusion of large mixed-use districts. Plans for these districts are primarily focused on residential, retail and office, though some permit light industrial. The primary freight need within these districts will be to service retail outlets, offices, and service facilities, such as medical centers and educational facilities. The increase focus on mixed-use developments is in response to the population and employment projections for the region. As shown in Tables 5.4 through 5.6, the growth in commercial and service jobs is projected to outpace that of industrial jobs. Care must be taken within these districts to provide compatible routes for freight traffic to service the commercial elements of mixed-use destinations, as well as permitted light industrial uses.

All of the study area counties are projected to have some growth in industrial development by 2035, ranging from 19 percent to 75 percent with Orange, Lake, and Osceola Counties projecting the greatest numerical growth. Orange County is projected to retain more than one-half of the growth in commercial and service jobs.

Figure 5.2 Future Land Use in the Seven-County Study Region



Source: Canin Associates.

Table 5.4 Projected Future Jobs and Population (2035 LRTP Data)

	Industrial Jobs	Commercial Jobs	Service Jobs	Hotel/Motel Population	Population
Sumter	14,107	12,394	32,658	4,920	210,002
Osceola	26,845	65,337	118,710	134,225	558,502
Lake	38,776	48,528	108,500	10,674	504,580
Volusia	43,338	66,288	156,443	52,747	692,763
Seminole	47,312	69,227	231,262	7,776	498,115
Brevard	74,852	85,865	217,688	29,811	815,753
Orange	131,045	322,337	1,053,412	340,757	1,886,505
Total	376,275	669,976	1,918,673	580,910	5,166,220
Polk	11,026	19,929	61,012	4,153	123,790
Marion	32,045	35,051	85,161	12,493	368,426

Notes: Nonstudy-area counties are in italics. Data Sources – 2035 Zdata from FDOT 5 district-wide model for counties, except Seminole and Osceola Counties, for which county-provided projections were used. 2035 data is provided because 2040 data has not been produced yet by all applicable MPOs at the time of this writing.

Table 5.5 Projected Change Jobs and Population (2005-2035 LRTP Data)

	Industrial Jobs	Commercial Jobs	Service Jobs	Hotel/Motel Population	Population
Sumter	+10,603	+9,138	+24,135	+3,696	+143,555
Osceola	+17,241	+43,219	+73,013	+57,844	+315,001
Lake	+18,968	+24,245	+51,007	+3,454	+240,938
Volusia	+12,566	+19,020	+37,697	+7,336	+198,132
Seminole	+12,395	+12,467	+108,451	+2,880	+75,485
Brevard	+14,091	+31,656	+55,072	+9,795	+288,833
Orange	+36,835	+153,920	+508,682	+138,507	+834,026
Total	+122,699	+293,665	+858,057	+223,512	+2,095,970
Polk	+6,332	+14,393	+49,076	+2,407	+43,632
Marion	+4,493	+6,607	+22,018	-401	+62,765

Notes: Nonstudy-area counties are in italics. Data Sources – 2035 Zdata from FDOT 5 district-wide model for counties, except Seminole and Osceola Counties, for which county-provided projections were used. 2035 data is provided because 2040 data has not been produced yet by all applicable MPOs at the time of this writing.

Table 5.6 Projected Change Jobs and Population (2005-2035 LRTP Data)

	Industrial Jobs	Commercial Jobs	Service Jobs	Hotel/Motel Population	Population
Sumter	75%	74%	74%	75%	68%
Osceola	64%	66%	62%	43%	56%
Lake	49%	50%	47%	32%	48%
Volusia	29%	29%	24%	14%	29%
Seminole	26%	18%	47%	37%	15%
Brevard	19%	37%	25%	33%	35%
Orange	28%	48%	48%	41%	44%
Total	33%	44%	45%	38%	41%
Polk	57%	72%	80%	58%	35%
Marion	14%	19%	26%	-3%	17%

Notes: Nonstudy-area counties are in italics. Data Sources – 2035 Zdata from FDOT 5 district-wide model for counties, except Seminole and Osceola Counties, for which county-provided projections were used. 2035 data is provided because 2040 data has not been produced yet by all applicable MPOs at the time of this writing.

5.3 FREIGHT VILLAGES UPDATE

The previous Freight Study did recommend freight villages within several of the mixed-use areas identified above. Thus, several of the Freight Villages identified in the 2002 plan that do not have significant existing industrial or commercial use have designated future land uses that indicate a future freight need. Table 5.7 provides a summary update on the freight villages identified in the 2002 study, as well as additional freight-intensive areas identified as part of the current effort. Following is a brief description of the primary freight-intensive regions throughout the study region presented by county.

Orange County

The County already has a series of land use policies directed toward industrial uses, but has not instituted any site-specific policies or codes directed at specific geographic locations or development of freight villages.

Table 5.7 Summary Update for Previously Identified Freight Villages and Planned Freight-intensive Areas

Freight Village Name	Jurisdiction	Freight Modes	Status	Established Boundary	SIS System	Land Use	Notes
Airport Industrial Park Orlando (AIPO) / Taft / Tradeport	City of Orlando/GOAA/Orange County	air, rail, highway	established	none	connectors & OIA & 528	mixed	This one was previously two separately designated Freight Villages and were formally known as Boggy Creek Road and Landstreet Vineland. This one has potential for an ILC designation
L.B. McLeod Road	City of Orlando/Orange County	highway	established	none	I-4	mixed com/industrial	City wants to encourage the growth of industrial in this area
Silver Star Road	City of Orlando/Orange County	rail, highway	established	none	none	mixed	Fragmented jurisdiction and value as commercial / industrial area is growing
OIA East	City of Orlando/GOAA	highway	planned	none	528	industrial	new focus for industrial development for the City
Oakland	City of Oakland						no update
Ocoee	City of Ocoee						no update
Horizon West TownCenter	Orange County	highway	retain potential	none	429	mixed	freight movement will likely increase
Hogshead Road	City of Apopka	highway/rail	established	none	none	industrial	Landlocked with infrastructure limitations
Zellwood	Orange County	highway/rail	established	none	none	industrial	Landlocked with infrastructure limitations
Kissimmee Gateway Airport	City of Kissimmee	air, rail, highway	established	Airport Boundary and Airport expansion area	airport, 17/92 connector	industrial	in depth sutdy underway
SR 417 Southern Extension	Osceola County	highway	not moving forward	none	Florida's Turnpike	mixed use	not a viable freight village
Poinciana Boulevard	Osceola County	highway, rail	established	none	none	mixed use	significant industrial presence - County wants to keep it industrial and potentially expand - needs a study

Harmony Research Park	Osceola County	highway	not moving forward	none	none	mixed use	not a viable freight village
Yeehaw Transportation Distribution Center	Osceola County	highway	planned	yes	Florida's Turnpike, 60, emerging roadway	mixed use (mostly warehouse / distribution)	Specific future land use jurisdiction
Orlando-Sanford International Airport	City of Sanford	air, highway, rail	established	none	airport, connector	mixed use	needs a study (City of Sanford, Airport, Seminole County)
Port of Sanford	City of Sanford	highway, rail	established	none	417, connector	mixed use	land use is transitioning away from industrial
Florida Crossroads	Sumter County	highway, rail	planned	yes	I75, Florida's Turnpike, 44	industrial / commercial	Primary Economic Development Center, Detailed study underway
CR 470 Corridor	Sumter County	highway	planned	none	none	industrial / commercial	Primary Economic Development Center
Christopher C. Ford Commerce Park	Lake County	highway	established	none	Florida's Turnpike	industrial	large industrial targeted growth
Tavares Freight Village	Tavares	highway, rail	established	yes	none	industrial	new study planned for this year
DeLand Airport	DeLand	air, highway	established	yes	none	industrial	no update
New Smyrna Beach Airport	New Smyrna Beach	air, highway	emerging	yes	none	industrial	no update
Parktowne Industrial Center	City of Edgewater	rail	emerging	yes	none	industrial	no update
Ormond Crossings	Ormond Beach	highway	planned	yes	I-95	industrial	new developer proposed project - recent approvals
Port Canaveral	Brevard County	highway, rail	established	yes	connector, port	mixed use	multiple studies and master plans in palce or underway
Industrial Park	Titusville						no update
Industrial Park	Melbourne						no update

Source: Canin Associates.

Horizon West

An entirely new Special Area Plan was recently developed for this area. Although some freight-intensive uses are allowed by code, this area will likely be more a freight service area for commercial facilities, and the freight village designation should remain to protect those opportunities. There is a potential east/west connector to Highway 27 in the future that would likely be a toll road and draw additional freight traffic through the area. Figure 5.3 displays the current and future land use for this area.

Silver Star

This area is fragmented between city and county jurisdiction, making any type of cohesive "Freight Village" policies or codes difficult to achieve. There is no Joint Planning Agreement (JPA) in place between the City of Orlando and the County that could facilitate the development of these types of policies or codes. Silver Star will remain as an industrial hub and will likely grow with more industrial and distribution uses (see Figure 5.4). There is potential to consolidate with industrial uses north of 50 and with county properties. This area needs more study.

Taft

This area was chosen as one of the case studies. See Section 5.4 for more detail.

Hogshead

This area is landlocked and expects to see modest growth intensification in industrial land uses (see Figure 5.5). In addition to being landlocked, there are also infrastructure constraints limiting the ability for increased density and expansion. This area has been annexed by the City of Apopka.

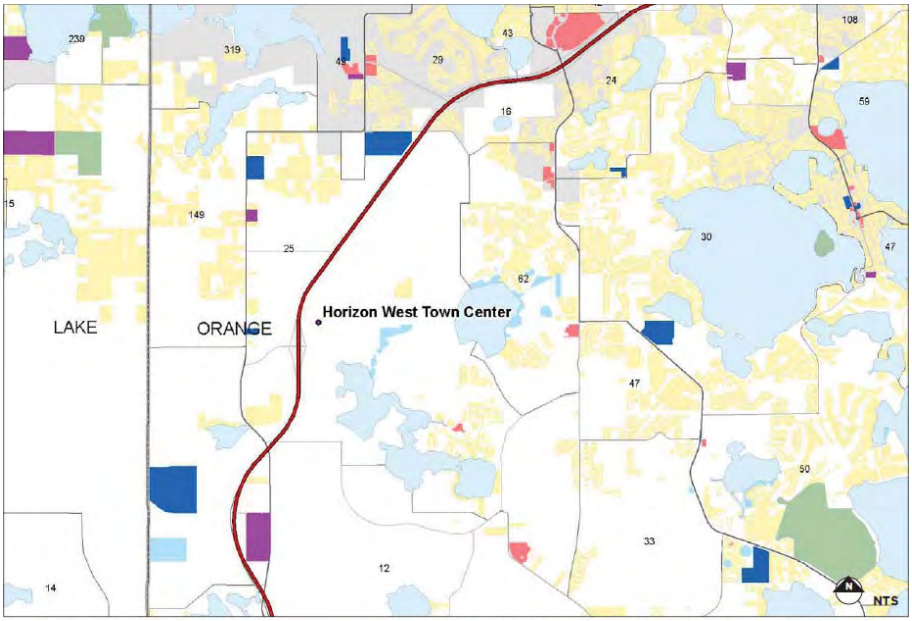
Zellwood

This area is landlocked and does not expect to see any more growth intensification. Additionally, this area is mostly served by water wells and septic tanks, which also places limits on increasing intensity.

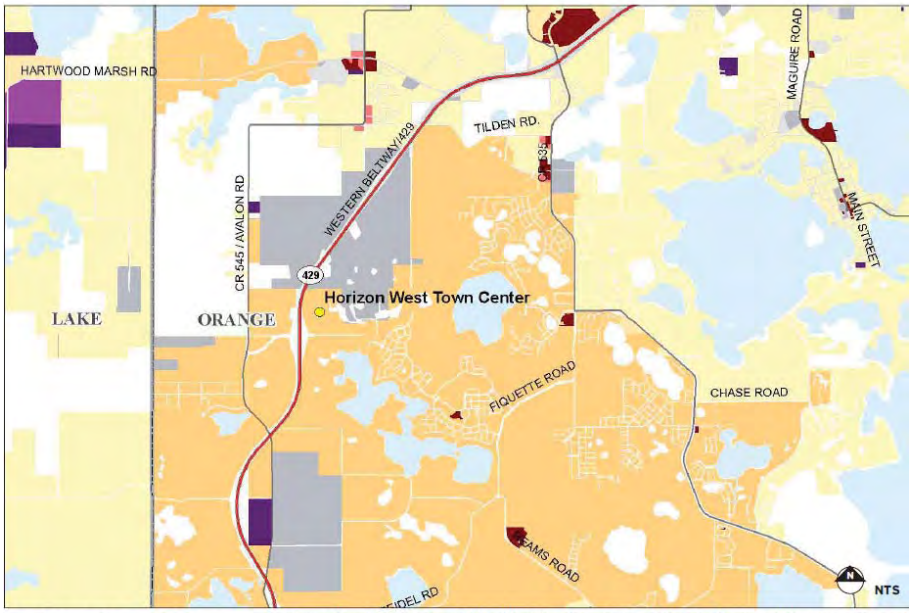
L.B. McLeod Road

The industrial character and land uses in this area will be preserved. It is a viable potential freight village, although it is mostly small-scale specialty manufacturing. Values are rising in the area and it is becoming a "design" destination for small-scale manufacturing.

Figure 5.3 Existing and Future Land Use for the Horizon West Area



Existing Land Use Generalized Land Use Derived from 2010 Parcels - FDOT District 5



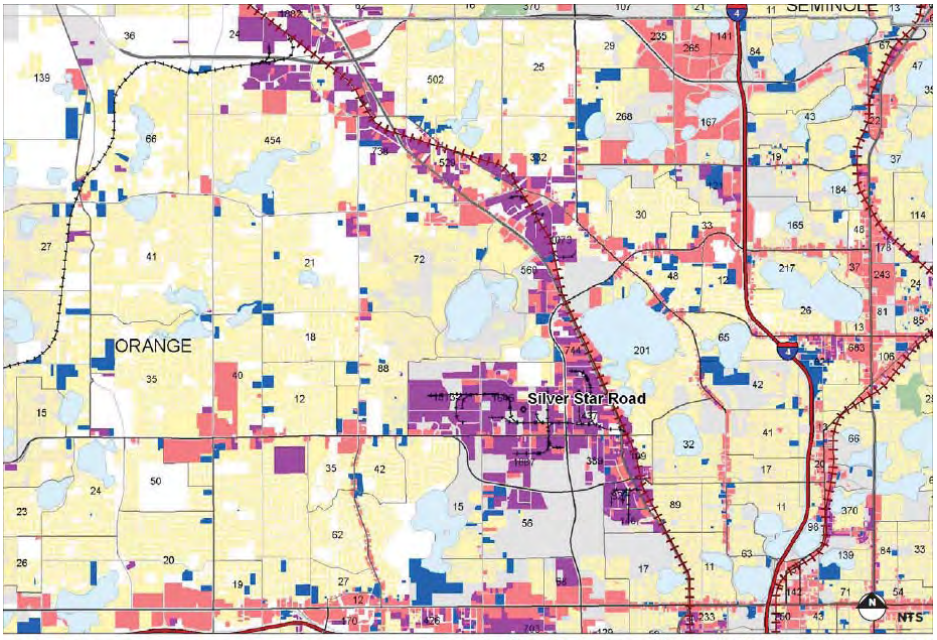
Future Land Use Generalized Future Land Use (2011) – East Central Florida Regional Planning Council

Future Land Use
- COMMERCIAL
- RESIDENTIAL
- HOTEL - MOTEL - TIMESHARE
- INDUSTRIAL
- INSTITUTIONAL
- MIXED USE
- PLANNED DEVELOPMENT

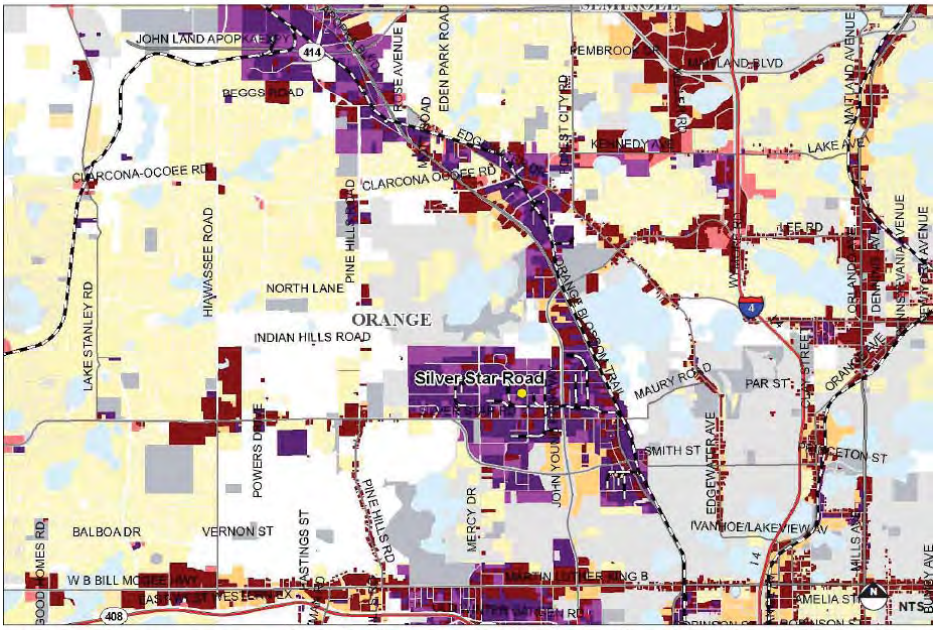
Existing Land Use
- INDUSTRIAL
- RETAIL/OFFICE

Source: Canin Associates

Figure 5.4 Existing and future Land Use for the Silver Star Freight Village



Existing Land Use Generalized Land Use Derived from 2010 Parcels - FDOT District 5



Future Land Use Generalized Future Land Use (2011) – East Central Florida Regional Planning Council

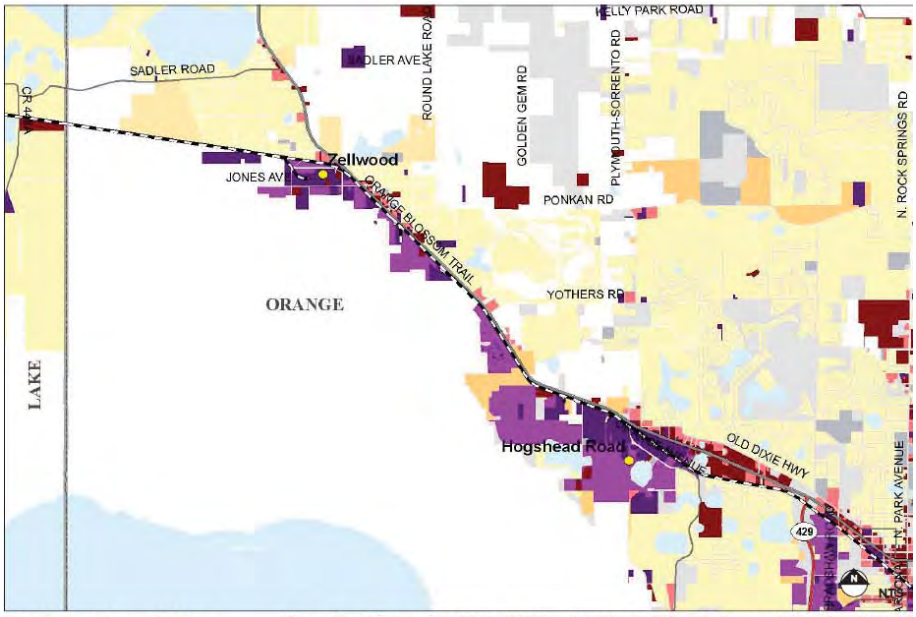
Future Land Use
- COMMERCIAL
- RESIDENTIAL
- HOTEL - MOTEL - TIMESHARE
- INDUSTRIAL
- INSTITUTIONAL
- MIXED USE
- PLANNED DEVELOPMENT

Existing Land Use
- INDUSTRIAL
- RETAIL/OFFICE

Source: Canin Associates.

Figure 5.5 Existing and Future Land Use for the Hogshead Freight Village

Existing Land Use — Generalized Land Use Derived from 2010 Parcels - FDOT District 5



Future Land Use — Generalized Future Land Use (2011) – East Central Florida Regional Planning Council

Source: Canin Associates.

Airport Industrial Park Orlando

This area has a direct relationship with Taft and will remain a focus for industrial development and pursuit of new manufacturing and distribution activities. This area was included as part of the Taft Case Study. See Section 5.4

OIA East

This area has a new emphasis on industrial development and is an addition to the potential freight village list as previously listed. This area should be studied as a greenfield freight village potential site.

Seminole County

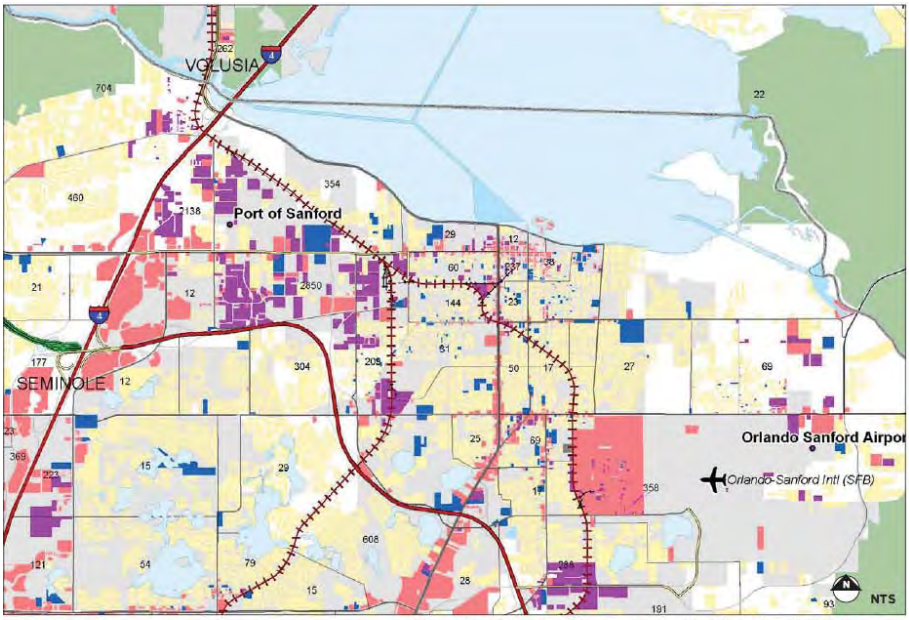
Port of Sanford

Much of the industrial land uses in this area are transitioning to other uses. The effect of SunRail will likely speed the transition away from industrial. There are still significant freight-intensive industrial uses and some would like to see more industrial and rail access in the area. There currently are no specific policies or codes based on freight-intensive uses for the area. Nor is there a specific boundary identified. There are enclaves of various jurisdictions in the area that would make it difficult to institute an areawide Freight Village designation. A formal Freight Village designation would likely be disturbing for the existing residential communities. Figure 5.6 presents existing and future land uses for this area.

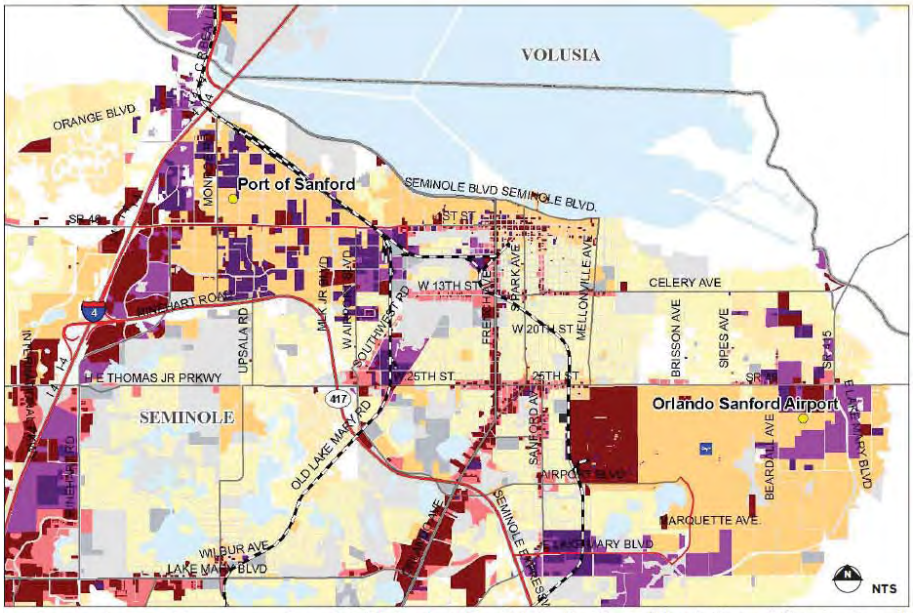
Orlando-Sanford International Airport

Some land south of Lake Mary Boulevard is transitioning away from industrial, and there are no specific policies in place. Depending on the Airport's long-term plans, especially if they are planning on increasing freight traffic, there could be a viable Freight Village in and adjacent to the Airport. The Aloma Line runs freight from the Port of Sanford on Tuesdays and Thursdays twice a day – some of the users would like more access, but some are already thinking of passenger rail to the airport from the SunRail station. Any Freight Village policies or codes would require a collaborative effort between Sanford, Seminole County, and the airport.

Figure 5.6 Existing and Future Land Use for Port of Sanford



Existing Land Use Generalized Land Use Derived from 2010 Parcels - FDOT District 5



Future Land Use Generalized Future Land Use (2011) – East Central Florida Regional Planning Council

Future Land Use
- COMMERCIAL
- RESIDENTIAL
- HOTEL - MOTEL - TIMESHARE
- INDUSTRIAL
- INSTITUTIONAL
- MIXED USE
- PLANNED DEVELOPMENT

Existing Land Use
- INDUSTRIAL
- RETAIL/OFFICE

Source: Canin Associates.

Osceola County

Kissimmee Gateway Airport

As can be seen in Figure 5.7, this area is basically already a freight village without the specific moniker. There is a specific policy associated with Airport Expansion Land Use Designation that include airport supportive uses and a Floor to Area Ratio (FAR) of up to 0.5. Additional studies are about to get underway. Southwest of the airport is a little problematic for expansion for more industrial uses and expansion of specific freight policies due to the existing residential development and the fragmented jurisdictions. Some industrial uses within the area would like to see a spur head north from the existing rail line on the SE boundary of the airport. There are multiple road expansion planned and in the works that will significantly increase capacity and access in and around the airport area (Hoagland and Martin Luther King specifically). The Vine Street overlay district, adopted in 2010, calls for all mixed-use and gives an advantage to the already designated industrial uses in the airport area for attracting future industrial uses away from this corridor.

Harmony Research Park

The Harmony Research Park is located in close proximity to the future Southport Connector, which is an important leg of the overall Osceola County Expressway Authority's master plan for the loop that connects the 429 to the 417. The Research Park is a very important component of the Harmony Master Planned Community. Based on land uses shown in Figure 5.8, the viability of creating a Freight Village in the area is questionable and needs more study and consultation with the land owners in the area.

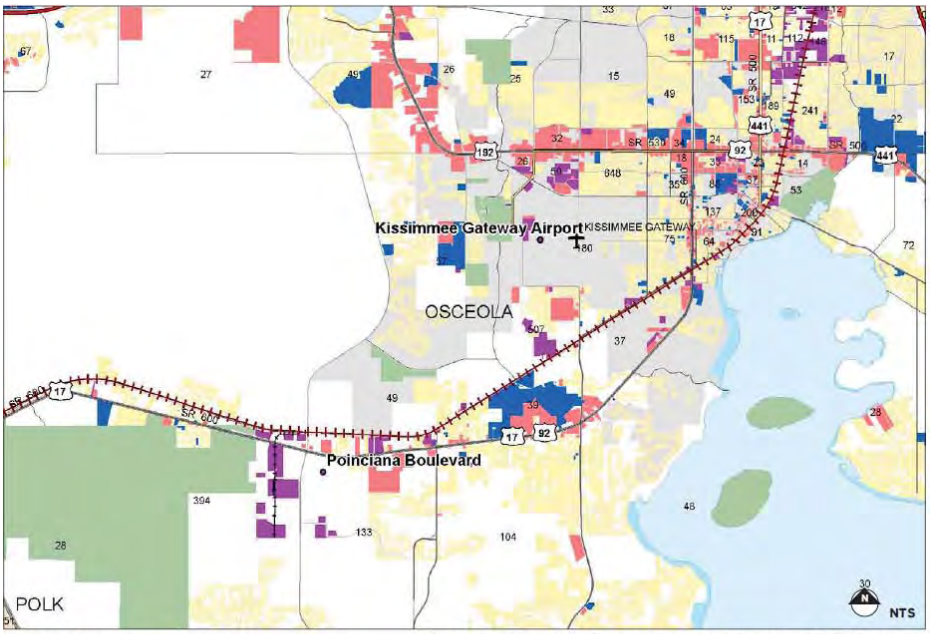
Poinciana Boulevard

The County does not want to lose the existing industrial character of the area and is looking at the area as a potential expansion area for existing and future industrial land uses (see Figure 5.9). The area is complex and needs special attention due to the arrival of SunRail, the pressure for residential development, existing industrial expansion plans, and the desire for more freight rail service by existing facilities. This area needs more study and there has been no effort to remove any of the industrial land uses at this time. It remains a viable location for a Freight Village detailed study.

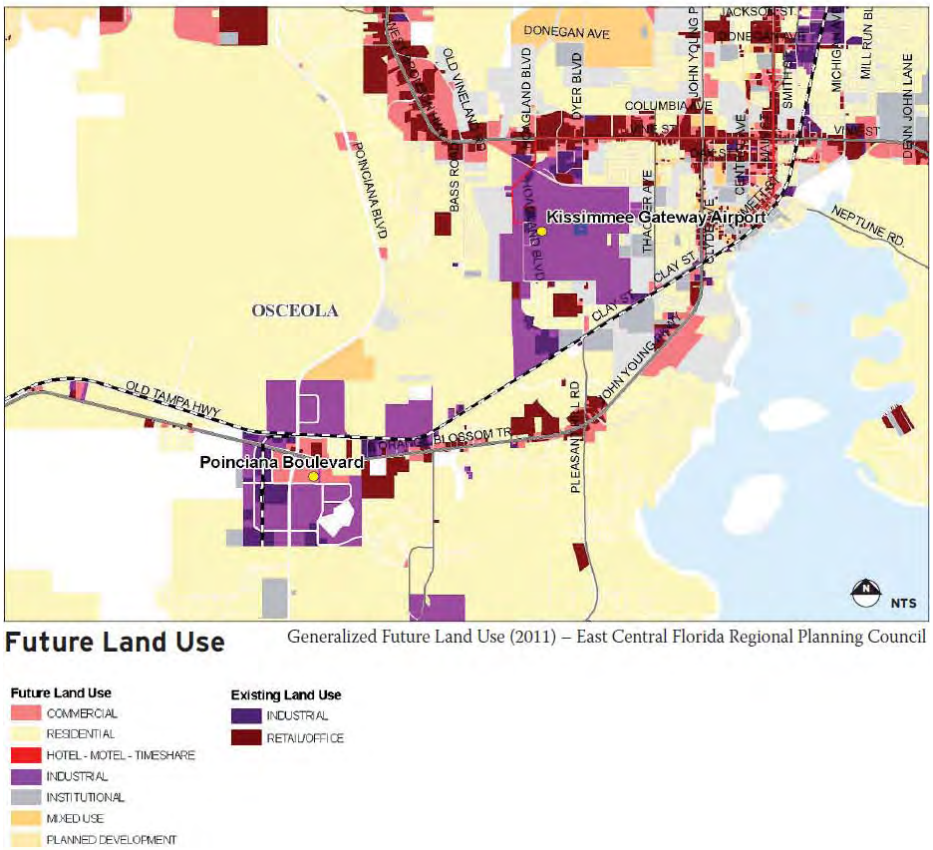
Yeehaw Junction

This area was chosen as one of the case studies. See Section 5.4 for more detail.

Figure 5.7 Existing and Future Land Use in the Kissimmee Freight Village



Existing Land Use Generalized Land Use Derived from 2010 Parcels - FDOT District 5



Future Land Use Generalized Future Land Use (2011) – East Central Florida Regional Planning Council

Future Land Use
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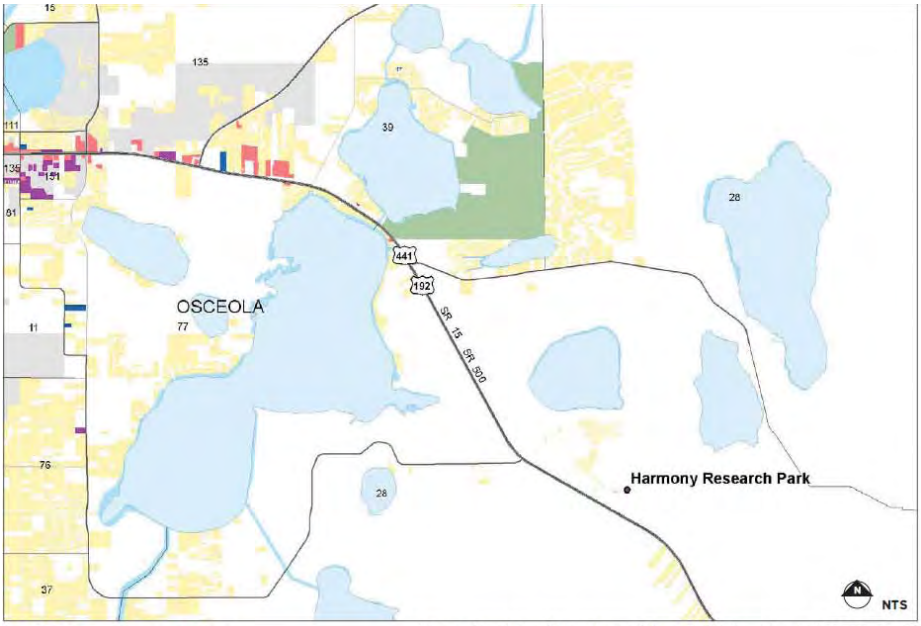
- INDUSTRIAL
- INSTITUTIONAL
- MIXED USE
- PLANNED DEVELOPMENT

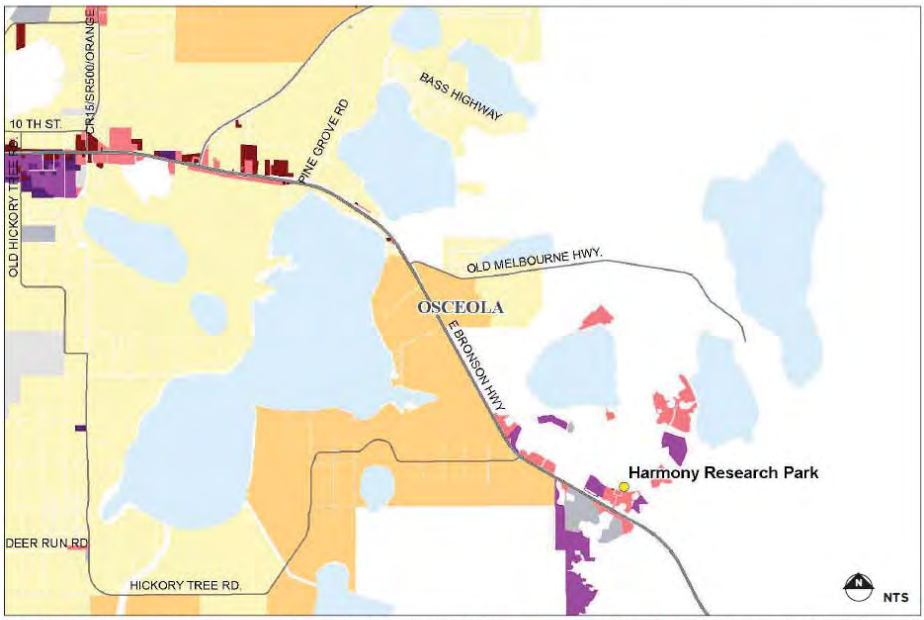
Existing Land Use
- INDUSTRIAL
- RETAIL/OFFICE

Source: Canin Associates.

Figure 5.8 Existing and Future Land Use in Harmony Freight Village



Existing Land Use Generalized Land Use Derived from 2010 Parcels - FDOT District 5



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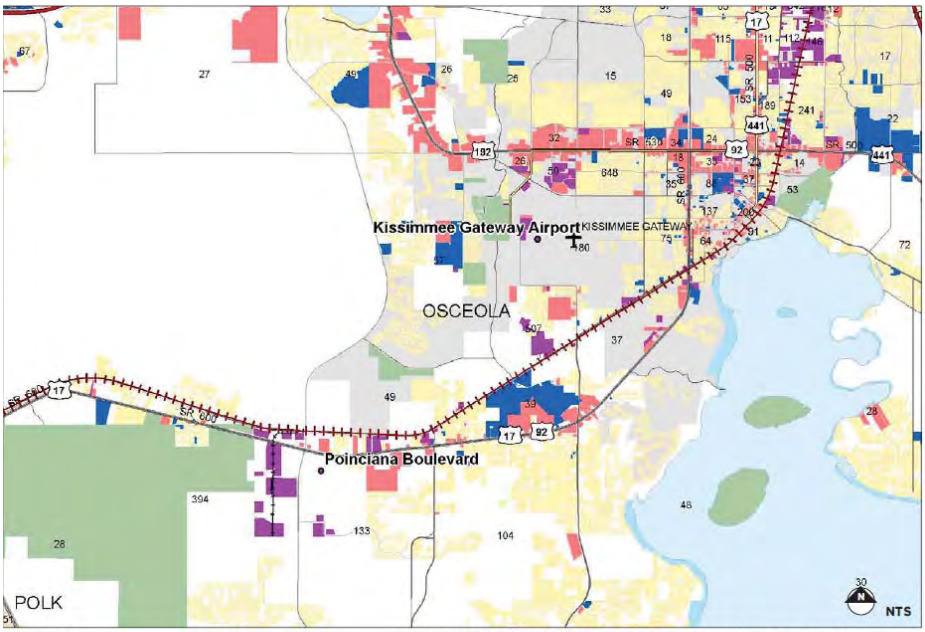
- PLANNED DEVELOPMENT

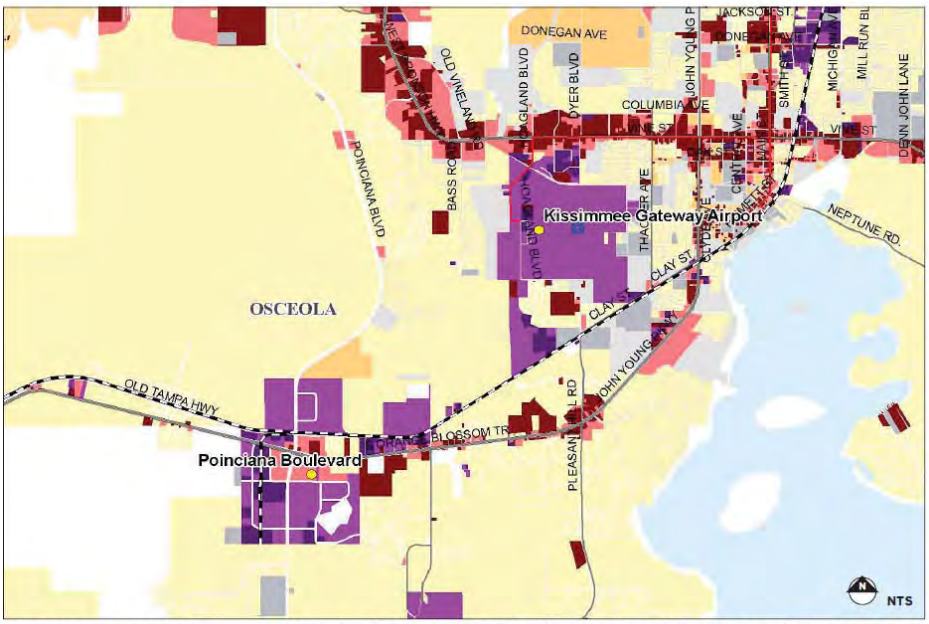
Existing Land Use
- INDUSTRIAL
- RETAIL/OFFICE

Source: Canin Associates.

Figure 5.9 Existing and Future Land Use for Poinciana Area



Existing Land Use Generalized Land Use Derived from 2010 Parcels - FDOT District 5



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- PLANNED DEVELOPMENT

Existing Land Use
- INDUSTRIAL
- RETAIL/OFFICE

Source: Canin Associates.

SR 417 Southern Extension

This area is another location where a future southern expressway interchange is proposed. The area is surrounded by multiple mixed-use designated DRIs. Based on existing and future land uses shown in Figure 5.10, this area does not need a specific Freight Village designation.

Sumter County

Florida Crossroads/Monarch Ranch DRI/Intermodal Logistics Center

This area is designated as a Primary Activity Center in the Comprehensive Plan, and a new "deeper freight study" currently is underway to identify appropriate uses to attract to the area. The County is coordinating with the main property owner and one other. CSX owns about 600 acres in the area and the area is being proposed as an ILC. The County views this area as a significant launch point for goods traveling west to the ports and south to Polk County.

County Road 470 Corridor

This entire corridor is designated as an economic development corridor in which to focus new growth. There are quite a few DRIs in development that feed off of this corridor. The corridor is bookended by two potential freight villages. A Primary Activity Center located at the I-75 interchange on the west and the interchange with Florida's Turnpike on the east in Lake County. Each of these areas has significant industrial uses designated on the future land use maps. The intersection of SR 471 and SR 50 is designated as a secondary Economic Activity Center intended to create local serving jobs. This area needs more study.

Lake County

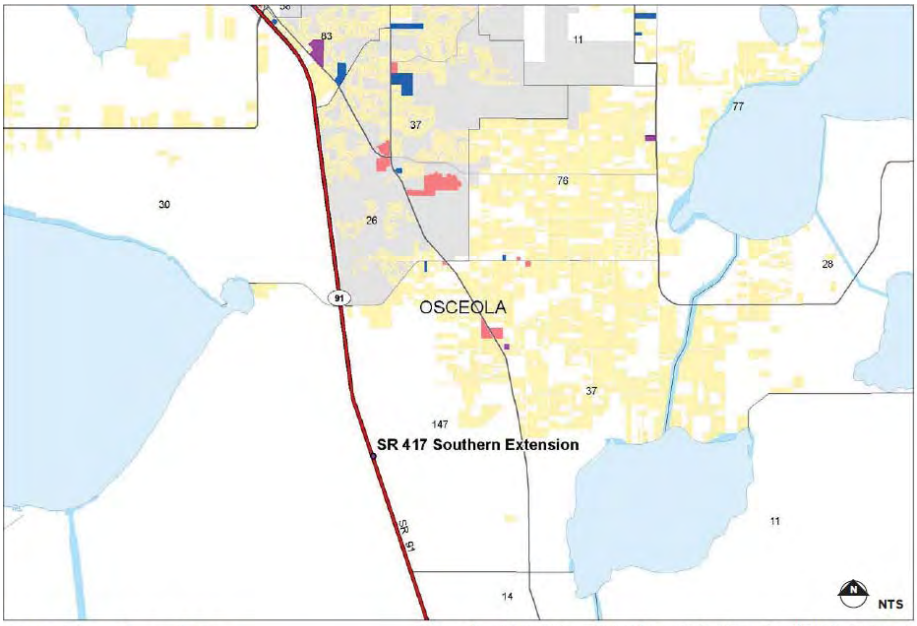
SR 33/SR 19/U.S. 27 and Florida's Turnpike: Christopher C. Ford Commerce Park

This is a county industrial park with multiple national DCs, and will likely continue to be a regional DC with more industrial uses planned, as shown on the future land use map. No geographic-specific detailed plans or policies were found.

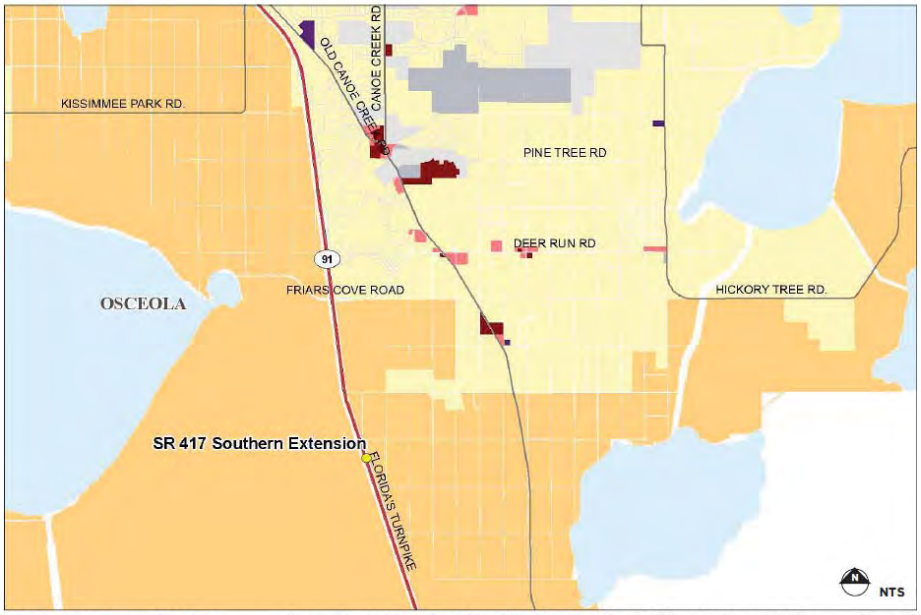
Tavares Freight Village

The area currently is designated industrial and is marketed as such. While no specific code or policy was found other than the industrial land use designation, the Tavares CIP plan has monies identified in the 2013 to 2014 budget for Preliminary and Conceptual Design for this Freight Village.

Figure 5.10 Existing and Future Land Use for the SR 417 Southern Extension



Existing Land Use Generalized Land Use Derived from 2010 Parcels - FDOT District 5



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- PLANNED DEVELOPMENT

Existing Land Use
- INDUSTRIAL
- RETAIL/OFFICE

Source: Canin Associates.

Volusia County

Volusia TPO conducted a Freight Study that was completed in 2009. The focus was on creating countywide truck routes. Since then many municipalities have created their own restricted routes and the County has completed a map of the truck-restricted routes. The Freight Study did not consider "Freight Villages." There are no freight-specific land use policies, but the comprehensive plan does include a policy about the efficient movement of goods and services. The potential to create Freight Villages lies within many designated Industrial Parks that are within the jurisdictions of the various cities throughout the County. These include the airport in Deland, New Smyrna Beach Airport, Parktowne Industrial Center in Edgewater, Deland Crossings, and the Ormond Crossings Project. Each of these areas has their own master plans and plans for expansion. Most of them have already designated industrial land use, but not specific codes; and many have various planning activities underway.

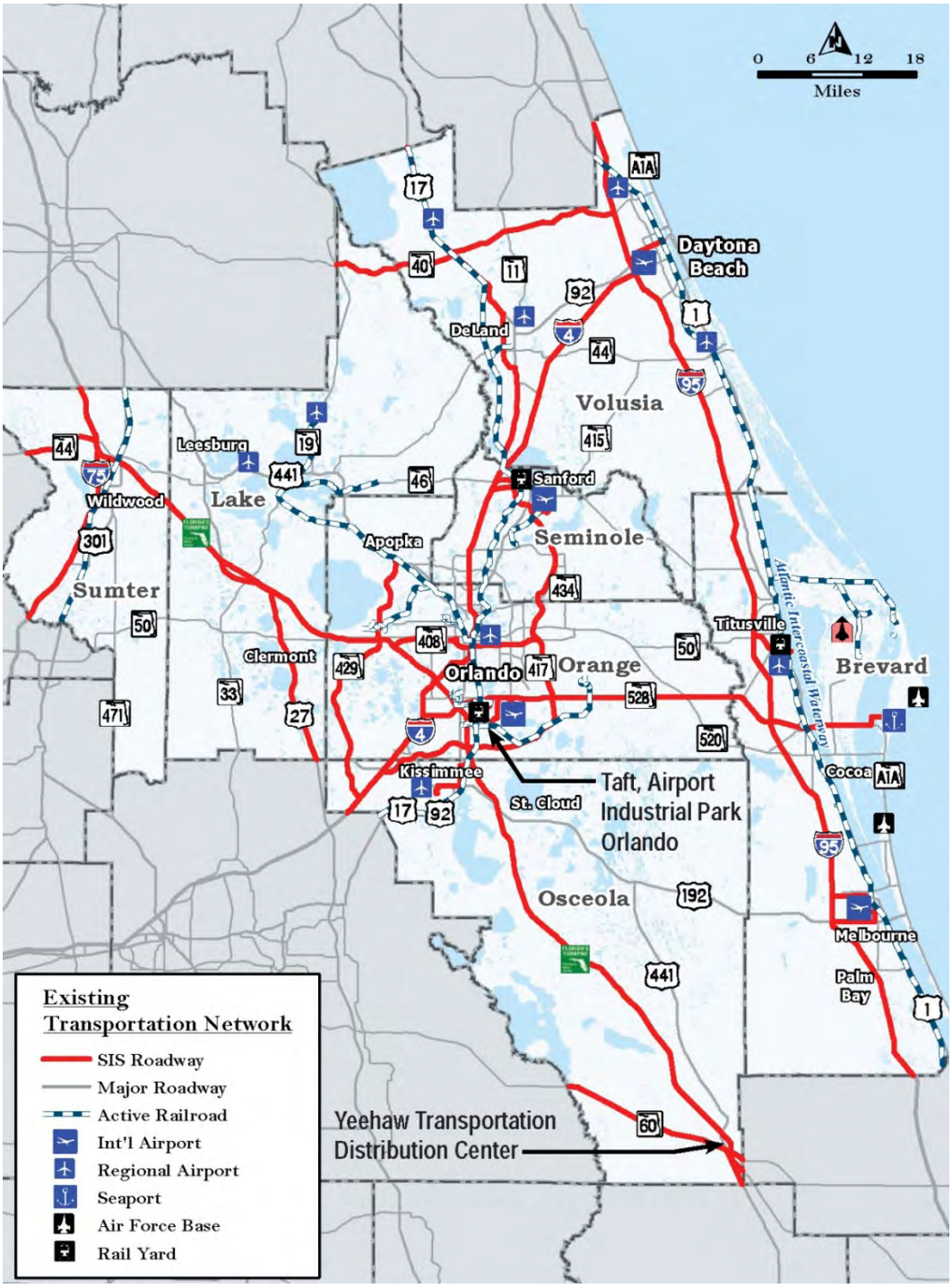
Brevard County

Similar to Volusia County, the opportunities for creating freight villages lies mostly within the various city jurisdictions. Specifically, Melbourne and Titusville each have established and growing industrial parks. Cape Canaveral, as an ILC, is of course its own type of complex freight village and has multiple studies underway for future expansion and the further facilitation of freight throughout the area.

5.4 FREIGHT LAND USE CASE STUDIES

The previous section provided an overview of the most significant freight land uses in the study region (current and future). After the status review and update of each of the potential freight villages, two were chosen for more in-depth case studies. The two areas chosen represent two very different opportunities to illustrate best practices in freight village development for long-term economic sustainability and freight mobility. The first area is the Taft/Landstreet/AIPO area. This is a large well-established freight-intensive area that demonstrates impediments to redevelopment as well as best practices for future freight village development. The Yeehaw Transportation DC is the only one out of all the potential freight villages reviewed to date that has applied development parameters within Comprehensive Plan policies to direct the future development of this greenfield site. This area was chosen to test those development parameters in order to illustrate best practices for future freight village designation, and highlight any potential unintended constraints that could hinder sustainable economic development of the freight village. The case study areas are shown in Figure 5.11. The lessons gleaned from these case studies can be used to develop recommendations for addressing freight-supportive land use throughout the region.

Figure 5.11 Location of Freight Land Use Case Studies



Taft/Tradeport and Airport Industrial Park Orlando (AIPO) Location Description

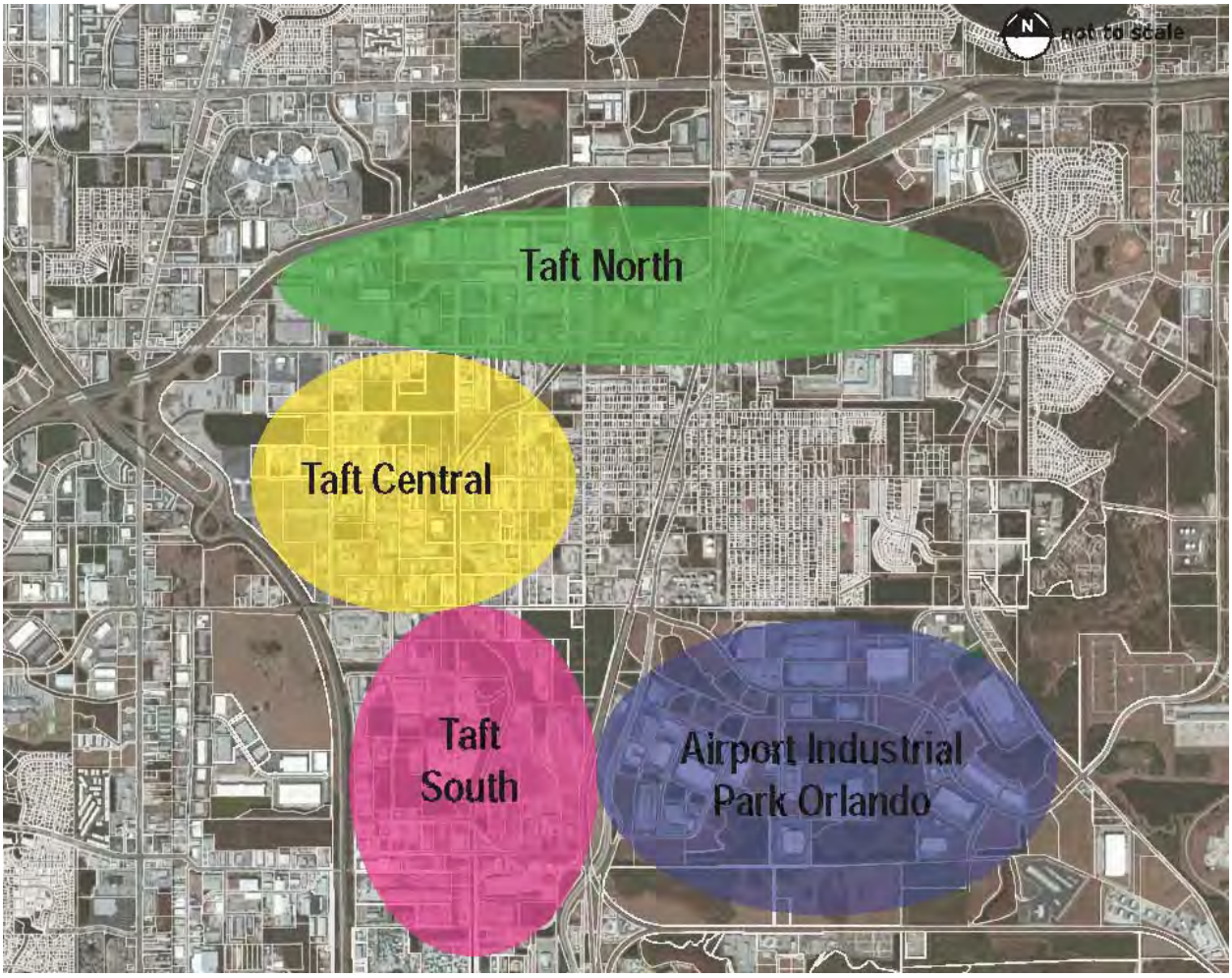
This area was previously designated as two different freight villages in the initial 2002 Freight Mobility study. For the purposes of this case study, the entire area is considered as one district with four distinct areas in order to derive differences between the multiple and varied freight-intensive land use patterns (see Figure 5.12). The district has continued opportunities for growth and redevelopment and is therefore an important area in which to identify best practices associated with creating a freight village land use pattern that is conducive to today's and tomorrow's freight movement needs.

Previous studies labeled one potential freight village as Landstreet-Vineland or Taft and the other as Boggy Creek Road. Boggy Creek Road was not identified as a separate freight village in the MetroPlan 2030 LRTP. For the purposes of updating the status of each of these areas and this case study, the names Taft and the AIPO are used. The AIPO is a specific Planned Unit Development designation within the City of Orlando's jurisdiction. The remaining areas within the district are split between Orlando and Orange County with most of the area within unincorporated Orange County.

For the purposes of this case study, the Taft area is considered to be the area south of SR 528, west of Orange Avenue, east of Florida's Turnpike and bounded roughly on the south by Zell Road and the OUC Railroad. In addition, the area east of Orange Avenue, south of SR 528, north of the Taft residential area, and west of Boggy Creek Road is included. Areas to the west of Florida's Turnpike and north of the 528 area also indicating heavy industrial uses currently and into the future. But they are not contiguous to this district due to the major highway separations. In addition, Orange County has indicated that lands north of SR 528 will be allowed and potentially encouraged to transition away from industrial use over time due to influence of the new Sand Lake SunRail station.

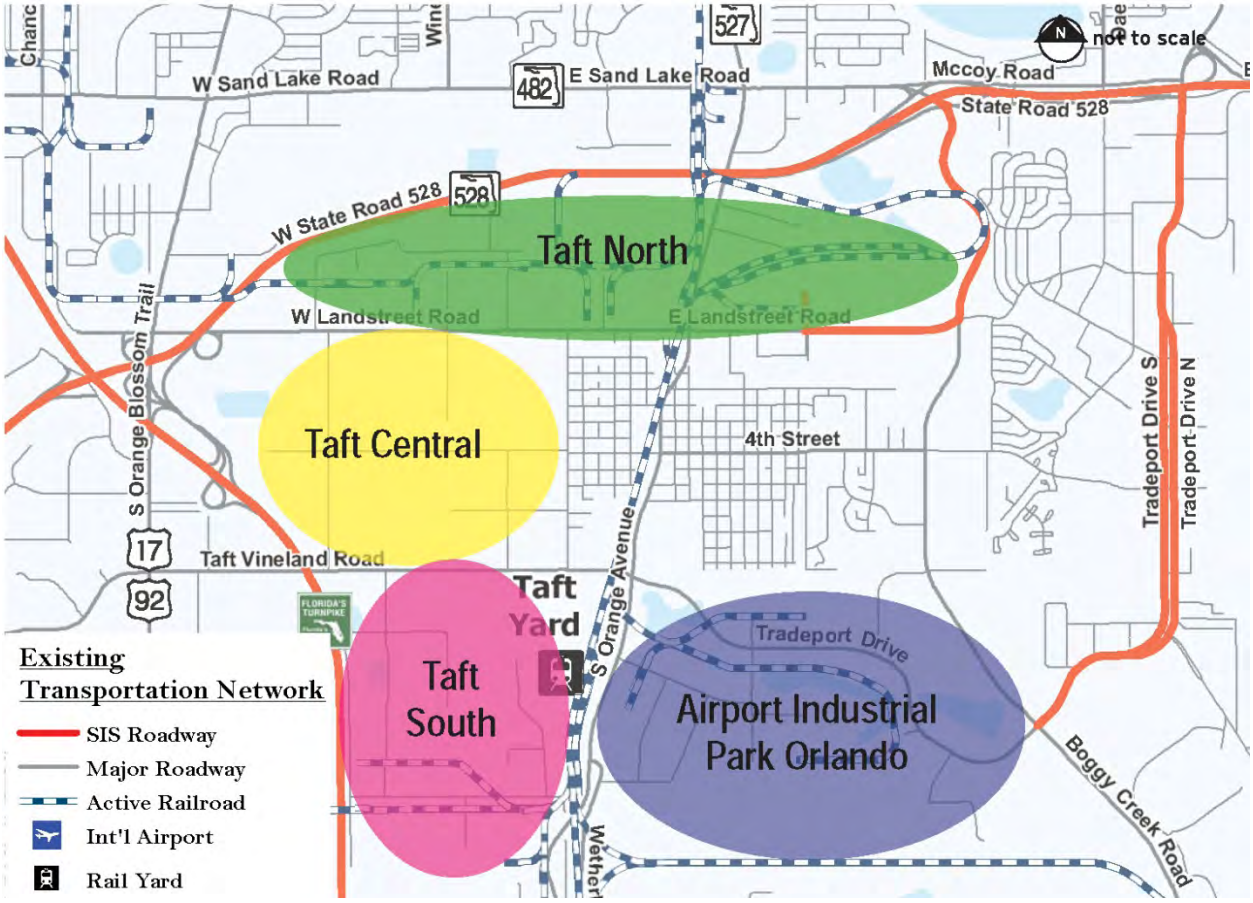
As shown in Figure 5.13, this district has connections to multiple SIS facilities, including highways and highway connectors, as well as the CSXT Total Distribution Services Inc. (TDSI). The district also is served by railway and is adjacent to the Tradeport area associated with OIA (or MCO). The area has the potential to be designated an intermodal logistic center (ILC), which could open the door to future grant funding opportunities.

Figure 5.12 Area Diagram for Taft District



Source: Canin Associates.

Figure 5.13 Transportation Network for Taft District



Source: Canin Associates.

Taft Existing Conditions

Land Use

The Taft area has three contiguous, but different land use patterns. The whole area is roughly 4,500 acres. The vast majority of the parcels throughout all three areas is based on a very rectilinear pattern, and there are few undeveloped lots in the entire Taft area.

The area **north of Landstreet** is served by railway spurs that encourages a warehouse/distribution land use pattern and type of industrial use. These types of uses are clearly more freight-intensive and require larger parcel sizes to accommodate those uses. They primarily consist of major DCs and the CSXT TDSI east of Orange Avenue and large DCs adjacent to SR 528. The parcels vary greatly, but most of the distribution facilities are accommodated by parcels in the range of 13 to 20+ acres (see Figure 5.14).

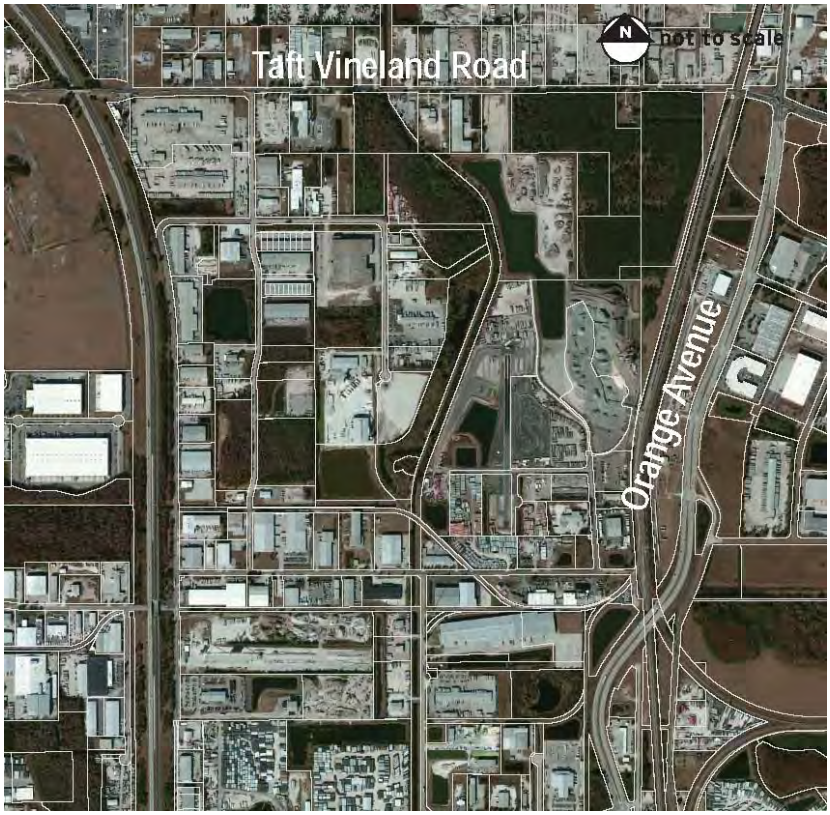
Figure 5.14 Taft North Aerial Map and Parcels

The **central Taft area** (shown in Figure 5.15) is dominated by homogenously sized, single-use industrial or commercially zoned properties. There is no railway spur access in this area. There are small commercial properties mixed in, as well as the old Taft residential neighborhood embedded within the area and surrounded by the industrial use. Even though there are no buffers between uses except for roadways, to date the County has not identified any specific complaints from the adjacency of the industrial use and the residential neighborhoods. The parcel sizes in the central area vary, but are predominantly in the two- to five-acre range with a homogenous pattern. It is clear that the larger parcels were agglomerated from the initially platted two-acre +/- lots. It is evident that the entire central area was platted at a time when land development constraints were limited, including buffer requirements and especially stormwater management.

Figure 5.16 displays the **South of Taft Vineland** Road. The development takes on a different character with larger parcels and an abundance of service yards for raw materials, including the CSX Taft Yard. This area also is served by railway spurs. The area is dubbed Regency Industrial Park. Parcels in this area have a wide range of sizes, and some appear to have been platted to accommodate specific tenants. There are still many lots in the area that have the same two- to four-acre lot pattern as the Central Taft area.

Figure 5.15 Taft Central Aerial Map and Parcels

Figure 5.16 Taft South Aerial Map and Parcels



Roadways and Access

There are three major east/west roads that service the area:

1. **Landstreet Road** is on the north and is a four-lane road with a continuous center turn lane. Going east, it has an at-grade rail crossing before the intersection with Orange Avenue, and then continues east to service the rest of the industrial areas before the intersection with Boggy Creek Road, and then dying into a residential neighborhood. To the west Landstreet Road continues underneath SR 528 to intersect with Orange Blossom Trail, and then subsequently accesses SR 528 and Florida's Turnpike.
2. **Taft Vineland Road** begins at the intersection of Orange Avenue where Tradeport Drive stops. Access through the intersection is complicated by both an at-grade rail crossing and an immediate constriction down to two lanes from four. On the west side Taft Vineland travels underneath Florida's Turnpike to eventually connect with Orange Blossom Trail, and then subsequently connects to SR 528 and the Turnpike.
3. In the southern area, **Central Florida Parkway** enters the area traveling underneath the Turnpike as a two-lane road. That road dead ends on the west and in order to reach Orange Avenue a driver must turn south and travel to Zell Road and then east again.

All of these major roads have multiple driveways accessing at random intervals, and Landstreet Road is the only one that has an urban cross-section with traffic lights, curb and gutters, sidewalks, and centralized stormwater ponds. The other two are rural with drainage swales and two lanes of traffic. The north-south circulation is an intermittent and incomplete grid throughout the entire area with multiple dead ends and circuitous travel patterns.

The area is significantly constrained with regard to external access. There are only three west connections, as described above, that all connect to Orange Blossom Trail. These are unobstructed by rail crossings or other major roads. On the east, there are only five connections to Orange Avenue, and only the southernmost route provides the convenience of no rail crossing. All four others have at-grade crossings, and two of those primarily serve the Taft residential neighborhood. Major northern and southern egress for all traffic leaving the area is Orange Avenue and secondarily Orange Blossom Trail. This has caused an overabundance of freight traffic heading north through Orlando. Boggy Creek also has northern egress to SR 528 and McCoy Road and is designated an SIS connector from that intersection, then along Landstreet Road all the way to the entrance of the CSX TDSI facility.

Open Space and Stormwater

Throughout the area, newer developments have individual drainage basins on property, while the majority of the properties are served by swales in the rights-of-way that lead to one main north south running ditch called the Boggy Creek

Canal. There are no parks or designated open spaces in the area. The few areas that remain undeveloped may have preservation opportunities. In some areas, there are landscape buffers between the residential uses, yet even in most of those areas, the landscape appears to be degraded and is not a complete buffer.

Existing Conditions Conclusion

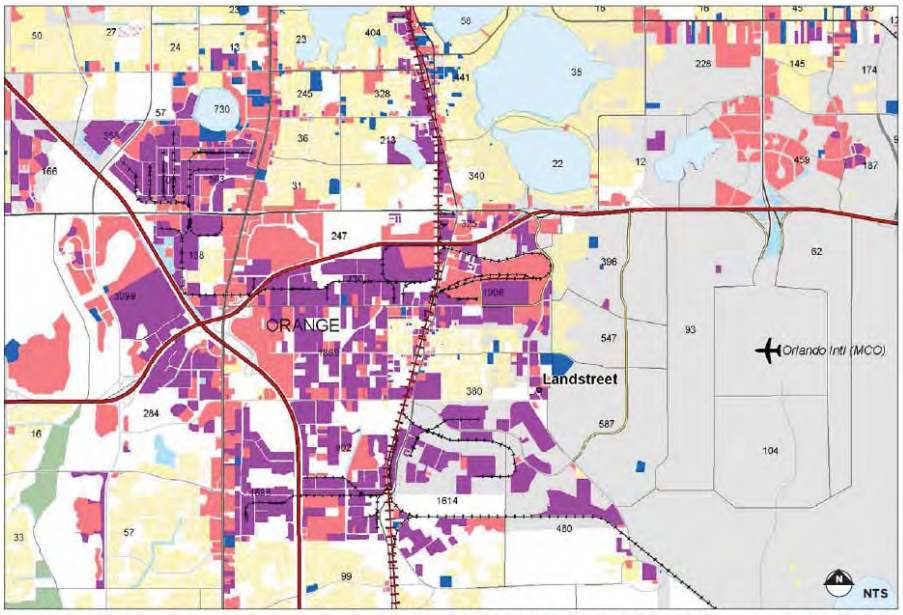
It is clear that the Taft area was not envisioned as one contiguous freight village, and there are currently no specific policies or codes to direct the development of the area. Portions of the area and many individual lots will remain constrained due to size, stormwater requirements of modern land development codes, access and capacity issues, and potentially historic brownfield issues. However, Orange County has a separately designated industrial land use zoning category that recognizes the historic nature of some industrial development patterns and releases the owner from some of the modern requirements such as buffers.

Taft Future Conditions

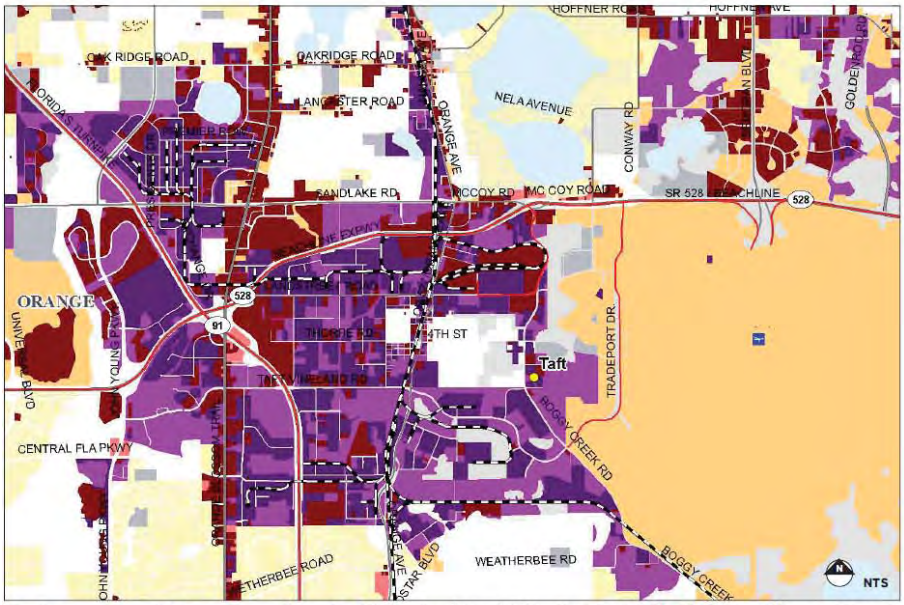
As can be seen in Figure 5.17, the future land use map remains almost identical to the existing land use map where existing parcels remain with the same designation, and undeveloped parcels are projected to add additional industrial or commercial land uses throughout all three of the Taft areas. New developments will likely be managed through the current land development code, and there could be significant restraints to development on some of the parcels due to spatial requirements associated with circulation and parking along with stormwater and buffer requirements. Potential redevelopment of parcels will be dependent on many factors, including the size of the parcel, condition of the facility, and whether or not the redevelopment will trigger the need to update the development to today's land development codes.

Additional constraints to redevelopment are associated with the roadway and drainage infrastructure. As mentioned before, there are significant access constraints that currently exist, and the only programmed alleviation is for Taft Vineland to be upgraded to a four-lane facility. The project is listed in the MetroPlan 2030 LRTP. The impacts of access to freight rail service due to the development of SunRail also could be a constraint to further increasing the freight capacity of the whole area. The drainage pattern throughout the area could become a significant constraint due to capacity and water quality issues associated with the Boggy Creek Canal.

Figure 5.17 Existing and Future Land Use for the Taft Freight Village Area



Existing Land Use Generalized Land Use Derived from 2010 Parcels - FDOT District 5



Future Land Use Generalized Future Land Use (2011) – East Central Florida Regional Planning Council

Future Land Use
- COMMERCIAL
- RESIDENTIAL
- HOTEL - MOTEL - TIMESHARE
- INDUSTRIAL
- INSTITUTIONAL
- MIXED USE
- PLANNED DEVELOPMENT

Existing Land Use
- INDUSTRIAL
- RETAIL/OFFICE

Source: Canin Associates.

Orlando Industrial Park Orlando (AIPO) Existing Conditions

Land Use

The Airport Industrial Park Orlando (AIPO) is located east of Orange Avenue and south of the Taft residential neighborhood. It is bound by Boggy Creek Road on the west and the OUC railroad on the south. The AIPO is a designated DRI in the State of Florida and the original Development Order (DO) was approved in 1982. The DRI process requires a rigorous evaluation of all the proposed development elements from land use to transportation infrastructure and offsite impacts for utilities. The DO approvals allowed for a mixed-use development program that includes warehousing, manufacturing, research park, office, and commercial totaling a maximum building square footage of 21.4 million. Upon approval of the DRI, a Planned Unit Development (PUD) zoning designation was approved by the City of Orlando. The PUD designation offers tremendous flexibility in land use and parcel size. Current parcel sizes range from very small parcels in the 2-acre range to very large 44-acre parcels. Staples has a warehousing facility on one of the larger parcels. There is a wide variety of uses on other parcels from small-scale manufacturing to multiple freight-intensive operations.

Figure 5.18 AIPO Aerial Map and Parcels

The configuration of the parcels and the parcel lot lines fit within a curvilinear pattern dictated by wetlands and Tradeport Drive, yet they try to achieve a semi rectilinear pattern and a fairly even distribution. Significant development potential remains throughout the AIPO in undeveloped lands and leasable space. The parcel pattern in the PUD demonstrates flexibility by offering the ability to create lot splits as necessary, and some of the facilities are clearly developed on an agglomeration of parcels in order to suit the user's spatial requirements. Flexibility also is demonstrated in the individual developments where relatively small amounts of space can be leased within larger buildings.

Roadways and Access

The major thoroughfare in the AIPO is Tradeport Drive. The road is configured as a four-lane facility split with a large median. The median is clearly intended for the future potential expansion to six travel lanes, if needed. Tradeport Drive has good access to both Orange Avenue on the west and Boggy Creek Road on the east. After the Boggy Creek intersection, Tradeport Drive continues east, turns into Jetport Drive and accesses the east of side the airport and all of the uses associated with the airport's industrial area, and then intersects with SR 528 on the north.

Overall, the site has very good access with the only major constraint being Tradeport Drive constricting down to two lanes as it transitions to Taft Vineland road after the Orange Avenue intersection, as mentioned in the Taft analysis.

Internally, the central and northern portions of the park are served by railroad spurs. The central part of the AIPO is served by a well thought-out grid system of roads with managed intersections and driveways appropriately sized for large trucks. Some of the road facilities are clearly designed for future lane expansion, if necessary.

Open Space and Stormwater

There are no designated parks within the AIPO, but there also is no residential development. There are significant natural open spaces that have been preserved in multiple locations throughout the area, and they have been placed in conservation easements. The stormwater is managed in both manmade and natural ponds. Some of the ponds are co-located for handling multiple parcels, and some are individually based for the larger users. It is important to note that some of these co-located facilities were built prior to any development, which is a significant benefit to future users. One additional point of interest is the large pond and buffer easement located between the AIPO and the Taft residential area to the north.

AIPO Existing Conditions Conclusion

The AIPO represents a contemporary industrial park development and is based on solid regulatory review of impacts internally and externally. The PUD zoning

provides significant flexibility that benefits owners and end users alike. The area could be considered a standalone freight village and maybe even a standalone ILC due to rail service and proximity to the important freight services at the airport and SIS connector designation for Tradeport Drive to Boggy Creek.

AIPO Future Conditions

Future conditions for the AIPO remain the same through build-out. Additional impacts with new development will be managed by the DO already in place and have been considered through build-out. The PUD is flexible and currently does not allow residential although the possibility of some type of hotel facility to service the area is allowed. Additional large distribution facilities are likely due to the proximity to the airport and favorable nature of the development pattern. While Tradeport is not in need of additional capacity at this time, adding lanes in the future is possible and Boggy Creek is slated for additional capacity from SR 528 to SR 417.

Key Findings

Table 5.8 summarizes the key findings from the Taft Freight Village Case Study. The overall district will continue to be primarily industrial and commercial for this freight study's time horizon. The overall case study area has four distinct development patterns each with different development possibilities and constraints in the short term and long term. The following table summarizes the key findings for each of the four areas.

The Taft area should be considered as three distinct potential freight villages due to the diverse character, access, mode availability, SIS access, land use and redevelopment potential.

Taft North Conclusion

Heavy freight presence will likely continue well into the future even as existing users may transition into new users. The existing warehouse space may be architecturally or systematically outdated, but the land will remain significantly valued for warehouse due to the central location, access to rail, and access to SR 528 and the Turnpike. There is SIS connector access that leads directly to the front door of the CSX TDSI. This area could be considered a viable freight village and deserves more study to determine an appropriate boundary and ensure that infrastructure and adequate road facilities are maintained as freight traffic is planned to increase. In addition, this type of study could lead to a proposed ILC designation of this area. That could lead to additional grant funding to assist in improving infrastructure. The area also may have the potential for a brownfield designation that could aid in funding for redevelopment of specific sites.

Table 5.8 Summary Findings for the Taft Freight Village Case Study

Taft District Key Findings	Area	Character	Key Findings
Land Use	Taft North	Individual zoning	Multiple uses and offers warehousing
	Taft Central	Individual zoning	Multiple small-scale uses only, specific grandfathered industrial zoning, transitioning zoning may be difficult
	Taft South	Individual zoning	Multiple uses, transitioning zoning may be difficult, only location for ore and materials yards in case study area
	AIPO	PUD in place	Allows maximum flexibility
Parcel Pattern	Taft North	Varied	Large- and small-scale development opportunities – little new development opportunity – conducive for redevelopment and new users
	Taft Central	Homogenous	Small-scale development only – little new development – constrained for redevelopment and new users
	Taft South	Varied	Large users dominated by ores and mineral yards – little new development opportunity – constrained for redevelopment
	AIPO	Varied	Large and small-scale development opportunities – available new development opportunity – conducive for redevelopment and new users
Travel Mode/SIS	Taft North	Road and rail, SIS – 528, Boggy Creek Connector	Multimodal – direct SIS connector access
	Taft Central	Road	Single mode – no direct SIS
	Taft South	Road and rail	Multimodal – no direct SIS access
	AIPO	Road and rail	Multimodal – direct access to SIS Boggy Creek Connector and adjacent to airport
Roadway Access	Taft North	Semi-constrained	Must access Landstreet for all ingress/egress routes
	Taft Central	Constrained	All ingress/egress routes constrained until Taft Vineland improved
	Taft South	Constrained	All ingress/egress routes constrained until Taft Vineland improved
	AIPO	Not constrained	Adequate road system in place

Taft District Key Findings	Area	Character	Key Findings
Rail Access	Taft North	Good	May be affected by SunRail
	Taft Central	None	No rail limits, long-term warehousing opportunities
	Taft South	Good	May be affected by SunRail
	AIPO	Good	May be affected by SunRail
Stormwater	Taft North	Good	Much of the existing development has on site storage aiding redevelopment possibilities
	Taft Central	Poor	Severely limited on site possibilities – limits redevelopment opportunities
	Taft South	Poor	Severely limited on site possibilities – limits redevelopment opportunities
	AIPO	Very good	Sitewide system with multisite shared storage facilities in place before development
Open Space	Taft North	Adequate	Buffers located where most needed on east side
	Taft Central	Very poor	Inadequate buffers adjacent to residential
	Taft South	Adequate	Buffers located where most needed on southern edge
	AIPO	Excellent	Abundant conservation open space and excellent residential buffer

Taft Central Conclusion

The majority of Taft Central area is based on an outdated development pattern for the support of freight-intensive land use. The area supports and will continue to support a large array of small-scale industrial and manufacturing uses that are less freight intensive. Significant impediments may inhibit the redevelopment of many of the parcels. Even with the grandfather clause in one of the industrial zoning categories, without parcel agglomeration large-scale warehousing or other freight-intensive uses may not be viable. However, small-scale manufacturing and truck servicing facilities are predominant current uses and will remain viable uses for the smaller parcels. Should the large area associated with the Greater Orlando Auto Auction on the east transition away from the current use, this would present a significant redevelopment opportunity and would deserve its own study that could prove to be a catalyst for the entire area and the development of a new standalone freight village. Internal circulation is difficult and undersized and external egress and ingress is compromised even with the improvements to Taft Vineland. There is no indication from the City or the County that this area will have any type of major

transition from its current land use pattern and character. On its own, this area does not represent a quality freight village opportunity for the future. Opportunities remain for the jurisdictions to consider other means of improving the infrastructure within the Taft Central area. Those opportunities for economic development incentives include the creation of some type of improvement district with a TIF type funding mechanism and/or the potential to investigate a brownfield designation for individual properties or an areawide designation. Should a district be created with appropriate local management, additional studies that could help in facility and architectural improvements include branding the area as its own district and potentially providing for beautification grant funding. Sydney Hayes Road might be the first study for this type of application as a project like that would have the added benefit of improving the buffer condition from the industrial uses and the Taft neighborhood to the east.

Taft South Conclusion

Taft South also will remain industrial for the foreseeable future. The big issue facing Taft South will be growth or contraction of the materials freight movements due to SunRail implementation. The whole area remains severely access constrained internally and externally for the foreseeable future. Due to these constraints, the area will likely remain as small-scale warehousing and manufacturing. Those designations are represented in the future land use plans and should remain. Any additional constraints imposed on redevelopment activities may impede the financial success of the companies that choose to locate in this area.

Airport Industrial Park Orlando Conclusion

This area represents a model that other freight villages could emulate. All of the elements contained within this area have created higher land values and rent values than the rest of the study area. The designation as an ILC remains a viable option, although how much additional improvements need to be funded would require further investigation. Elements that make the AIPO a successful model include:

- The DRI process ensured that detailed impact studies were undertaken for facilities and infrastructure that responded to the ultimate build out condition.
- PUD zoning designation provides maximum flexibility in parcelization, land use, and reuse opportunities. The PUD also provides for a wide range of business activities with no residential uses requiring internal buffering.
- Spine roadways and infrastructure were sized correctly and built upfront to provide parcels with immediate viability. Additional future capacity has also been planned.

- The adjacency to the airport and the connection to the Boggy Creek SIS connector provide excellent connectivity. The site has excellent internal and external access.
- Rail service is in place to provide for large-scale warehousing activities.
- Shared stormwater facilities that are developed prior to parcel sales create value and enhance the viability of individual lots.
- Protected open spaces respond well to the existing environmental conditions, and the large buffer to the north against the residential area is an outstanding example of an appropriate buffer development.
- The size of the development allowed for the creation of an internal management structure that regulates infrastructure, architectural character, and branding for the whole project. This enhances value for all parties involved.

Yeehaw Transportation Distribution Center (YTDC) Case Study

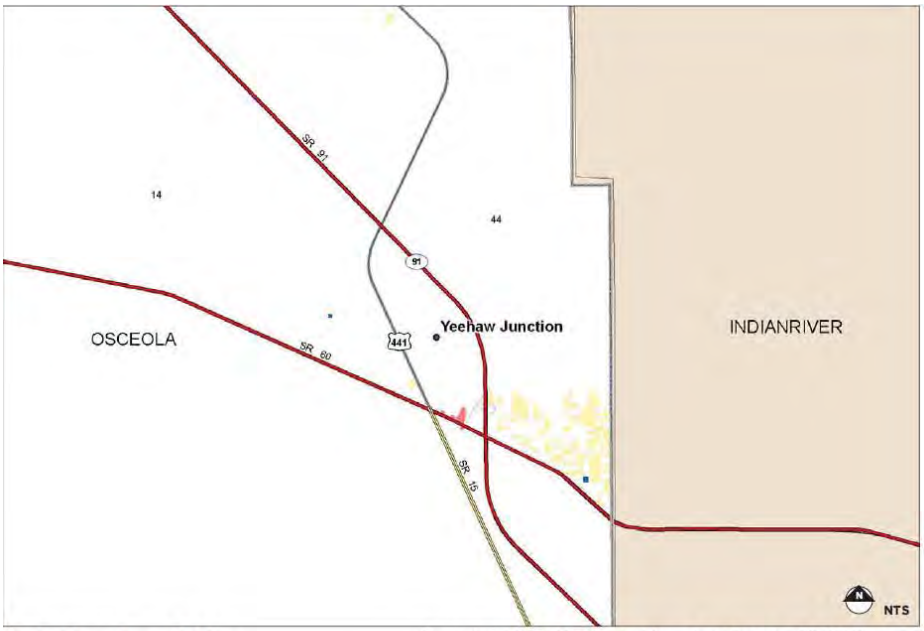
Location and Context

The YTDC is located at the intersection of Florida's Turnpike, US 441, and SR 60, an area known as Yeehaw Junction. The roads surround the site and create an island of development potential within rural southeast Osceola County. The area was first identified as a potential freight village in the 2002 Freight Mobility study. This is a strategic location given the intersection of multiple major highways providing a central access point for potential distribution and logistics centers for goods traveling throughout the region.

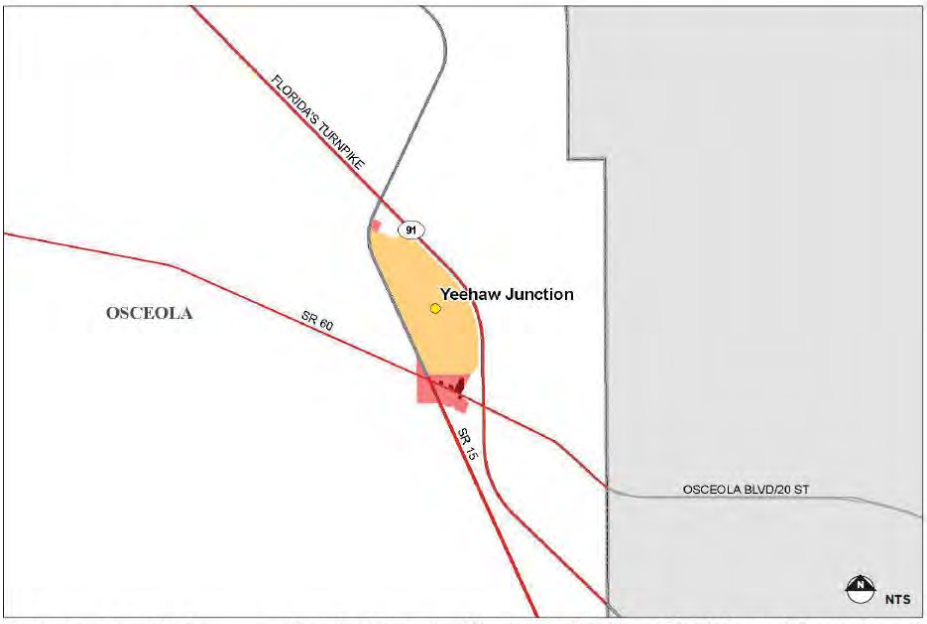
Within Osceola's 2025 Comprehensive Plan, the area has been designated with its own overlay district and policies, as outlined in the land use element under Goal 4: Yeehaw Distribution Center. The Overlay district is called the Yeehaw Transportation Distribution Center Overlay. The designation is intended to provide a focus for creating employment opportunities in southeast Osceola, and to create equitable development opportunities. There currently is minimal development in the area, and there are no large freight-intensive uses, although truck traffic is significant through the various intersections and is projected to increase over time (see Figure 5.19 for existing and future land use for the area).

Currently, there is little development within the overlay and no warehousing/ industrial uses as envisioned. There are minimal rural residential opportunities and travel-serving commercial uses adjacent to the overlay area. The overall area available for development within the overlay is in the range of 671 acres.

Figure 5.19 Existing and Future Land Use for the Yeehaw Junction Area



Existing Land Use Generalized Land Use Derived from 2010 Parcels - FDOT District 5



Future Land Use Generalized Future Land Use (2011) – East Central Florida Regional Planning Council

Source: Canin Associates.

This case study applies the standards written into the overlay to future development scenarios in order to test those parameters and the resulting development patterns. The results will identify whether the overall standards as applied achieve the goals of the YTDC. In addition, the results may provide land use best practices for future freight villages throughout the freight mobility study area.

Existing Overlay District Review

The current overlay as written specifies that all development shall comply with all other policies and portions of the Comprehensive Plan, as well as all aspects of the current land development code. The overlay further enhances those parameters by adding specific standards to be achieved with regard to land use mix, timing of development, and the size of a proposed development.

The size of a proposed development is dictated in two ways. The first is the requirement that any proposed development must be submitted as a contiguous Planned Development (PD) with a minimum of 400 acres. The second way the overlay dictates size is by providing overall caps to the total allowable development. The size of the PD submittal is significant as it basically forces any future development to consider the entire site. Given the size constraints in the policy and the actual size of the overlay area, two PDs would not be permissible.

The YTDC Overlay policy land use mix contains the parameters presented in Table 5.9.

Table 5.9 YTDC Overlay Parameters

Land Use	Square Feet	Units
Warehouse/Distribution	2,000,000	
Light Industrial	200,000	
Commercial	50,000	
Residential		630 dwelling units
Conservation		74 acres (dependent on final wetland delineation)
Utilities		10 acres
Total	**2,250,000**	**630 dwelling units**

Source: Canin Associates.

There are multiple development scenarios that could achieve this mix dependent on many factors. Also, there is the availability of providing a land use conversion matrix to adjust the mix as part of the PD, providing additional flexibility. There is not a description in the overlay policies as to how this mix was developed. It is important to note that the residential use is included within this mix as residential is typically specifically isolated from industrial uses through buffers and other means. In this case, due to the relative isolation of the

site, the policy intends to provide affordable housing options in close proximity to the jobs being created. The policy specifically states that pedestrian ways and bicycle facilities shall provide safe alternatives to automotive travel, and the whole site must be internally accessible. The mix also provides for a small amount of commercial, which could be a typical strip retail development to house local services. There is a large and significant wetland identified on the site and the conservation designation is appropriate.

Timing of the development is contingent upon the development of the residential units, and monitoring provisions will be triggered at the 750,000 square feet and 1.2 million square feet of development stages. Another provision of the policy states that residential development within the YTDC will be contingent on the availability of "adequate and proximate" public education facilities. It is unclear how this might impact the progression of the development as the nearest Osceola County schools are approximately 40 miles away.

Future Land Use Development Scenarios

In order to test the future possibilities for the YTDC, two different development scenarios were investigated. Each of the two plans utilizes the entire program as listed in the YTDC policies. The prototypes for the industrial land uses are based on examples of large-scale heavy warehousing/distribution activities, medium-scale warehousing/industrial, and small-scale light manufacturing/industrial. Each of the prototypes accounts for parking and truck movement within the overall site of each large facility. It is presumed that some of the medium-sized and smaller facilities will share some infrastructure.

Each of the plans has the same layout for the commercial and residential land uses. The commercial is assumed to be small scale, strip center, local serving uses; and the residential represents a mix of housing types with one apartment complex, a townhome development, and some single family homes. Overall, density averages around 5.7 dwelling units an acre for all of the net residential acreage. The residential area is buffered nicely from the industrial uses by the preserved wetland area, yet it is connected internally with a single wetland crossing. This crossing will have to be a multimodal facility to comply with the policies. The residential areas also are contiguous with both the existing and proposed commercial areas providing additional internal connective opportunities.

There will likely only be two main access points on SR 441; therefore, the industrial use has been allocated one access point, and the commercial and residential has been allocated the other in order to attempt to minimize truck/car conflicts in the future development.

The center portion of the site is the most logical place for the warehousing and light industrial uses due to access and proximity. The major difference between the two scenarios is evident in the type of anticipated warehouse/distribution activities and the resulting undeveloped land.

Scenario A

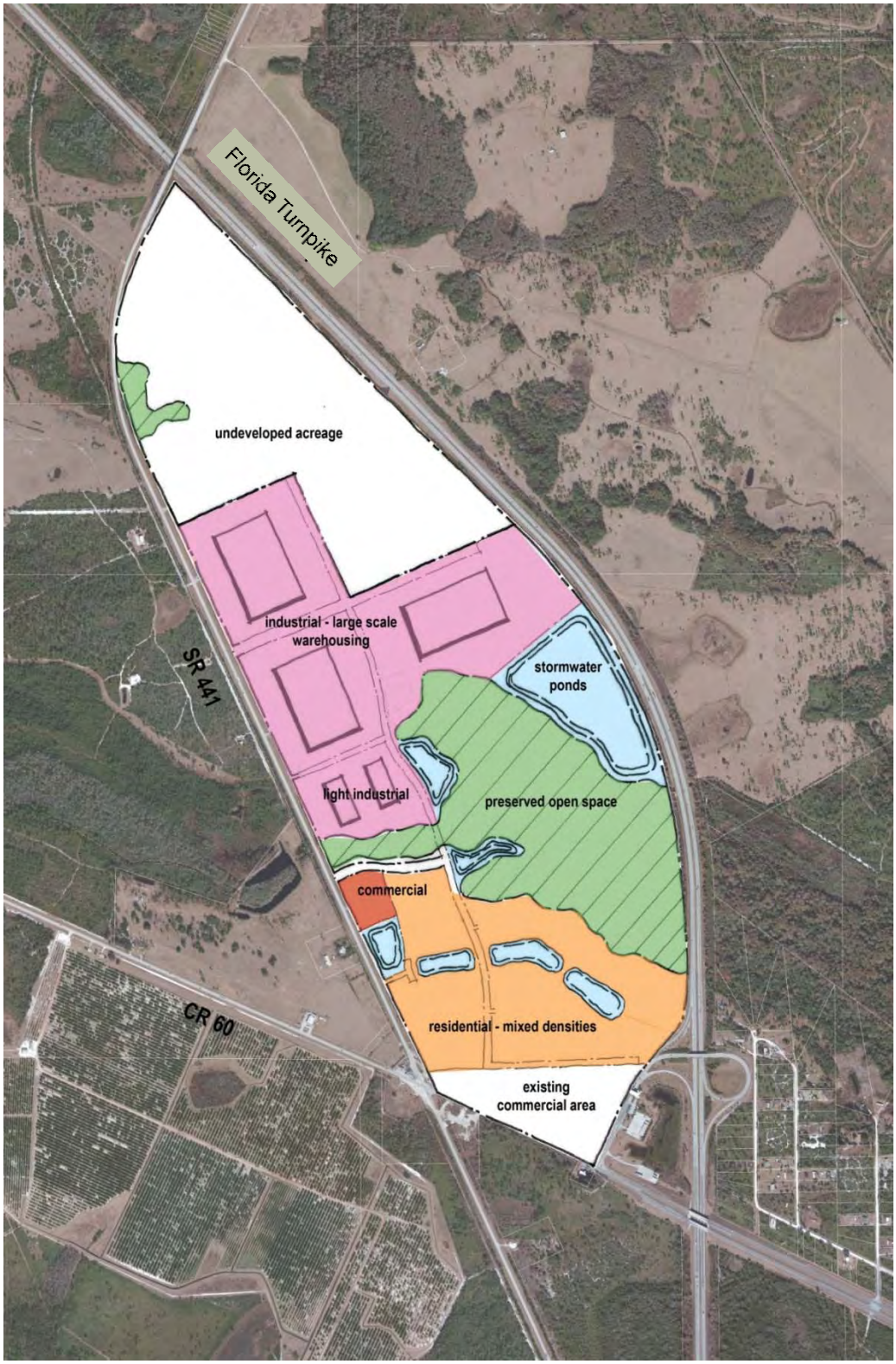
Scenario A is based on a large-scale warehousing development with three very large facilities and two smaller facilities, as needed, to fill out the program. Table 5.10 and Figure 5.20 summarize the development assumptions for Scenario A.

Table 5.10 Development Assumptions for YTDC Scenario A

Land Use	Acres	Square Feet	Units
Warehouse/Distribution	155	2,000,000	3 large buildings
Light Industrial	21	200,000	2 small buildings
Commercial	5	50,000	Strip center retail
Residential	109		630
Conservation	133		
Ponds	67		
Undeveloped	171		
Utilities	10		Within undeveloped area
Total	671	2,250,000	630

Source: Canin Associates.

Figure 5.20 YTDC Land Development Scenario A



Source: Canin Associates.

Scenario B

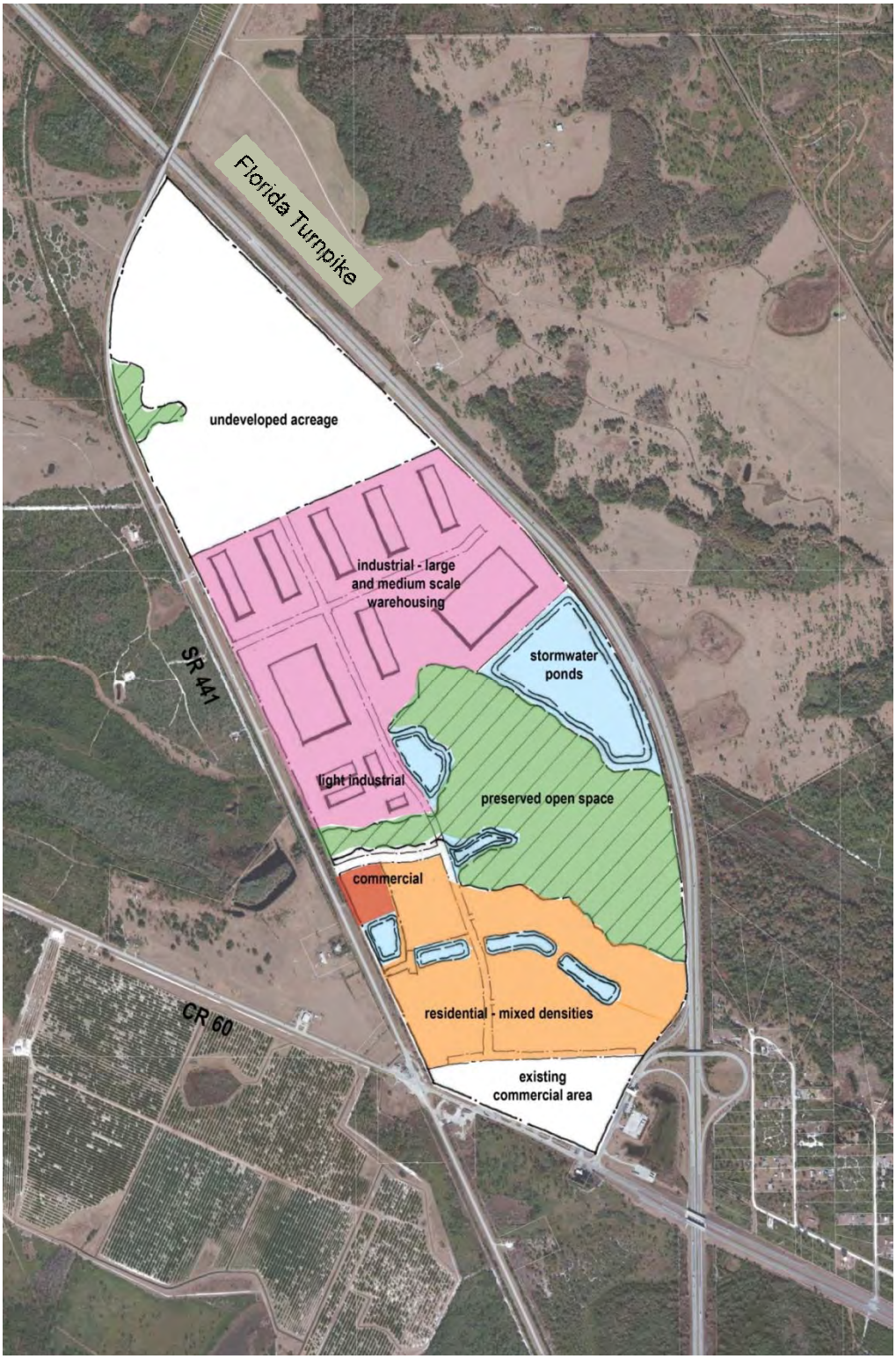
Scenario B, summarized in Table 5.10 is based on two large warehousing facilities, six medium-sized facilities and smaller facilities, as needed, to fill out the program. This scenario may play out if the site develops more incrementally overtime. Figure 5.21 displays an overlay of the elements of Scenario B.

Table 5.11 Summary YTDC Land Development Scenario B Assumptions

Land Use	Acres	Square Feet	Units
Warehouse/Distribution	167	2,000,000	2 large buildings, 6 medium buildings
Light Industrial	21	200,000	4 small buildings
Commercial	5	50,000	Strip center retail
Residential	109		630
Conservation	133		
Ponds	67		
Undeveloped	159		
Utilities	10		Within undeveloped area
Total	671	2,250,000	630

Source: Canin Associates.

Figure 5.21 YTDC Land Development Scenario B



Source: Canin Associates.

Key Findings for the YTDC Overlay

- The cap of 400 acres on the size of any PD submittal forces a potential developer to consider the entire site as one PD;
- The cap on development, as described, will likely leave significant portions of the site undeveloped;
- The smaller scale of warehousing uses equates to more land required for development;
- Access is very good and the planned separation of the industrial versus residential main entry points minimizes truck/car conflicts;
- The size of the residential use is adequate given the proposed development mix and the anticipated quantity of future employees based on that mix; and
- The site lends itself to a good natural buffer between the residential uses and the warehouse/industrial uses.

Conclusions and Implications for Future Freight Villages

- Size constraints on the PD submittal size could prove to be an impediment to development due to land ownership issues and/or the cost of developing the plan and submittal documents. Placing restrictions like this is not recommended for future freight villages, although the creation of a discernible and logical boundary is encouraged.
- The land use mix is heavily weighted toward warehousing, which is logical, but still constraining in terms of flexibility. However, there is the opportunity to provide a land use conversion matrix, and the PD is an appropriate tool to provide for additional development flexibility. The PD tool should be the zoning of choice for future greenfield freight villages.
- Placing a cap on the development intensity at the policy stage may artificially limit the development potential of a freight village. As demonstrated in the scenarios, a significant portion of the site is left undeveloped after the cap on development was reached. Placing a cap on development intensity is a good practice; however, it might be best achieved during the PD process, where detailed studies on the site are performed.
- Including residential in the land use mix works in this situation due to the relatively isolated location and the need to provide housing. In addition, the existing wetlands provide a good natural buffer on the site. However, each potential freight village site must be evaluated on its own merits, and residential uses may not be appropriate to include in a freight village PD due to limited buffering opportunities or existing residential already in the area.
- The housing policy may prove to be too restrictive for timing of the development. For instance, if two large warehouse/distribution facilities want to locate on the site, their combined square footage (based on typical

models) will trigger the provision for on-site affordable housing. Industrial warehousing and residential development do not follow the same market pressures, and one does not necessarily trigger the need for the other in real estate development. Timing of development relative to a residential provision should be considered carefully for future freight village PDs.

5.5 COMMUNITY IMPACTS

Goods movement is essential to supporting the region's economy and quality of life. However, growth in goods movement activities (from manufacturing to truck traffic) also gives rise to negative community impacts. In addition to safety and air quality concerns, freight activities can cause excessive noise and vibration along significant goods movement corridors. As population continues to grow and expand throughout the region, so will commercial centers, leading to more widespread dispersion of freight-intensive impacts such as truck traffic.

Safety issues are probably the most visible impact associated with freight activities, largely related to increasing truck traffic and the risk of truck accidents. Although in the study region there was a *reduction* in truck-involved crashes of about 36 percent between 2006 and 2010, the fact remains that truck-involved crashes are often more severe; and the probability for injury, fatalities, and personal property damage is greater. In addition, the clearance time of truck-involved crashes is likely to be longer, leading to increased delay for all system users.

The freight sector is also associated nationally with increasing pollution, especially emissions of criteria pollutants (and is a particularly significant source of nitrogen oxides (NO_x) and particulate matter (PM) due to the prevalence of diesel engines), air toxics, and greenhouse gases (GHG). This includes emissions from both mobile sources, such as trucks, and stationary sources such as rail yards. Truck traffic is a significant contributor to damaging emissions, and emissions mitigation strategies must address truck emissions. Newer equipment and advanced fuels are tools to reduce the emissions arising from truck traffic. However, these technologies can be costly and may lead to decreased fuel efficiency and other engine maintenance concerns, leading the private sector to be slow in adoption. There is a strong interest in the trucking industry to shift toward alternative fuels – both for the environmental benefits and the economic benefit of lower fuel costs from certain alternatives.[18]

This section will present an overview of key regional concerns and challenges, documenting the scope of the issues. This will facilitate the development of mitigation strategies to enhance livability in the recommendations phase of the

[18] Interviews with several carriers.

study. The key areas examined include air quality, safety, congestion, and light and noise pollution.

Air Quality Concerns: Public Health and the Economy

Emissions from the movement of freight can have serious impacts on public health, property, and the natural environment. From a public health perspective, there are six common air pollutants defined as "criteria pollutants "by the U.S. Environmental Protection Agency (EPA) and the Clean Air Act (CAA): 1) Ozone (O_3); 2) $PM_{2.5}$ and PM_{10}; 3) Carbon Monoxide (CO); 4) NO_x; 5) Sulfur Dioxide (SO_2); and 6) Lead (Pb).

Increased presence of these six criteria pollutants have been linked to a variety of health conditions, including reduced lung function, asthma and other respiratory illnesses, increased risk of cancer, and premature death (especially in vulnerable groups such as children and the elderly).

Emissions from freight movement also lead to the formation of O_3. Ozone is formed when emissions of NO_x chemically react with volatile organic compounds (VOC) under conditions of heat and light (i.e., sunshine). Ozone is linked to a variety of public health impacts, including chest pain, coughing, throat irritation, and congestion. Long-term exposure can worsen existing afflictions like asthma or bronchitis, or even lead to permanently scarred lung tissue.

Research in recent years has continued to explore the health effects related to the freight sector, especially PM, and concerns about toxic "hot spots" is often an issue when regions explore expansion of freight transportation facilities. Although Central Florida currently is an attainment area under the U.S. EPA, the threat of negative regulatory effects of nonattainment, coupled with the negative health consequences for residents proximate to freight facilities, makes air quality impacts a growing concern for the region.

In addition to public health, environmental, and health concerns, air quality nonattainment has the potential to impact the region's economy. Some of the types of requirements that are required under the CAA can make it more costly to live or conduct business. A sampling of the requirements that has been observed across the nation include:

- More stringent and costly emissions control equipment for new or expanding industry (such as requiring industrial facilities to install pollution control equipment or limit their production).
- Higher energy costs due to requirement for cleaner burning fuels.
- More stringent automobile inspection and maintenance requirements.
- Transportation control measures, such as reduced speed limits, peak-time penalties, and congestion mitigation measures. Air quality impacts of freight movement in the Central Florida region is discussed in detail in the Central Florida Regional Freight and Air Quality Report.

Safety Concerns

The Issue

Safety is equally important to the private freight industry and the traveling public. Primary safety concerns related to freight movement include injuries, crashes, the movement of hazardous materials, and security concerns. Trucks, in particular, create concern about crashes and the transport of hazardous materials. The fact remains that truck-involved crashes are often more severe; and the probability for injury, fatalities, and personal property damage is greater. In addition, the clearance time of truck-involved crashes is likely to be longer, leading to increased delay for all system users.

The Scope of the Problem in the Central Florida Region

Total daily vehicle miles traveled (DVMT) over the region's roads has decreased approximately 1 percent from 2006 to 2010 (from 99 million miles to 98 million miles).[19] A review of the crash history for a five-year period between 2006 and 2010[20] for all roads in the study area reveals that the number of truck-involved crashes in 2010 (2,050) decreased by 36 percent from 2006 (3,218). However, the number of crashes not involving trucks in the study area in 2010 (34,565) only decreased by 1 percent from 2006 (34,758). The trend is similar for fatalities and injuries. In the five-year period between 2006 and 2010, fatalities resulting from truck crashes were reduced by 50 percent, and fatalities from other crashes were reduced 27 percent; and truck crash-related injuries decreased 41 percent, compared to other crash-related injuries decreasing by 4 percent. This also means that the proportion of truck-involved crashes to total crashes has decreased from 8 percent in 2006 to 6 percent in 2010 on all roads in the study area.

The study region has a lower incidence of commercial vehicle crash fatalities than does the State of Florida as a whole. While the study region accounted for about 18 percent of overall DVMT in the State of Florida[21], it accounted for approximately 15 percent of total commercial vehicle crash-related fatalities.[22] Reducing the number of crashes, injuries, and fatalities is very important to the study region. Per the National Safety Council estimates, for year 2010, the motor vehicle crashes cost residents and businesses in the study region approximately $3.0 billion in wage and productivity losses, medical expenses, administrative expenses, motor vehicle damage, and employers' uninsured costs.[23]

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[19] FDOT, Reports of Highway Mileage and Travel (DVMT) 2006 and 2010.

[20] FLHSMV Traffic Crash Statistics Report 2010.

[21] FDOT, Reports of Highway Mileage and Travel (DVMT) 2010.

[22] FLHSMV Traffic Crash Statistics Report 2010.

[23] "Estimating the Costs of Unintentional Injuries, 2010," National Safety Council.

Locations on the state highway network that have relatively high truck-crash rates are shown in Figure 5.22 and displays the cumulative number of truck-involved crashes from the years 2006 through 2010 per every 0.1-mile roadway segment. Roadway segments with more than 20 truck-involved crashes are highlighted in red. The greatest concentration of crashes involving trucks has occurred in U.S. 17-92/441 between SR 50 and Orange/Osceola county line, and SR 423 (John Young Parkway) between SR 50 and SR 408.

The section of U.S. 17-92/441 between SR 50 and the Orange/Osceola County line that currently exists as a six-lane with a two-way left-turn lane is being modified as median-divided roadway, and will significantly help improve the safety on this section. Interviews with trucking companies also identified the U.S. 17-92/U.S. 441 corridor (through Orange County) as an area where drivers are advised to avoid, especially during peak hours and between midnight to 3:00 a.m. due to the high percentage of nightclubs and bars along this corridor. Their concern is to avoid potential crashes and costly liability, and several companies are monitoring driver routes to manage this risk.

Congestion

The Issue

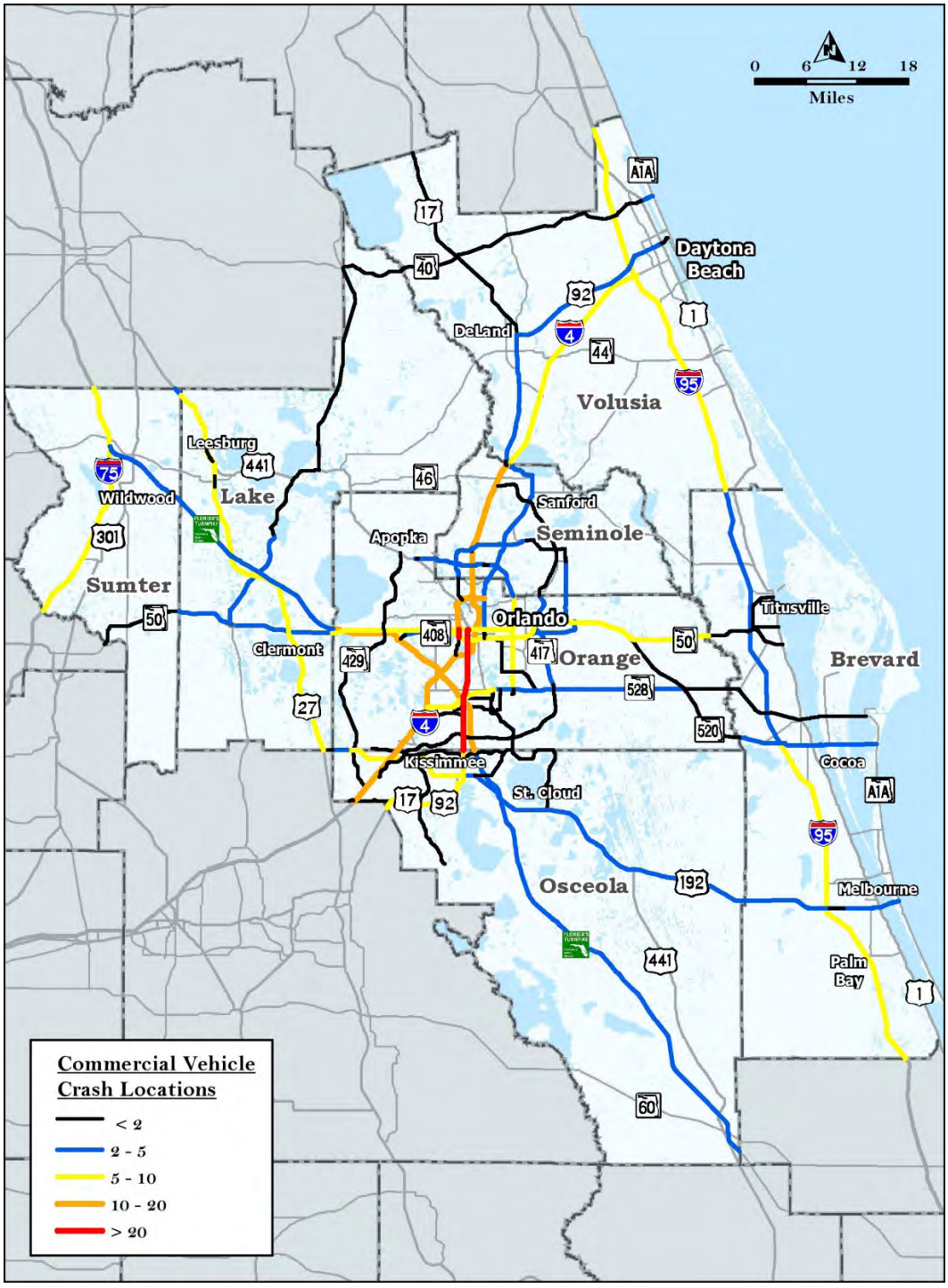
Congestion is a major issue in many metropolitan regions. The extent of the effects congestion can have are not limited to delays and the economic cost of fuel and time wasted; traffic congestion can have a number of effects on drivers, the environment, and health. A high concentration of idling engines produces a large volume of air pollutants and increases the exposure of these pollutants to the occupants of vehicles and residents in surrounding areas. Traffic congestion also has been linked to negative health effects caused by stress – such as fatigue, digestion difficulties, pains, and hypertension.

The Scope of the Problem in the Central Florida Region

Congestion issues are generally concentrated on the region's highway system and would most affect the movement of goods by truck. The core of the study region's highway system currently operates at a level of service (LOS) D, E, or F, a deficient LOS that indicates a generally high level of congestion throughout the region, notably on key freight routes such as I-4, I-95, and SR 408.

Though caused by a combination of many factors, including passenger vehicles, freight vehicles, roadway design, weather, and crashes, the movement of freight does contribute to congestion. This is partially because the highways that comprise the most significant freight routes also are major commute corridors. Some of these corridors (such as I-4, I-95, Florida's Turnpike, and SR 408) see more than 10,000 trucks daily.

Figure 5.22 Commercial Vehicle Crash Locations on State Roads
2006 to 2010



Source: FDOT, FLHSMV Traffic Crash Statistics Report 2010.

Note: Data reported for freight corridors identified in Figure 2.3.

For the nonhighway modes, there does not appear to be congestion issues under current conditions. For rail, the major operational issue, which may affect goods movement flows in the region is the shifting of a portion of the current rail freight traffic on CSXT A Line to the CSXT S Line and a relocated rail terminal facility in Winter Haven, Florida (from Taft) to help accommodate SunRail commuter passenger service. This shift may cause challenges for existing shippers along the S Line who may experience greater volumes of truck traffic and possible congestion on the region's roadways as a result of the new service. The relocation of the rail terminal from Taft (to Winter Haven, in Polk County) also may lead to longer truck trips on some of the study area's major highway freight corridors to access customers within the study area.

Noise and Light Pollution

Noise pollution is described by the U.S. EPA as "unwanted or disturbing sound." In terms of freight movement, noise pollution complaints generally focus on truck sounds (including braking, loading, and engine sounds); train whistles, horns and movement, the sound of air cargo planes, or the sounds that tend to accompany industrial land uses. Noise pollution can have major consequences to people's health. Problems can include annoyance, sleep disturbance, reduced productivity, hearing loss and tinnitus, cardiovascular disease, and effects on the immune system, among others. Noise Induced Hearing Loss (NIHL) is the most common health impact, though research has shown that there are numerous other negative impacts on public health.

Light pollution causes such adverse health outcomes as headaches, carcinoma and other cancers, sleep deprivation and associated health effects such as decreased mental capacity, a compromised immune system, depression, hypertension, and weight gain. Light pollution also can have environmental consequences, such as disrupting delicate ecosystems by confusing animal navigation or changing predator-prey relationships. It also can waste energy if not being used for an active and necessary purpose.

Instances of noise and light pollution are very difficult to depict on a regional scale. However, it is possible to observe the spatial allocation of industrial land uses, which will likely have higher noise and light impacts on their neighbors than other types of land uses.

5.6 SUMMARY

Freight transportation has increasingly invoked "not in my backyard" reactions from communities leading to concerns about the location of freight facilities and the movement of cargo. Despite community apprehension, there is a mutual understanding that freight transportation plays a vital role in the economic well-being of communities and businesses. Nationally, efforts have been made to balance the movement of freight with community goals by making freight transportation operations and facilities "good neighbors." This chapter has

presented data regarding the community impacts arising from freight transportation, and there is a need to identify and implement mitigation strategies for both existing and future impacts.

6.0 Future Freight Demand and the Impact on the Region's Economy

6.1 FACTORS IMPACTING FUTURE FREIGHT VOLUMES

Freight demand is influenced by numerous factors, many of which are subject to change substantially over relatively short periods of times. These factors can be broadly grouped into the following categories:

- Economic structure;
- Industry supply chains and logistics;
- Transportation infrastructure; and
- Public policy, regulation and governance.

Freight demand is directly and positively related with the type and amount of economic activity in a region. The amount and type of goods production and consumption in an area and the relationship between producers, consumers, and intermediate suppliers impact the volume and spatial distribution of freight flows. The following components of the economy have the greatest influence on freight demand:

- Types of industries;
- Personal consumption;
- Trade patterns; and
- Economic geography or land use.

Global Trade Trends

Trade activity is a critical component of the economic opportunity arising from freight activity in the Central Florida region and can be divided into three broad categories: international, domestic, and local. Each of these trade categories have distinct freight demand characteristics in terms of the origin-destination (O-D) patterns of shipments, commodities handled, modes used, types of facilities used, length of haul, size of shipments, and time dependencies. For example, local trade in the region is dominated by trucking compared to international shipments, which depend heavily on marine and rail in addition to trucking.

Florida's deepwater ports and international airports make the region a global gateway and opportunities exist for the Central Florida region to expand its role in the global marketplace. However, positioning to take advantage of these opportunities requires an understanding of the global trade trends most likely to have the greatest impact on the region. These include the expansion of the Panama Canal, diversion of traffic through the Suez Canal, and trade agreements, especially with Central and South American countries.

Expansion of the Panama Canal, through the development of new channels and the widening and deepening of existing ones, will allow it to maintain and even enhance its market share for trade between Asia and the United States. This expansion, scheduled for completion by 2014, will offer opportunities for the intermodal transportation system in the Central Florida region by accelerating growth at the State's deepwater ports.

6.2 CENTRAL FLORIDA FREIGHT FORECASTS

As discussed in detail in the *Future Commodity Flow Profile Report*, two forecasts were developed to examine the future demand for freight transportation in the region.[24]

1. **Forecast 1 – Adjusted Trade and Logistics Forecast.** The forecast developed for the Florida Trade and Logistics study was adjusted to reflect the most up to date expected growth in population and Gross Domestic Product (GDP) in the region, state, and country; and
2. **Forecast 2 – Freight Analysis Framework Version 3.3 (FAF3.3)-Based Forecast.** The Federal Highway Administration's (FHWA) FAF3.3 growth rates were calculated by mode, commodity, and origin-destination (O-D) and were applied to the base year.

Forecast Summary

In 2010, more than 201 million tons of freight moved over the region's transportation system. Projections over the next 30 years estimate freight will increase to the range of 271 million to 325 million tons by 2040 – a 35 to 61-percent increase, respectively. Table 6.1 displays freight flows by weight and direction in 2010 and 2040, including the two forecasts projections developed for this study. Figure 6.1 graphically displays the proportion of regional freight tonnage by direction for 2010 and for the two forecast scenarios in 2040.

[24] The study area is comprised of seven counties in the Central Florida region. This area includes Brevard, Lake, Orange, Osceola, Seminole, Sumter, and Volusia counties.

The largest component of total regional freight, through traffic, is expected to maintain or increase its share over the next 30 years from 60 percent of the total in 2010 to 61 to 66 percent by 2040. Inbound freight is the second largest component and it is expected to maintain this share over the next 30 years (19 percent of the 2010 total and 18 to 19 percent of the 2040 total), which indicates that the Central Florida study region will continue to be a net importer of goods.

Outbound freight is the third largest component, 11 percent of the 2010 total; and by 2040, this share will likely remain constant (10 to 12 percent of the 2040 total). Intraregional freight accounted for 10 percent of the total freight movements in 2010, and over the next 30 years the intraregional freight is expected to decrease to 8 to 6 percent.

Table 6.1 Total Tonnage by Direction
2010 to 2040, Tons in Thousands

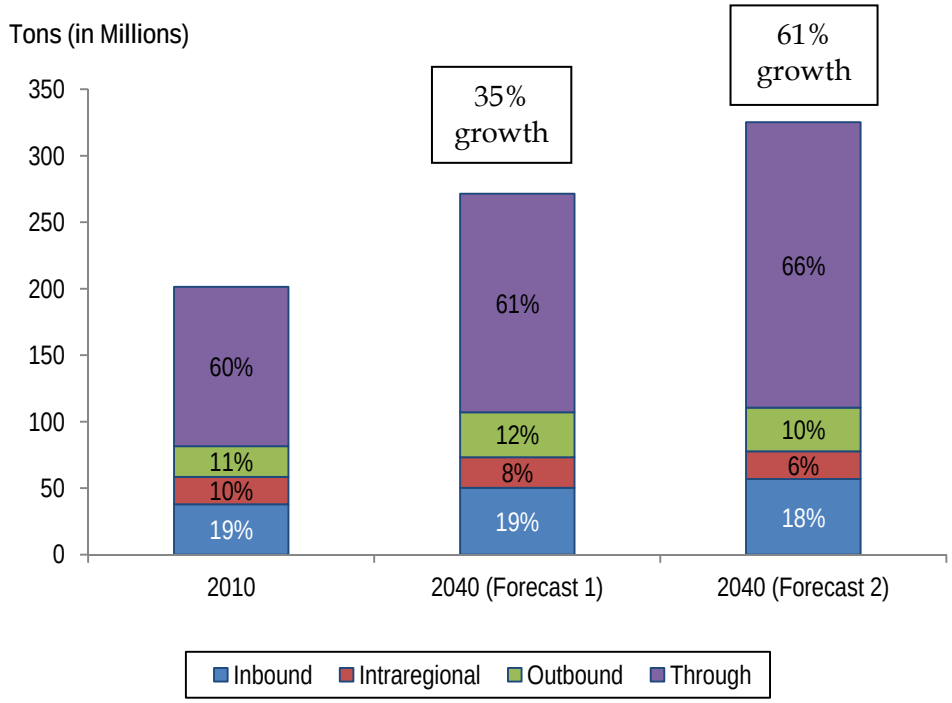
Direction	2010[a]	2040 (Forecast 1)	2040 (Forecast 2)	Percentage Change (2010 to 2040 Forecast 1)	Percentage Change (2010 to 2040 Forecast 2)
Inbound	37,894	50,282	56,926	33%	50%
Intraregional	20,560	23,033	20,832	12%	1%
Outbound	23,129	33,713	32,798	46%	42%
Through[b]	119,857	164,406	214,653	37%	79%
Total	201,440	271,434	325,209	35%	61%

Source: 2010 FDOT Trade and Logistics data, 2009 Full STB Waybill data, 2040 Trade and Logistics New Forecast (Forecast 1) processed by Cambridge Systematics, and 2040 FAF3-Based Forecast (Forecast 2) processed by Cambridge Systematics.

[a] The base year for the rail data is 2009.

[b] Through rail moves were not included due to the inability to estimate it with the full STB Waybill dataset. Therefore, the total through tonnage shown here likely underestimates actual through tonnage due to the lack of through rail data.

Figure 6.1 Direction of Total Freight Flows by Weight
2010 to 2040

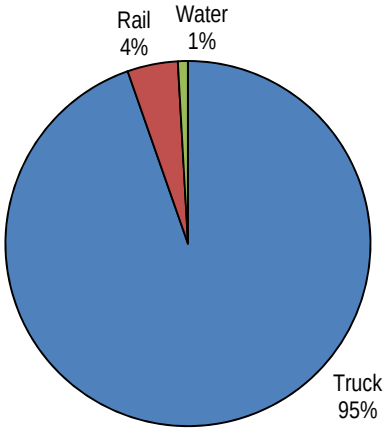


Source: 2010 FDOT Trade and Logistics data and 2009 full STB Waybill data, 2040 Trade and Logistics New Forecast (Forecast 1) processed by Cambridge Systematics, and 2040 FAF3-Based Forecast (Forecast 2) processed by Cambridge Systematics.

Table 6.2 and Figures 6.2 and 6.3 display the breakdown of total freight tonnage by mode for 2010 and the two forecast scenarios in 2040. Clearly, trucks are the dominant mode of freight transportation throughout the region. About 95 percent of all freight tonnage in 2010 and 96 percent in 2040 were moved by truck. Like most regions, Central Florida is dependent on trucks for movement of most of its freight, particularly those shipments that both originate and terminate within the region. This total is reasonable since trucks normally provide the last link in the transportation chain, transporting all types of commodities from their intermediate destinations, such as seaports or rail terminals, to their final destinations.

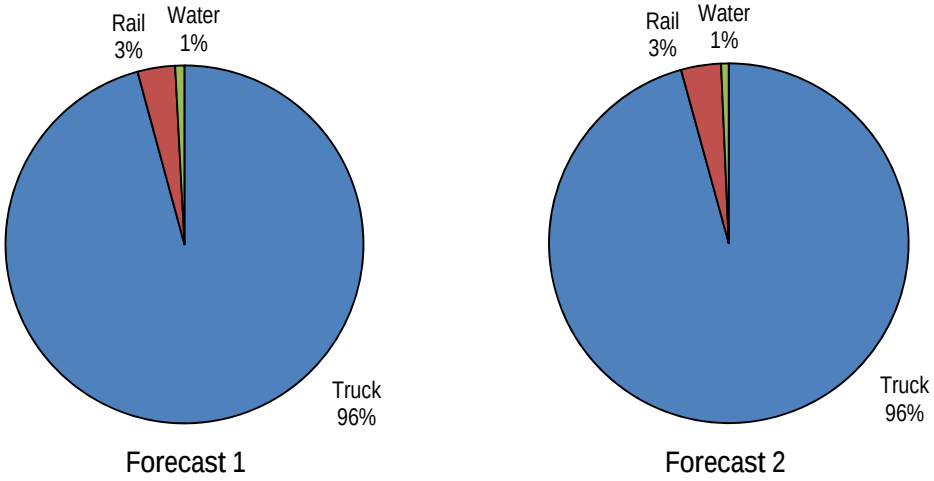
Rail is the second most common mode transporting nearly 4 percent of the freight tonnage in 2010 and 3 percent of the total in 2040, not including rail traffic that simply moves through the region. International waterborne freight through Port Canaveral follows, accounting for 1 percent of the tonnage in 2010 and expected to remain constant in 2040.

Figure 6.2 Mode Share by Weight – All Directions
2010 (Exclusive of Through Rail Tons)



Source: 2010 FDOT Trade and Logistics dataset and 2009 full STB Waybill dataset.

Figure 6.3 Mode Share by Weight – All Directions
2040 (Exclusive of Through Rail Tons)



Source: 2040 Trade and Logistics New Forecast (Forecast 1) processed by Cambridge Systematics; and 2040 FAF3-Based Forecast (Forecast 2) processed by Cambridge Systematics.

Table 6.2 Summary of Regional Freight Flows by Weight
2010-2040, Tons in Thousands (Exclusive of Through Rail Tons)

	Truck			Rail			International Water		
Direction	2010	2040 (Forecast 1)	2040 (Forecast 2)	2009	2040 (Forecast 1)	2040 (Forecast 2)	2010	2040 (Forecast 1)	2040 (Forecast 2)
Inbound	28,745	40,979	45,270	8,530	8,497	10,850	620	806	806
Intraregional	20,560	23,033	20,832	0	0	0	0	0	0
Outbound	22,631	32,942	31,925	480	726	828	18	45	45
Through	118,714	163,010	213,257	N/A[a]	N/A[a]	N/A[a]	1,142	1,396	1,396
Total	190,650	259,964	311,284	9,010	9,223	11,678	1,780	2,247	2,247

Source: 2010 FDOT Trade and Logistics data, 2009 Full STB) Waybill data, 2040 Trade and Logistics New Forecast (Forecast 1) processed by Cambridge Systematics, and 2040 FAF3-Based Forecast (Forecast 2) processed by Cambridge Systematics.

[a] Through rail moves were not included due to the inability to estimate it with the full STB Waybill dataset. Therefore, the total through tonnage shown here likely underestimates actual through tonnage due to the lack of through rail data.

County-Level Forecasts

To better understand which portions of the Central Florida study region are impacted by which types of freight movement, county-level freight profiles were developed. This section of the report describes the existing conditions in freight tonnage for each of the seven counties in the study region. Table 6.3 show 2010 and 2040 freight tonnage for inbound, outbound, intracounty, and through movements for each of the seven counties in the study region. Excluding through traffic, Orange County is the jurisdiction with the highest level of freight accounting for 40 percent of the freight tonnage moving into, out of, and within the region. Brevard County with Port Canaveral follows, accounting for 20 percent of the freight activity inbound, outbound, and intraregionally. Including through traffic, Orange County accounts for 24 percent of the freight tonnage moving in, out of, within, and through the region; and Osceola and Sumter Counties follow, each accounting for 18 percent of the total freight activity.

While Orange County is projected to continue to be the most significant county in terms of total volumes, it is projected to grow at a slower rate than many of the other counties. Table 6.4 presents the range of projected growth in commodity tonnage by county. Osceola, Orange, and Sumter Counties are projected to be the fastest growing in commodity tonnage under Forecast 1, while Brevard, Osceola, and Volusia are projected to be the fastest growing in commodity tonnage under Forecast 2.

Table 6.3 Inbound, Outbound, Intracounty, and Through Freight Flows by County
2010 to 2040, Tons in Thousands

	Inbound			Outbound			Intracounty			Through			Total		
County	2010	2040 (Fcst. 1)	2040 (Fcst. 2)	2010	2040 (Fcst. 1)	2040 (Fcst. 2)	2010	2040 (Fcst. 1)	2040 (Fcst. 2)	2010	2040 (Fcst. 1)	2040 (Fcst. 2)	2010	2040 (Fcst. 1)	2040 (Fcst. 2)
Brevard	7,292	9,624	8,576	10,422	13,017	16,835	1,388	1,744	1,660	22,984	30,975	47,392	42,085	55,361	74,463
Lake	5,611	6,631	7,759	4,777	4,945	3,588	832	650	504	72,140	100,326	119,484	83,361	112,553	131,336
Orange	23,878	29,589	33,048	12,091	19,626	16,810	2,584	3,842	2,645	93,208	126,834	156,092	131,761	179,891	208,595
Osceola	2,598	2,974	3,670	458	737	468	12	19	12	92,515	130,804	156,872	95,583	134,534	161,022
Seminole	8,474	10,886	12,093	2,074	2,333	3,255	171	198	130	28,829	36,401	49,302	39,549	49,819	64,780
Sumter	1,079	1,016	1,644	5,009	3,576	2,879	3	2	2	93,501	130,857	156,399	99,592	135,451	160,925
Volusia	3,907	5,443	5,463	3,388	5,538	4,468	471	497	352	51,117	66,076	97,586	58,882	77,553	107,869

Source: 2010 FDOT Trade and Logistics data, 2009 Full STB Waybill data, 2040 Trade and Logistics New Forecast (Forecast 1) processed by Cambridge Systematics, and 2040 FAF3-Based Forecast (Forecast 2) processed by Cambridge Systematics.

Table 6.4 Projected Growth in Commodity Tonnage by County

	Growth	
County	Forecast 1	Forecast 2
Brevard	24.0%	43.5%
Lake	25.9%	36.5%
Orange	26.8%	36.8%
Osceola	29.0%	40.6%
Seminole	20.6%	38.9%
Sumter	26.5%	38.1%
Volusia	24.1%	45.4%

Source: 2010 FDOT Trade and Logistics data, 2009 Full STB Waybill data, 2040 Trade and Logistics New Forecast (Forecast 1) processed by Cambridge Systematics, and 2040 FAF3-Based Forecast (Forecast 2) processed by Cambridge Systematics.

Traffic Forecasts

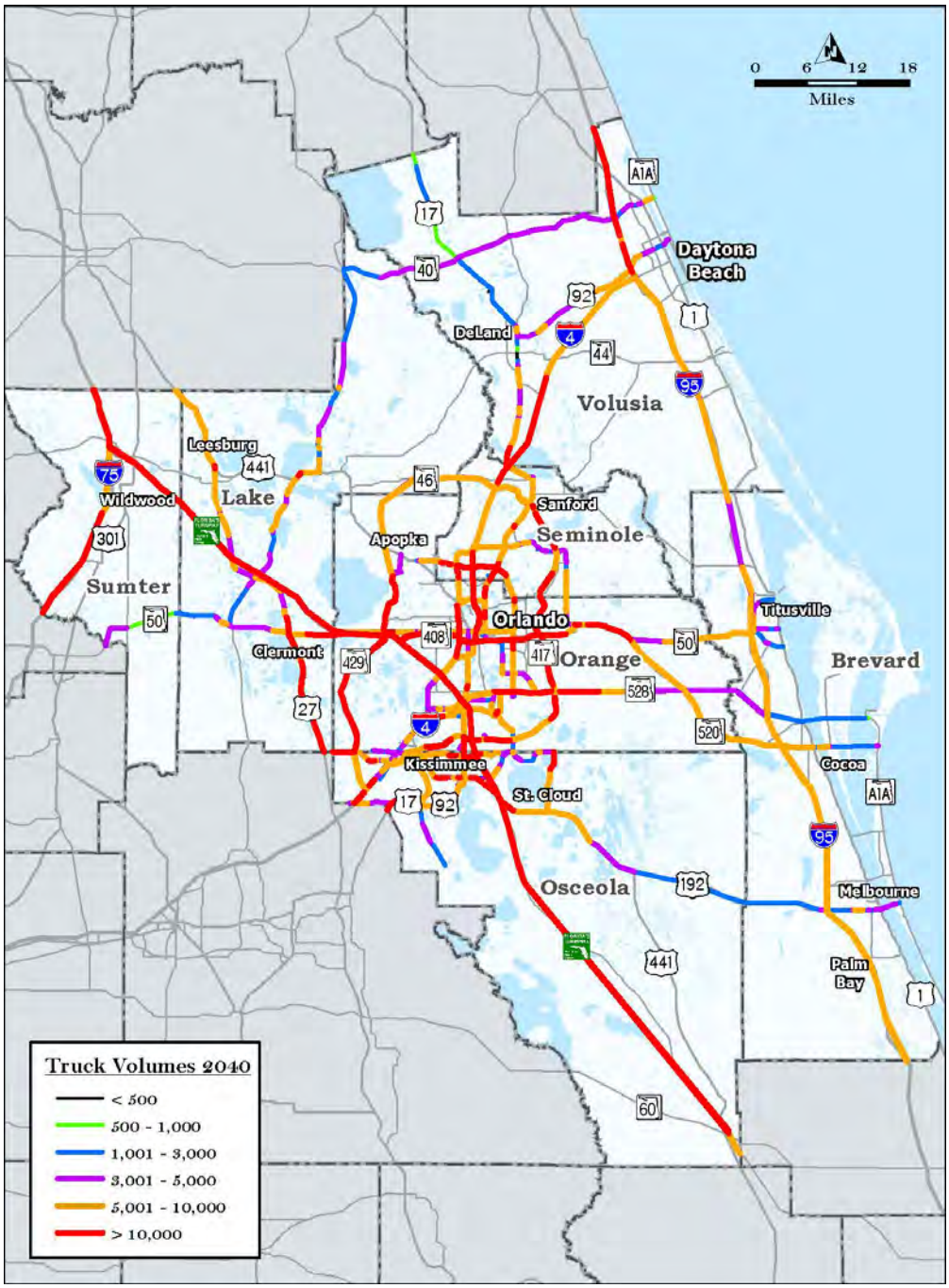
Freight in the Central Florida area is projected to remain heavily dependent upon highway truck transportation for the movement of goods within and through the region due to both the development patterns of the region, as well as the limited ability of other modes, such as rail and water to provide flexible, reliable, and cost-competitive service to these areas. Intermodal rail and bulk commodities through Port Canaveral will remain vitally important to the continued growth of the region and progress in underway by CSX, FEC, and Port Canaveral to meet future demand. The highway network must consider the needs of all road users, including truck traffic.

The future pattern of freight, goods, and services movements throughout the seven-county study area was conducted by the consultant team in coordination with MetroPlan Orlando and FDOT District 5 through an analysis of the 2040 Truck forecasts prepared by the MetroPlan Orlando modeling consultant. The 2040 forecast was developed from the FDOT District 5 regional travel demand model (CFRPM) using the spatial freight origin and destination inputs completed as part of the Central Florida Freight Flow profile and using the model to assign this truck forecast over the future highway network. The results of the model freight flows were screened and organized to evaluate corridors projected to carry the greatest volumes of heavy truck traffic.

The model produced highway network truck volumes for light trucks and heavy trucks. It is noted that the 2040 highway network used in the CFRPM is an *approximated network* that reflects the currently adopted highway projects in the applicable LRTPs of the composite MPO/TPO study area. A long-range plan update is underway by MetroPlan Orlando that will revise and refine the adopted plan.

The 2040 truck forecast by average annual daily truck traffic (AADTT) truck volume range is shown in Figure 6.4. Data represented in this figure reflects post-process data-smoothing that was necessary to assignment irregularities, such as zero volume highway links or imbalanced daily truck flows.

Figure 6.4 2040 Highway Truck Forecast



Source: CFRPM 2040 Truck Model, GIS Analysis by HDR.

The forecasts indicate that the highways that currently carry the greatest volume of trucks are expected to add the greatest number of trucks in the future. This includes I-4, I-75, Florida Turnpike, SR 508, SR 429, U.S. 27, and I-95. The truck traffic forecast also indicate the regional freight subsystem identified in Chapter 3 will continue to be the portion of the region's roadway network that is most critical to freight movement in 2040.

6.3 ECONOMIC IMPACT OF FREIGHT ACTIVITY

The existing multimodal freight transportation system within MetroPlan Florida is diverse with access to multiple east-west and north-south highways, a Class 1 railroad, three Class 2 and three railroads, a deepwater port, multiple air cargo facilities, and a spaceport. These transportation choices provide the region with a competitive advantage for freight transport; one that should be built upon as the area continues to grow. Freight generates the following impacts in the MetroPlan region:

- 31,785 transportation and warehousing jobs in 2011;
- 6,344 air transportation-related jobs in 2011;
- 201.4 million tons of freight moved to, from, through, and within MetroPlan;
- $2.3 billion in transportation and warehousing value-added; and
- For every million tons of freight moved in Central Florida, 155 direct transportation jobs and $7 million in direct income is created.

The economic impact of freight on the Central Florida region is discussed in detail in the *Central Florida Regional Freight Economic Impact Report*. Policy changes promoting increased efficiency, infrastructure improvements, freight diversions, and better access to the transportation system can generate benefits beyond jobs, income, and value-added. Freight improvements can impact shippers and receivers, direct users, and the public and result in "out-of-pocket" savings and benefits to society. Out-of-pocket benefits include vehicle operations and maintenance savings, fuel cost reductions, and shipper cost savings. The benefits to society include environmental, safety, roadway congestion, travel time savings, and roadway maintenance. Each of these potential freight-induced benefits is described in Table 6.6.

Table 6.5 Summary of Potential Transportation Benefits

Type of Impacts	Population Affected by Impacts	Economic Benefit
Reductions in pollutants and GHG	Florida Residents	Monetized value of reduced emissions
Shipper cost savings & inventory costs	Shippers and receivers	Monetized value of shipper cost and inventory savings
Reduced roadway congestion	Roadway users	Monetized value of roadway congestion
Reductions in property losses, injuries, and deaths due to safety improvements	Florida residents	Monetized value of reduced accidents
Reduced pavement maintenance associated with vehicle use of roadways	Florida residents	Monetized value of pavement maintenance savings
Reduced vehicle operating and maintenance costs	Shippers and receivers	Reduced vehicle use and depreciation
Travel distance and fuel consumption reduction due to use of more efficient route or mode	Shippers and receivers	Reduction in fuel consumption
Construction delay	Shippers and receivers	Delays associated with freight delays during construction periods
Reduced travel time	Florida residents, and shippers and receivers	Monetized value of reduced travel time for heavy trucks

The benefit concepts described above are often used in benefit-cost analyses of transportation projects and are consistent with U.S. DOT and FDOT guidelines. Often, transportation improvement projects also require separate analyses to estimate the short-term and long-term economic impacts to the region. The short-term impacts are directly related to the initial construction expenditures; whereas, the long-term impacts focus on the operations of the project in terms of jobs, income, and GDP growth. Using data from the FHWA's FAF, along with job and income data from the Bureau of Labor Statistics, a series of job and freight conclusions were drawn to develop "planning-level" job creation estimates for the MetroPlan region. This sketch-level analysis found that, for every million tons of freight moved in Central Florida, it creates 155 direct transportation jobs and $7 million in direct income.[25] Alternatively, using multipliers from the IMPLAN model, it is estimated that for every $1 million spent on transportation services, 6 to 9 direct and indirect jobs were generated, as well as $325,000 to $500,000 in net new income for Florida.[26]

[25] Estimated using Central Florida region data from the FHWA FAF3 and Bureau of Labor Statistics CES.

[26] Estimated using the IMPLAN Model.

7.0 Needs and Deficiencies

Current and future freight mobility needs were identified based on data, technical analysis and stakeholder input presented above and in previous technical reports. The needs presented here are focused on those of regional concern and on the regional freight system identified in Chapter 3 and in general represent systemic needs. Systemic needs can be defined as universal or general mobility issues that are broader in nature and may reflect infrastructure, operational, institutional and/or regulatory deficiencies or inefficiencies. Often, but not always, addressing systemic needs requires significant investment in terms of infrastructure and money and/or innovative solutions. The systemic needs for current and future freight mobility in the Central Florida region have been organized around four key issues including:

- System capacity
- Freight Land Use Opportunities and Conflicts
- Safety
- Community and Environmental Impacts

7.1 SYSTEM CAPACITY

Congestion and resulting capacity deficiency were identified as a significant concern on the major interstates and freight routes. The ultimate goal of this plan is not to identify projects that simply add additional capacity, but rather identify a combination of solutions that maximize the velocity or throughput of the region's multimodal transportation system. The first step in the process is understanding what is causing congestion since it is not always simply too much volume. The research conducted and documented as part of this needs assessment and in previous reports for this effort revealed three root causes of congestion, existing and projected.

First, there are physical infrastructure constraints on existing freight-significant roadways. These range from the need for new capacity addition to operational improvements, including infrastructure management and business practices and institutional bottlenecks.

Second, there are new growth patterns emerging that impact freight travel patterns currently and especially in the future. These include robust population growth in the counties surrounding the City of Orlando and Orange County; investment in intermodal and inland port facilities in Winter Haven and

potentially Sumter County; and expansions of the regional port facilities such as Port Canaveral and Citrus County. While the existing system provides some connectivity between these regions, it does not necessarily do so in the most direct manner, leading to spillover congestion issues to other parts of the region.

Third, to date the region's congestion issues have by in large been addressed through single mode solutions without accounting for spillover impacts across modes. With the addition of SunRail, the interaction of the two surface transportation systems (highway and rail) is going to increase, potentially resulting in chokepoints because planning of the two networks not fully incorporate the systemwide impacts.

These three root causes of congestion impact freight travel throughout the region giving rise to significant needs on critical components of the region's freight system as discussed below.

Intermodal Connectors and Key Freight Arterials

A key part of the study effort has been to identify existing and near term needs that have significant impact on freight movements. These types of bottlenecks often include inefficient intermodal connectors and arterials serving historical and newly developed industrial and commercial areas. Focusing on these types of bottlenecks often leads to significant improvements to freight mobility and reductions in community impacts at relatively low costs. Additionally, improving throughput on these facilities can also lead to reduced pressure on other local and regional roadways.

Intermodal connectors provide critical connections between freight nodes and their users. They are a part of any freight system, but given the essential role they play in goods movement they deserve additional focus. The primary points of concern are the ports, the airports, with MCO being the dominant freight facility, and the rail intermodal terminals. Virtually all of these facilities lie along the major arteries. The issue then is ensuring the connections to those arteries can accommodate efficient truck operations and significant truck volumes. In addition, more direct connections may be needed.

A prior SIS study conducted by FDOT District 5identified project needs through year 2030. These phased project recommendations developed from the SIS connector study have been updated to reflect the current year to year 2025 as Phase 2 and year 2025 to 2040 as Phase 3. Table 7.1 presents examples of intermodal connectors and freight arterials that have various deficient conditions. This list is not intended to represent the full universe of specific needs but rather focus on those having the most impact on the freight network examined in Chapter 3 of this report. Many of the facilities listed have numerous deficiencies, including physical and operational.

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Table 7.1 Central Florida Regional Freight Subsystem Intermodal Connector Needs by County

Intermodal Hub/Freight Facility	Roadway / Connector	Need / Improvement
Brevard County		
Port Canaveral	SR 401 from Port to SR 528	The Canaveral Port Authority (CPA) has identified the following improvement needs in the SR 401 corridor. • An additional westbound dedicated through lane on SR 401 for spaceport departing traffic, • Median improvements to clearly delineate truck merging and acceleration lanes for entering westbound heavy trucks, • Relocation of Grouper Road, • Deceleration lanes for stacking of trucks at the main entrance Long term • Replace 401 moveable bridge over the barge canal with a fixed span • Implement findings of 2018 On-Port Access Study (FM# 4320801)
Kennedy Space Center and Cape Canaveral Air Force Station	NASA Pkwy from I-95 to Space Center	<u>Phase 1</u> • Add second NB left turn at SR 405 and Grissom Pkwy • Provide DMS/VMS signs at SR 405 @ SR 407 and SR 50 at I-95 ramps to provide information on traffic during launches <u>Phase 2</u> • Add second WB left turn at SR 405 and Grissom Pkwy. • Add second NB (SR 405) right turn lane at SR 405 and Barna Ave. • Add second EB right turn lane at SR 405 and Grissom Pkwy. <u>Phase 3</u> • Add second EB left turn lane at SR 405 and SR 50. • Modify exclusive right turn lane to shared right and through lane at SR 405 and Grissom Pkwy. • Add second WB left turn lane at SR 405 and Grissom Pkwy. • Add second EB left turn lane at SR 405 & Sission Rd. • Drainage; Reinforce Pavement for Heavy Trucks

Intermodal Hub/Freight Facility	Roadway / Connector	Need / Improvement
Melbourne International Airport	St. Johns Heritage Pkwy / I-95 Interchange - Planned New proposed interchange and roadway improvements US 192 – various intersection improvements. Airport Blvd from Airport to US 192 US 192 from Airport Blvd to I-95 - Planned widening from 4 lanes to 6 lanes in 2020. Ellis Road from John Rodes Blvd to Wickham Rd - Planned widening from 2 lanes to 4 lanes Airport Blvd from Airport to US 192	<u>Ellis Road/NASA Blvd as SIS Connector</u> New Interchange with I-95 at Ellis Road and the widening of Ellis Rd to four lanes between Wickham Rd/NASA Blvd and the interchange. This project has completed PD&E which is now awaiting approval by FHWA. Once the PD&E is approved, FDOT will request a moving in the SIS connector designation from US 192/Airport to Ellis Rd/NASA Blvd. This will provide a direct four lane connection between MIA and I-95 <u>US 192 as SIS Connector</u> <u>Phase 1</u> • Add an exclusive SB left turn lane at John Rhodes @ US 192 • Add second NB left turn lane at Wickham Rd. @ US 192 • Add second SB right turn at Evans Rd. @ US 192 <u>Phase 2</u> • Add second EB left turn lane, second SB left turn lane and an exclusive WB right turn lane at John Rhodes @ US 192 • Add two EB right turn lane, second SB left turn lane, an exclusive SB right turn lane, third EB through lane and third WB through lane at Wickham Rd. @ US 192 • Add third EB through lane and third WB through lane at Meadowlane Rd. @ US 192 • Add second SB left turn lane, second WB left turn lane, third EB through lane and third WB through lane at Dayton Rd. @ US 192 • Modify EB right turn lane to shared through and right turn lane, add third WB through lane and second NB left turn lane at US 192 @ Laila Ct. • Add second SB left turn lane, second WB left turn lane, second NB left turn lane, third EB through lane and third WB through lane at Evans Rd. @ US 192 • Modify EB and WB right turn lane to shared through and right turn lane at US 192 @ Melbourne Sq. Mall • Add second EB left turn lane, third EB through lane and third WB through lane at Dairy Rd. @ US 192 • Add second EB left turn lane and second SB right turn lane at Airport Blvd. @ US 192 • Add an exclusive EB right turn lane, an exclusive SB right turn lane and an exclusive WB right turn lane at Airport Blvd. @ Hibiscus Blvd. • Add an exclusive NB right turn lane and an exclusive WB right turn lane and modify the SB right turn lane to shared through and right turn lane at Airport Blvd. @ Nasa Blvd. • <u>Phase 3</u> • Add second WB right turn lane and third SB through lane at Wickham Rd. @ US 192 • Modify NB right turn lane to shared through and right turn lane and add an exclusive EB right turn lane at Evans Rd. • Add second SB right turn lane and second WB left turn lane at US 192 and Dairy Blvd. • Add third EB through lane and third WB through lane at Airport Rd. @ US 192 • Add an exclusive SB right turn lane at Airport Blvd @ Nasa Blvd.***

Intermodal Hub/Freight Facility	Roadway / Connector	Need / Improvement
Lake County		
Leesburg Municipal Airport	SR 44 / Main St from Airport to Dixie Ave Dixie Ave from SR 44 to US 27 US 27 from Dixie Ave to Turnpike	<u>Phase 1</u> • SR 44 -TSM / operational strategies (i.e. signal coordination) • US 27 - TSM / operational strategies (i.e. signal coordination)
Orange County		
Orlando International Airport	Jeff Fuqua Blvd from Airport to SR 528	Planned Passenger Rail service from SR 528 to Terminal (All Aboard Florida Proposal)
	Tradeport Dr from Airport to SR 528	Planned widening from 4 lanes to 6 lanes in 2020; TSM / operational strategies (i.e. signal coordination). <u>Phase 2</u> • Add an exclusive NB right-turn lane on Tradeport Dr at Boggy Creek Rd and Tradeport Dr. <u>Phase 3</u> • Add second EB through lane on Boggy Creek Rd at Tradeport Dr. and Boggy Creek Rd. Add second WB through lane on Boggy Creek Rd at Tradeport Dr. and Boggy Creek Rd.

Intermodal Hub/Freight Facility	Roadway / Connector	Need / Improvement
Orlando Amtrak / Intermodal Yard	Sligh Blvd from Amtrak to Columbia St Columbia St from Sligh Blvd to Division Ave Division Ave from Columbia St to Kaley Ave Kaley Ave from Division Ave to I-4	<u>Phase 1</u> • Improve directional signage to and from Orlando Amtrak station. • Sligh Boulevard - Planned realignment and improvements to accommodate future BRT along Sligh Boulevard <u>Phase 2</u> • Add an exclusive NB right-turn at Division and Columbia St. • Add an exclusive WB right-turn at Division and Columbia St. <u>Phase 3</u> • Add an exclusive NB right-turn lane for EB off-ramp. • Signalize Division Ave. and Columbia St. • (if warranted) • Kaley Ave from Division Ave to I-4 - Widen from 4 lanes to 6 lanes • Division Ave from Columbia St to Kaley Ave - Planned widening from 2 lanes to 4 lanes in 2020; TSM / operational strategies (i.e. signal coordination
Orlando Executive Airport	Crystal Lake Dr from Airport to SR 408 Andes Ave from Lake Underhill Rd to SR 50 Fairgreen St from Old Cheney Hwy to Maguire Blvd	<u>Phase 3</u> • Andes Ave from Lake Underhill Rd to SR 50 – New North-South connection – potential toll road • Fairgreen St from Old Cheney Hwy to Maguire Blvd Parallel roadway behind existing development; Provides back of house access and circulation
Osceola County		

Intermodal Hub/Freight Facility	Roadway / Connector	Need / Improvement
Kissimmee Gateway Airport	Hoagland Blvd from Airport to US 17-92	<u>Phase 1</u> • Add a signal at Hoagland Blvd. and 5th St. intersection (if warranted) • Modify EB shared through and right turn lane to exclusive through and right turn lanes at US 192 and Thacker Rd • Add second NB left turn lane at Thacker Avenue and US 192 <u>Phase 2</u> • Add second EB left turn lane and second WB left-turn lane at Thacker Avenue and US 192 • Add third WB left turn lane at Osceola Pkwy and Michigan Ave • Add second NB through lane at Osceola Pkwy. and Michigan Ave <u>Phase 3</u> • Add second WB left-turn at US 192 and Hoagland Blvd Modify SB right turn lane at US 192 and Thacker Rd. to shared right and through lane • Add third NB left turn lane at Osceola Pkwy. and Michigan Ave • Widen from 2/4 lanes to 6 lanes • Realign roadway

Intermodal Hub/Freight Facility	Roadway / Connector	Need / Improvement
Kissimmee Intermodal Center	Main Street / Broadway Ave Osceola Pkwy from Main St to Turnpike	<u>Phase 1</u> • Enhance passenger pick-up/drop-off area • Enhance bus boarding area • Improve directional signage for Amtrak and Greyhound stations • Develop alternate truck routes to serve development and station area redevelopment. Main St objective to increase pedestrian and transit not compatible with heavy truck operations. Potential use of Oak Street and other parallel roadways. <u>Phase 2</u> • Add a traffic signal at Main St. and Dakin Ave. (if warranted) • Add third WB left turn lane at Osceola Pkwy and Michigan Ave. • Add second NB through lane at Osceola Pkwy. and Michigan Ave. • Planned widening from 6 lanes to 8 lanes in 2020 on Osceola Pkwy from Main St to Turnpike • TSM / operational strategies (i.e. signal coordination) <u>Phase 3</u> • Add second WB left turn at Main St. and Oak St. • Add third NB left-turn lane at Osceola Pkwy. and Michigan Ave.
Polk County		
Winter Haven CSX Integrated Logistics Center (NEW FACILITY)	Pollard Rd from Project to SR 60	Construction of site is underway.
Seminole County		

Intermodal Hub/Freight Facility	Roadway / Connector	Need / Improvement
Sanford (Auto Train Station) Amtrak	SR 46 from Amtrak to I-4	<u>Phase 1</u> • Provide bicycle racks at the Amtrak Station • Pavement resurfacing on Persimmon Ave. from SR 46 to Amtrak Tracks <u>Phase 2</u> • Add a new signal at Persimmon Ave. (if warranted) • Improve directional signage for Amtrak station along the connector • TSM / operational strategies (i.e. signal coordination) <u>Phase 3</u> • Add second NB left-turn at I-4 NB off-ramp to WB SR 46 • Add second WB right-turn at I-4 NB off-ramp • Add third NB left-turn at Town Center Blvd • Add third NB left-turn at Rinehart Rd • Widen from 4 lanes to 6 lanes
Orlando Sanford International Airport	Airport Blvd access to Sanford Ave Lake Mary Blvd from Red Cleveland Blvd to SR 417	Planned widening from 4 lanes to 6 lanes in 2020 <u>Phase 1</u> • Modify shared SB right-turn to exclusive lanes (i.e. add one SB right-turn lane) at Lake Mary Blvd. @ CR 427/Sanford Ave • Limited designated routes for truck access due to residential development surrounding airport support areas. Identify route for truck access. <u>Phase 2</u> • Add third EB Left-turn lane, third WB left-turn lane and second NB left-turn lane at Lake Mary blvd. @ CR 427/Sanford Ave • Improve directional signage to/from the airport <u>Phase 3</u> • Add second SB RT at Lake Mary Blvd. @ CR 427/Sanford Ave • Add EB through at Lake Mary Blvd. @ CR 427/Sanford Ave
Volusia County		
Daytona Beach International Airport	US 92 from SR 483 to I-95	<u>Phase 1</u> • Add second SB right turn at Williamson Blvd • Programmed signal improvements <u>Phase 3</u> • Add a second NB left turn lane at US 92 and Williamson Blvd • Add a second SB left turn lane at US 92 and Williamson Blvd

Intermodal Hub/Freight Facility	Roadway / Connector	Need / Improvement
Ormond Beach Municipal Airport (non-SIS)	Airport Rd from Airport to US 1 / SR 5 US 1 / SR 5 from Airport Rd to I-95	Phase 3 • Widen US 1 from 4 lanes to 6 lanes
Deland Municipal Airport (non-SIS)	Industrial Dr from Airport to Brunswick Ln Brunswick Ln from Industrial Dr. to US 92 US 92 / International Spdwy from Brunswick Ln to US 17	Phase 1 • US 92 is programmed for resurfacing Phase 2 • Resurface and improve Industrial Dr for truck usage
New Smyrna Beach Municipal Airport	US 1 from Airport to Canal St Canal St from US 1 to SR 44 SR 44 from Canal St to I-95	Phase 2 • Resurface US 1 and SR 44 • TSM / operational strategies on Canal St (i.e. signal coordination) Phase 3 • Widen US 1 and SR 44 from 4 lanes to 6 lanes

Sources: FDOT District 5 Work Program (programmed improvements) and FDOT District 5 LOS_All (planned improvements); Final FDOT District 5 SIS Connectors Needs Assessment (2010)

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Bottlenecks at Key Interstate Interchanges and Freight Generators

Truck bottlenecks are recurring chokepoints along highways and other roadways that severely impede efficient freight movement. Bottlenecks are a national issue, and the identification of freight bottlenecks is a key feature of recent MAP-21 legislation. At the state and MPO level, identification and mitigation of network performance issues is key to meeting federal requirements and to ensuring efficient trade and commerce. To analyze key truck bottlenecks using truck GPS data, the American Transportation Research Institute (ATRI) was enlisted to conduct an analysis of the central Florida region.

ATRI utilized its proprietary truck GPS database to identify and measure congestion at 10 of the worst truck bottlenecks in the study area based on truck delay. As background, the ATRI truck GPS database compiles anonymous trucking operations data from several hundred thousand trucks. Each truck used in performance measurement analyses has a regular position read (generally every 1 to 15 minutes) and contains a vehicle speed. At a given highway location 1) historical truck position datasets can be compiled, 2) average truck speed trends can be tracked and 3) bottlenecks can be identified.

The first step in this analysis was to select a dataset within the nine-county area. The dataset selected covered truck positions on weekdays for 12 months, January through December 2012.

Next the dataset for the area was further narrowed to include just data points that fell along the Florida SIS road network and other key freight corridors. These data were then organized into roadway segments which were generally 1 mile in length.

The data for each roadway segment was analyzed by hour of day, and aggregated average speed profiles were created for each. This process included a calculation of the following key measurements for each segment:

- Free Flow Speed: defined as the maximum hourly average speed.
- Congestion Threshold: defined as hours of an average weekday where average speed is below 85% of free flow speed.

The congested times and locations were next identified using the congestion threshold measurement, and by calculating the extra travel time that would be needed to traverse a congested segment. The travel time delay figures were multiplied by the number of truck position reads in each time/segment bin to capture the importance of locations for freight movement. Finally, for each segment within the study network the total delay across a typical 24 hour time period was calculated to produce an average daily delay figure.

The 10 worst truck bottlenecks were identified using the total delay measurement. The following section contains a report for the 10 worst bottleneck locations (shown in Figure 7.1) that were identified through this analysis. The locations are as follows, in rank order by total delay:

- US 17/92 at Poinciana Blvd
- US 17/92 near FL Turnpike
- I-4 at SR 408
- SR 60 at US 17
- SR 50 at US 17/92
- US 192 at US 17/92
- US 17/92 Downtown Kissimmee
- US 192 near FL Turnpike
- SR 436 at I-4
- SR 50 at SR 408

It was determined by the research team that the location in downtown Kissimmee was temporary constraint due to construction activity and thus it was removed from the analysis.

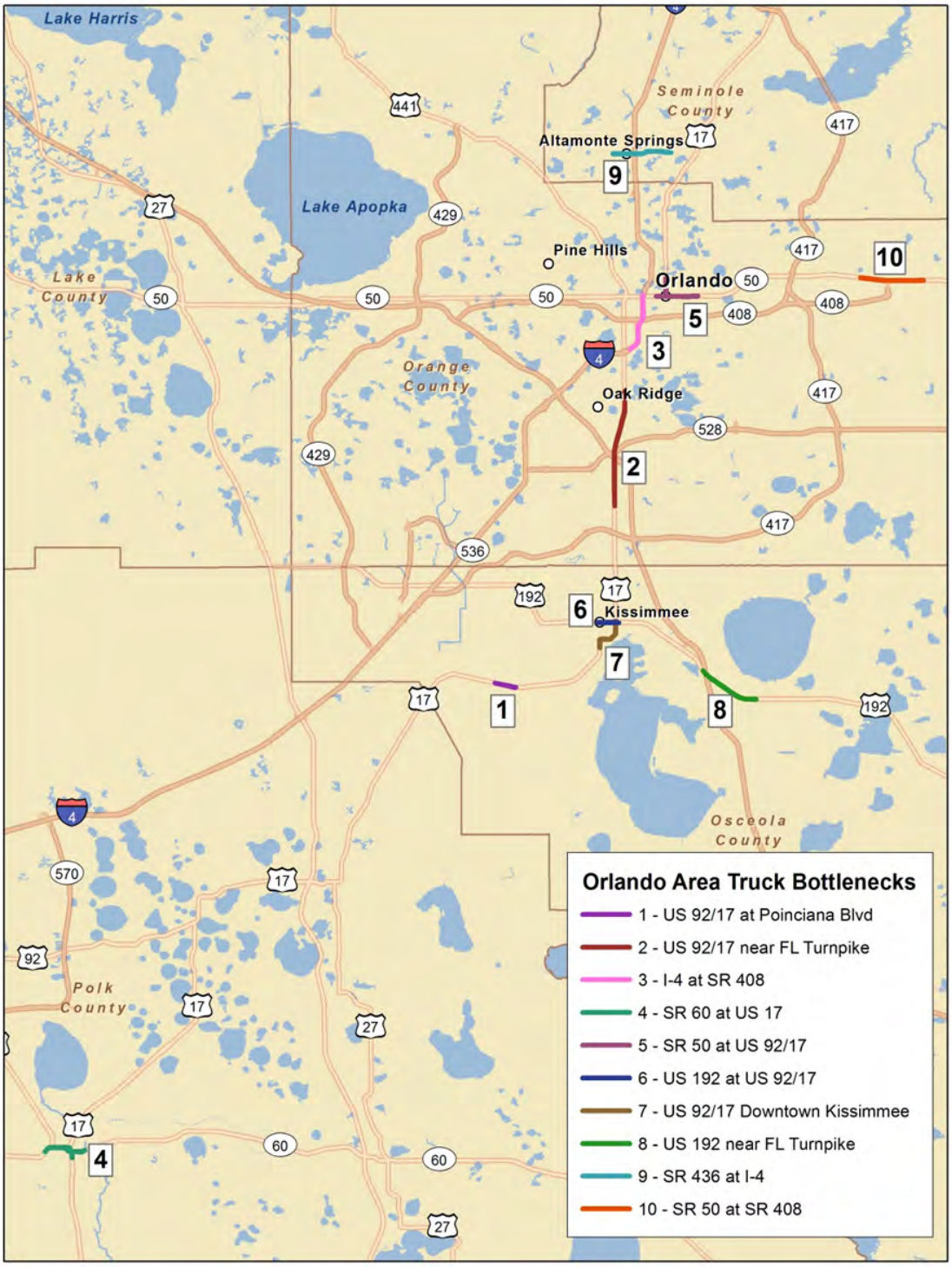
The results of the analysis are contained in Figures 7.2 to 7.10. Each summary includes:

- A context map
- congestion threshold distribution chart for each direction
- average hourly speed
- hours per day below the congestion threshold (based on daily averages)
- slowest speed/free flow speed (a measure of variability)
- volume index[27]

An in-depth examination of these bottlenecks will be undertaken as part of the development of recommendations and solutions.

[27] A volume index from 0-100 based on the number of position reads per mile in the bottleneck segments relative to all other segments analyzed. Each segment was given a percentile score from 0-100, with the segment having the highest number of position reads per mile equal to 100. The index scores for all segments in the bottleneck were averaged to generate the overall bottleneck volume index. For example, a value of 75 means that a segment contained more position reads per mile than found in 75% of segments analyzed.

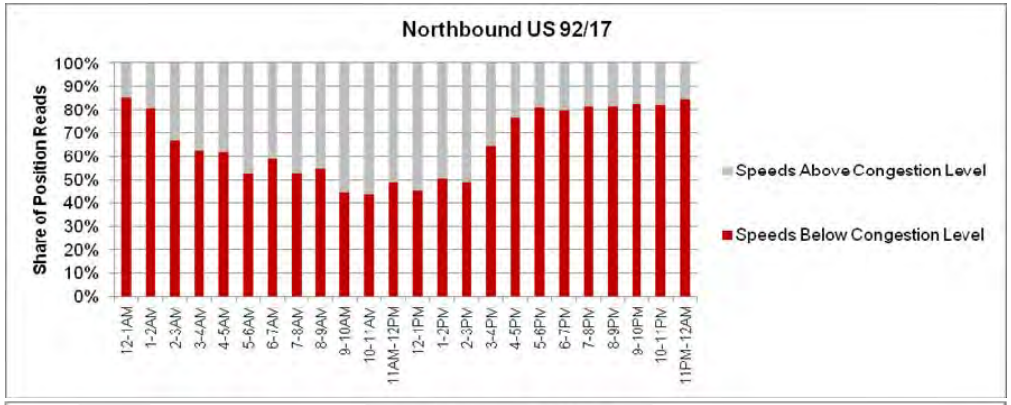
Figure 7.1 Location of Most Significant Truck Bottleneck Based on Delay, 2012

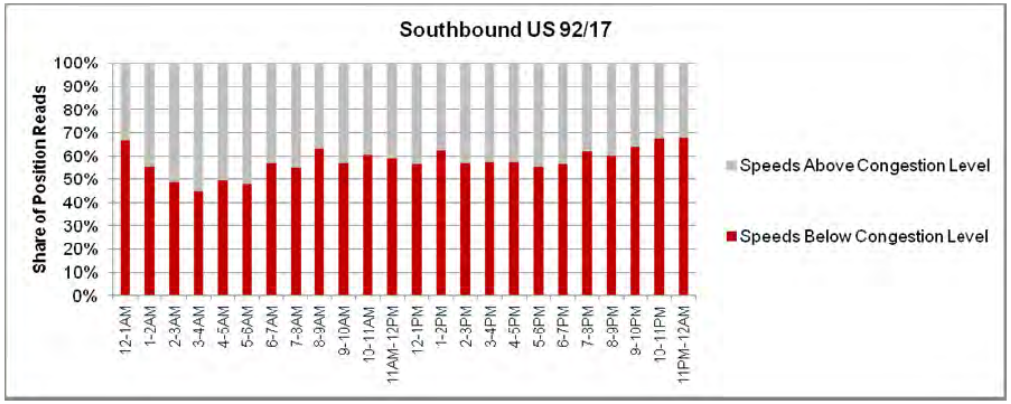


Source: ATRI

Figure 7.2 US 17/92 at Poinciana Boulevard, Osceola County

Hours/Day Below Congestion Threshold: 20 of 24
Slowest Speed/Free Flow Speed (Variability): **54**%
Volume Index: **93** of 100





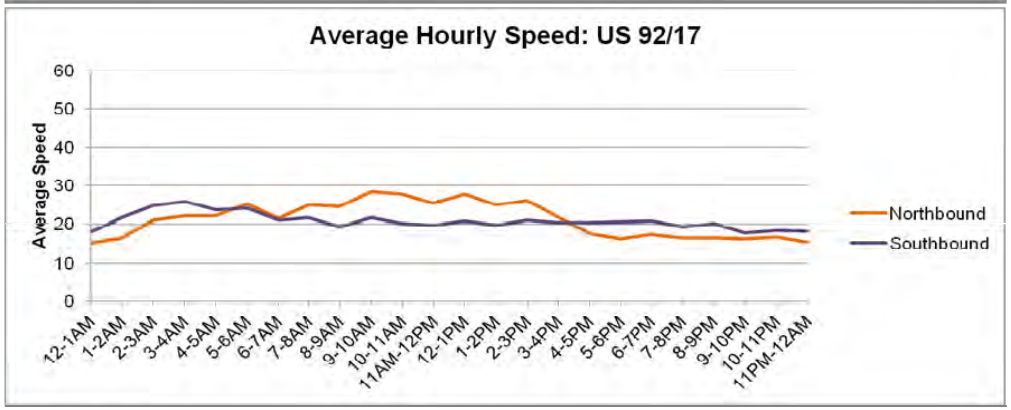
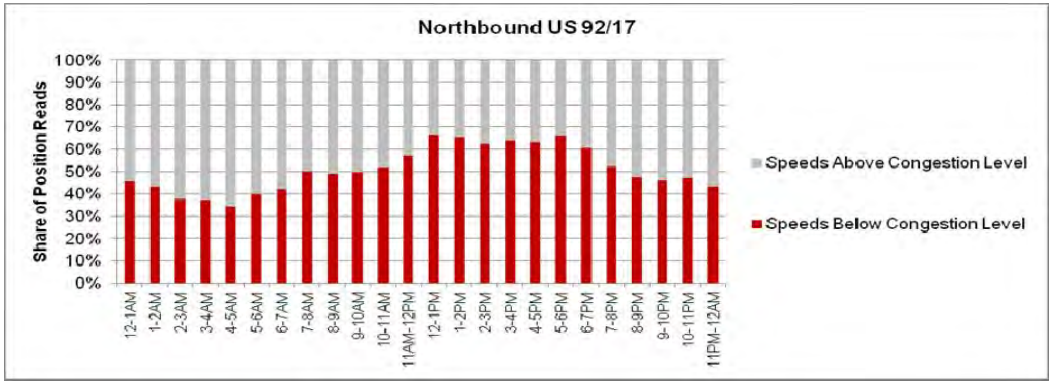
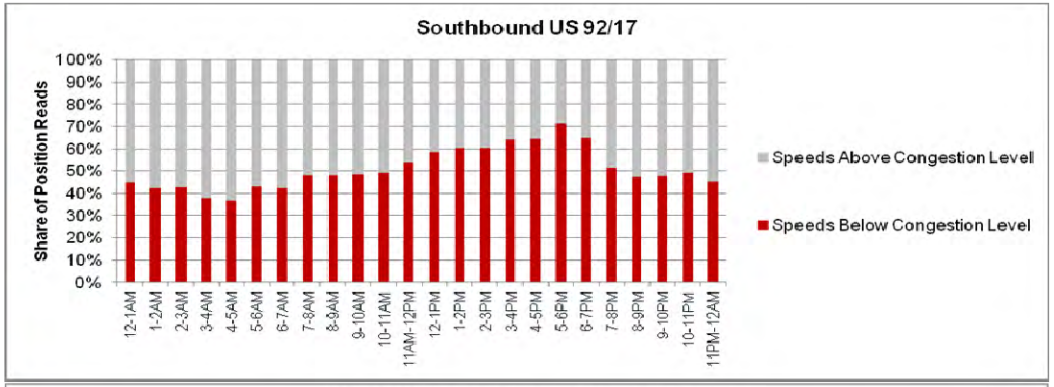


Figure 7.3 US 17/92 near Florida's Turnpike, Orange County

Hours/Day Below Congestion Threshold: **22** of 24
Slowest Speed/Free Flow Speed (Variability): **39%**
Volume Index: **80** of 100





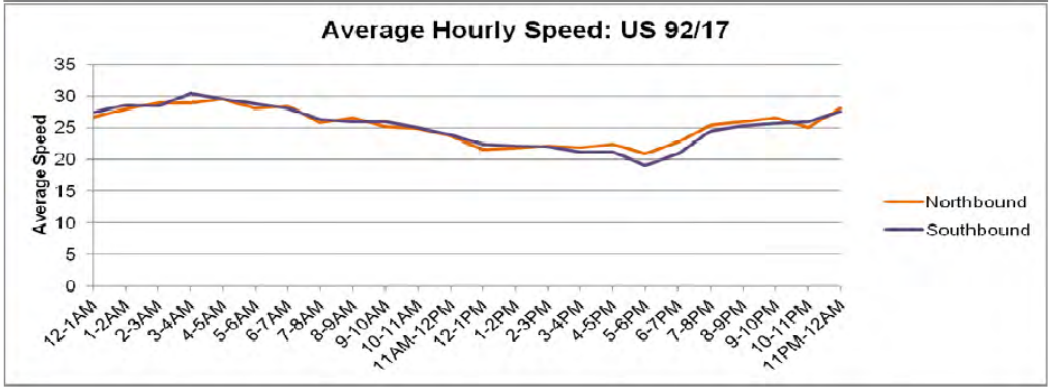
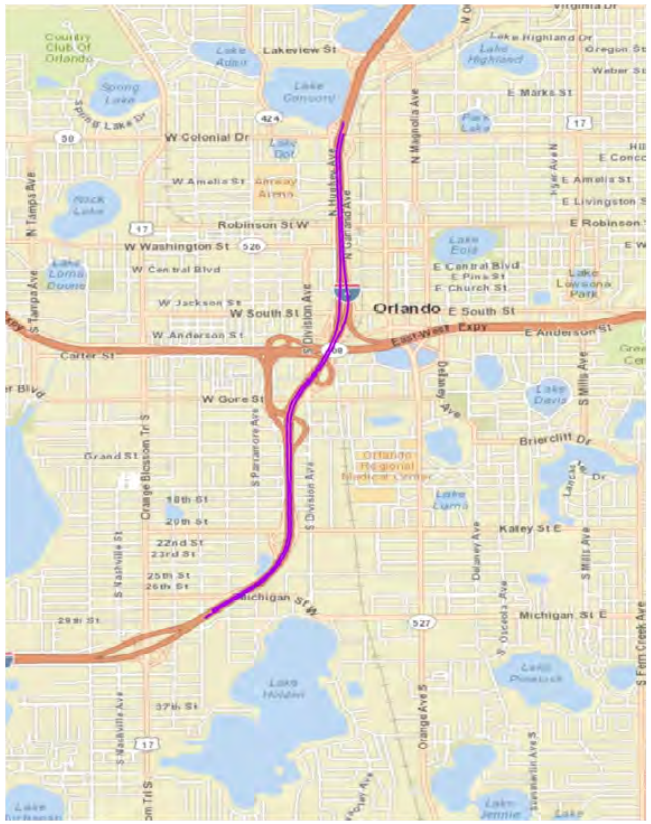
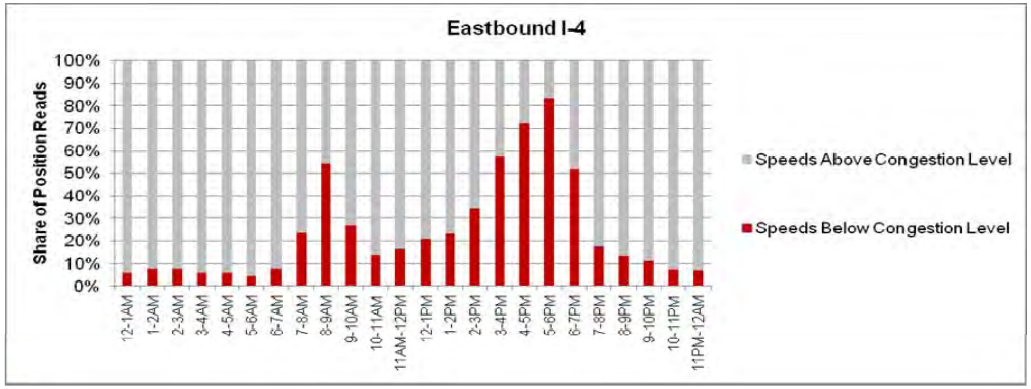
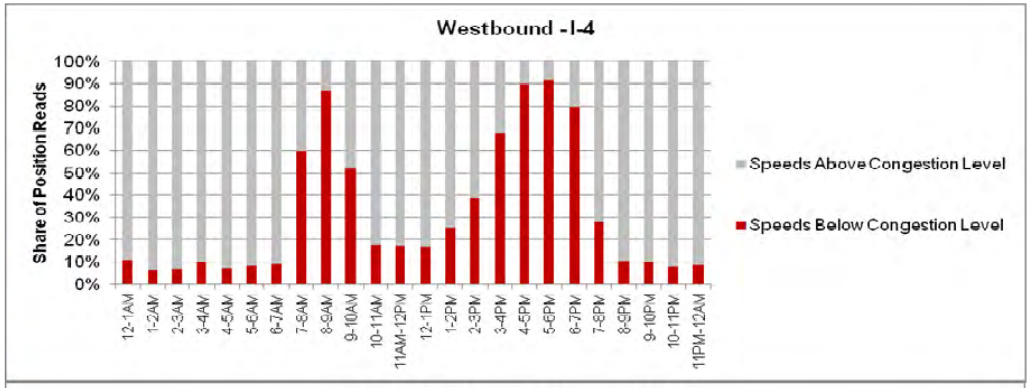


Figure 7.4 Interstate 4 at SR 408, Orange County

Hours/Day Below Congestion Threshold: **10** of 24
Slowest Speed/Free Flow Speed (Variability): **25**%
Volume Index: **99** of 100







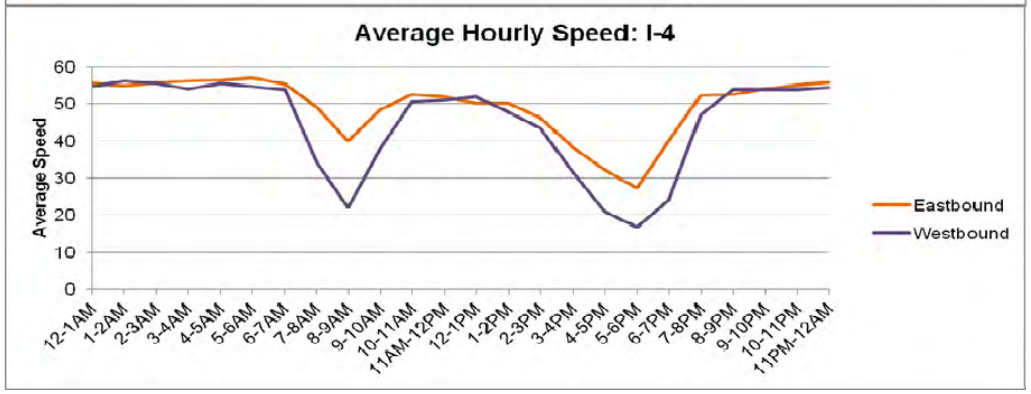
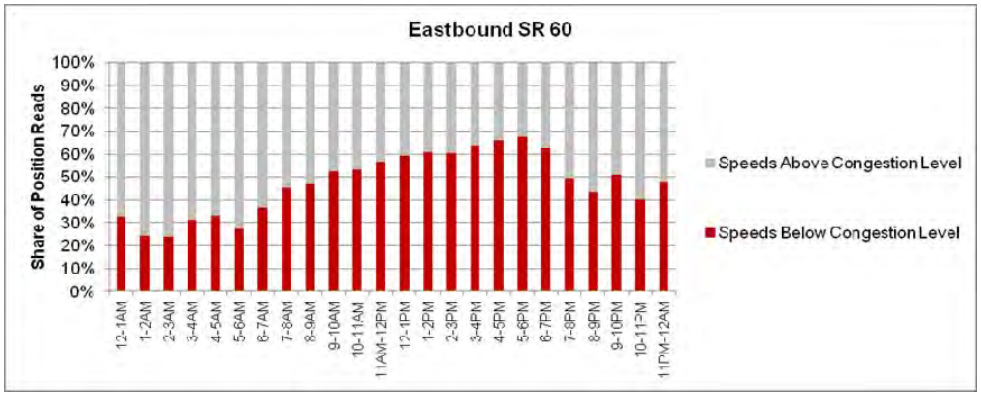
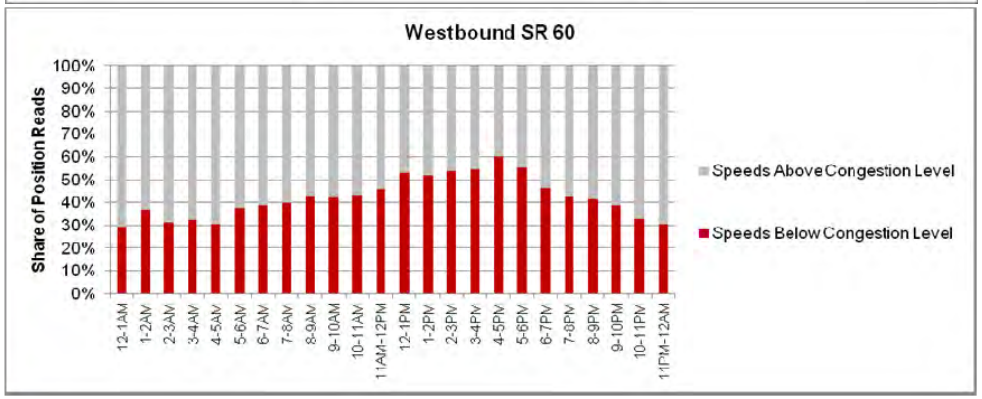


Figure 7.5 SR 60 at US 17, Polk County

Hours/Day Below Congestion Threshold: **17** of 24
Slowest Speed/Free Flow Speed (Variability): **59%**
Volume Index: **75** of 100





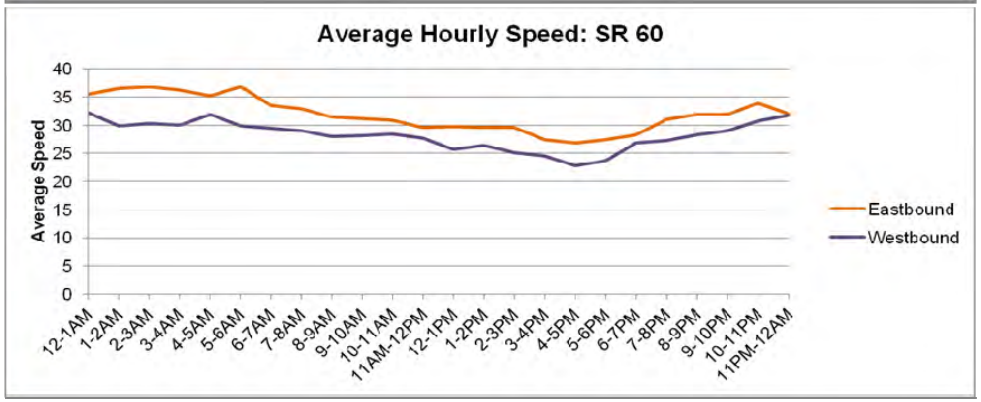
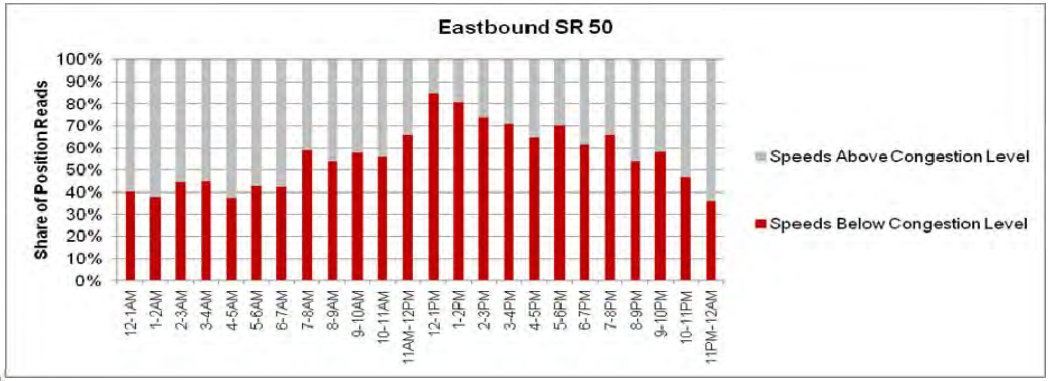
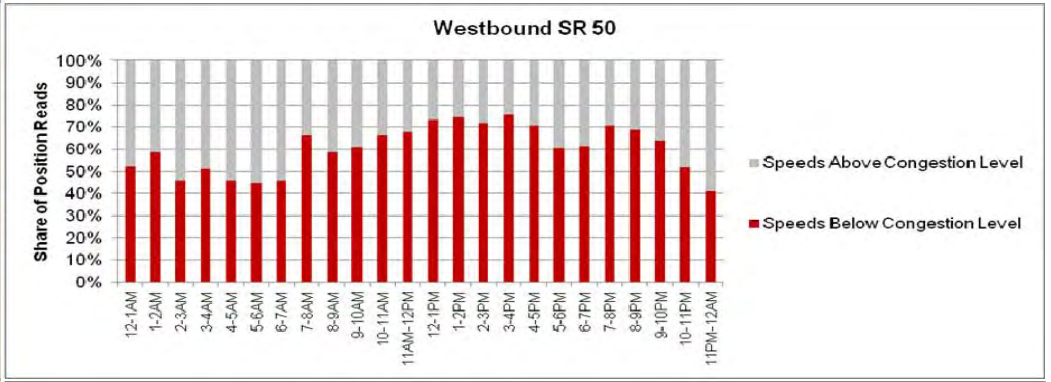


Figure 7.6 SR 50 at US 17/92, Orange County

Hours/Day Below Congestion Threshold: **19** of 24
Slowest Speed/Free Flow Speed (Variability): **44**%
Volume Index: **53** of 100





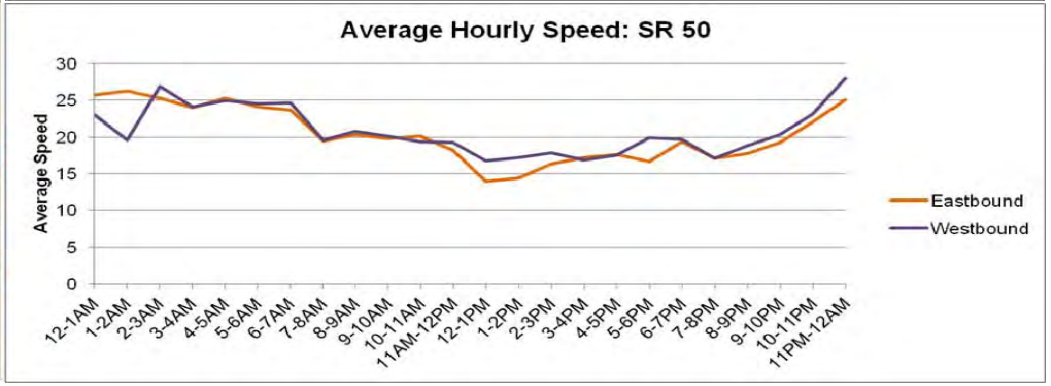
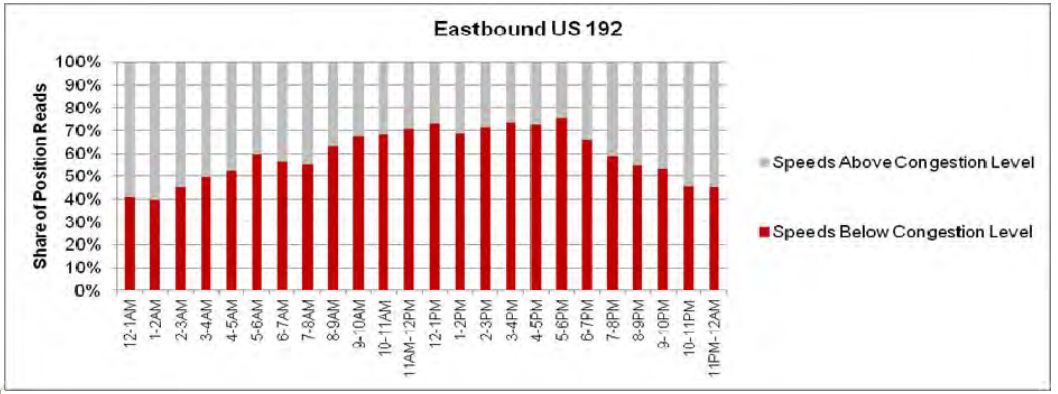
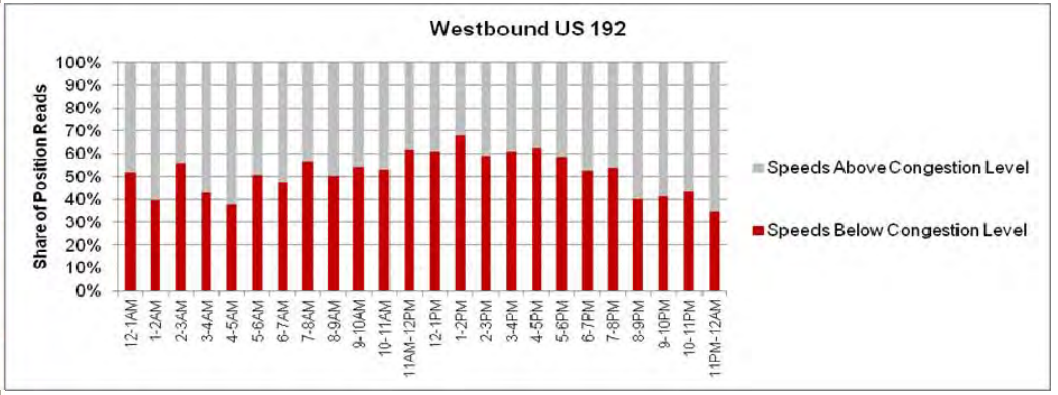


Figure 7.7 US 192 at US 17/92, Osceola County

Hours/Day Below Congestion Threshold: **18** of 24
Slowest Speed/Free Flow Speed (Variability): **59**%
Volume Index: **78** of 100





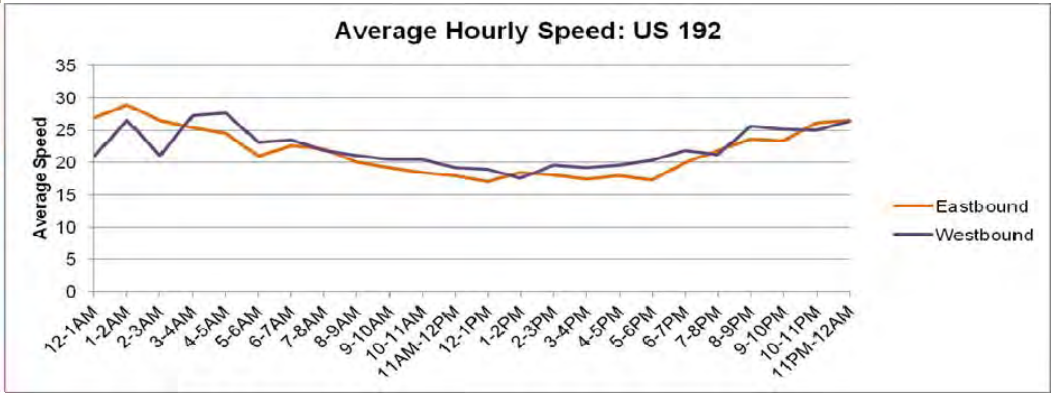
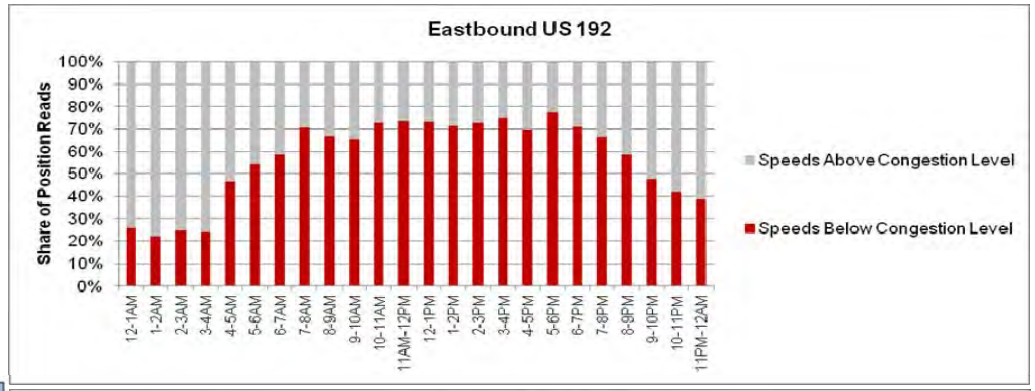
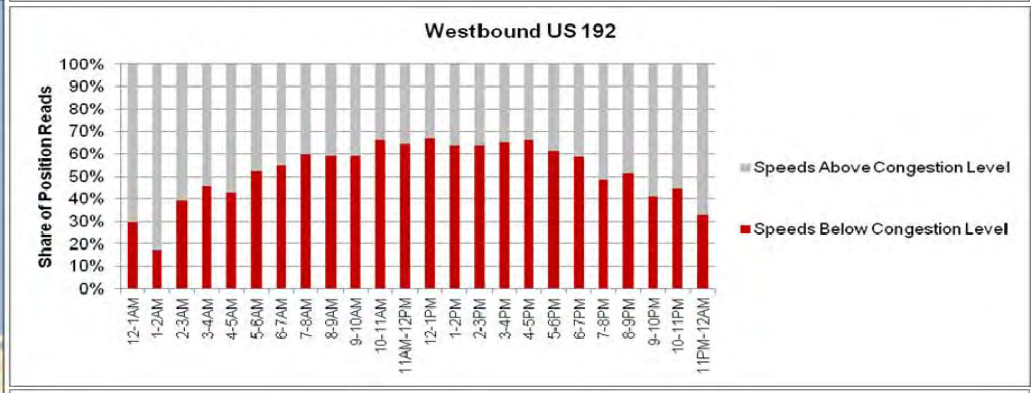


Figure 7.8 US 192 near Florida's Turnpike, Osceola County

Hours/Day Below Congestion Threshold: **20** of 24
Slowest Speed/Free Flow Speed (Variability): **43%**
Volume Index: **55** of 100





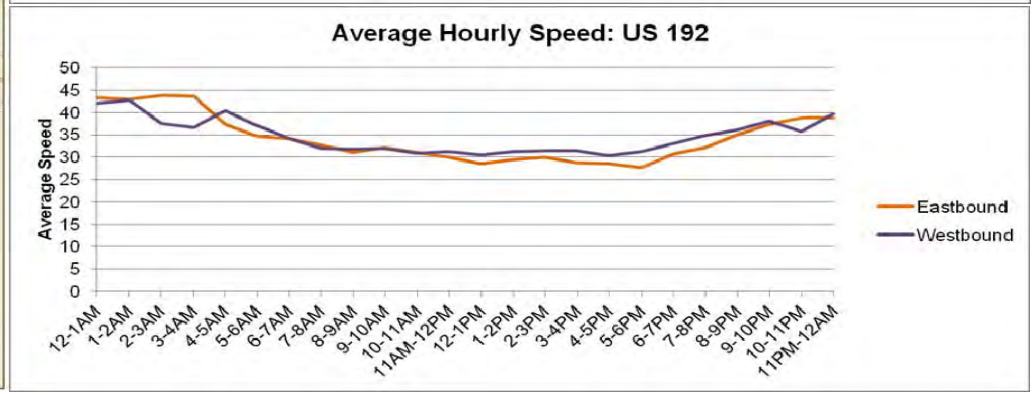
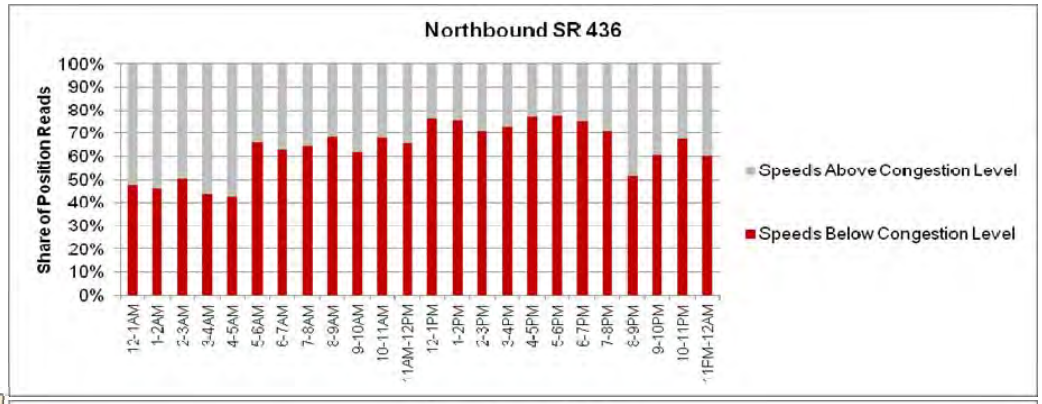
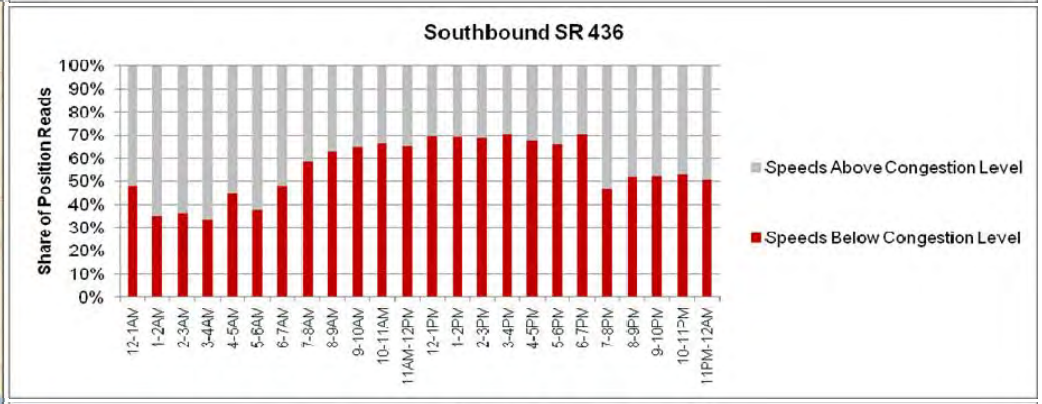


Figure 7.9 Interstate 4 at SR 436, Seminole County

Hours/Day Below Congestion Threshold: **21** of 24
Slowest Speed/Free Flow Speed (Variability): **47%**
Volume Index: **55** of 100





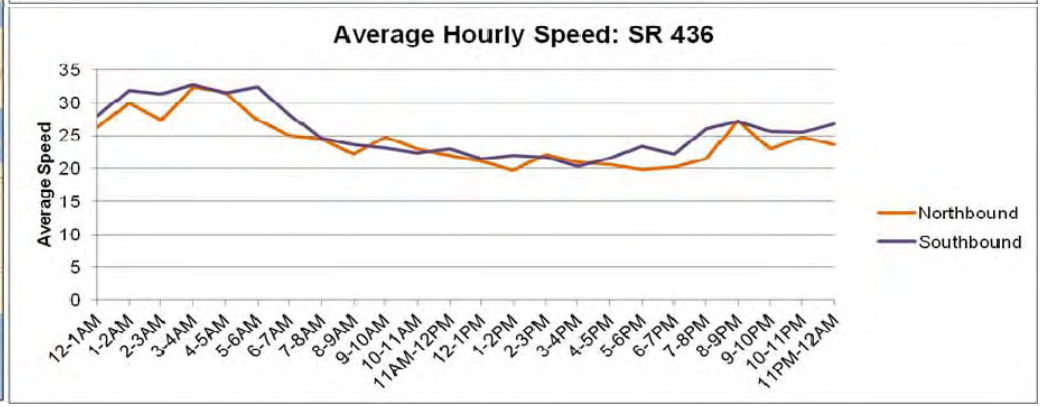
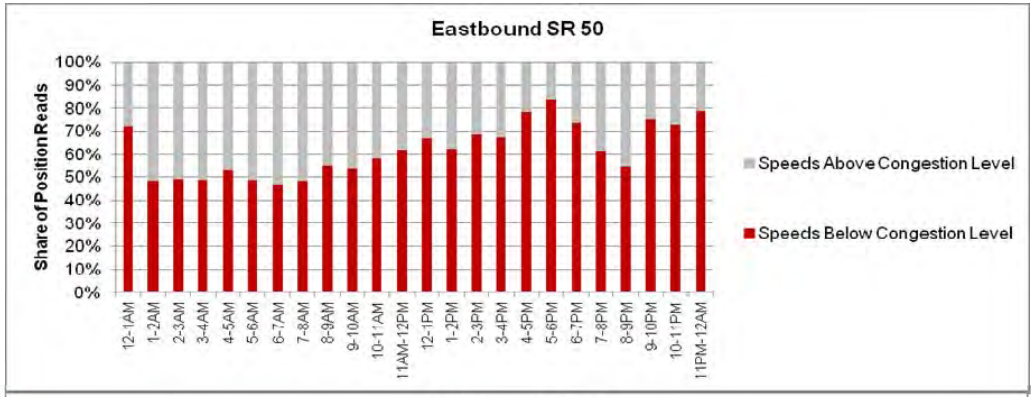
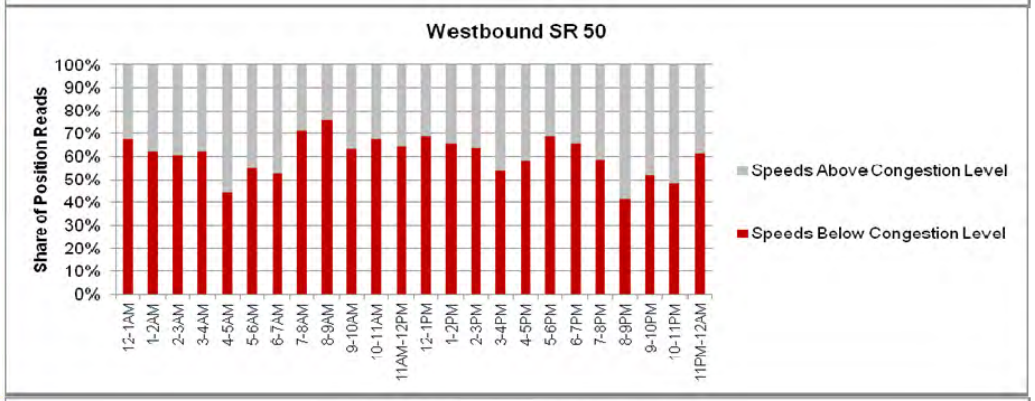
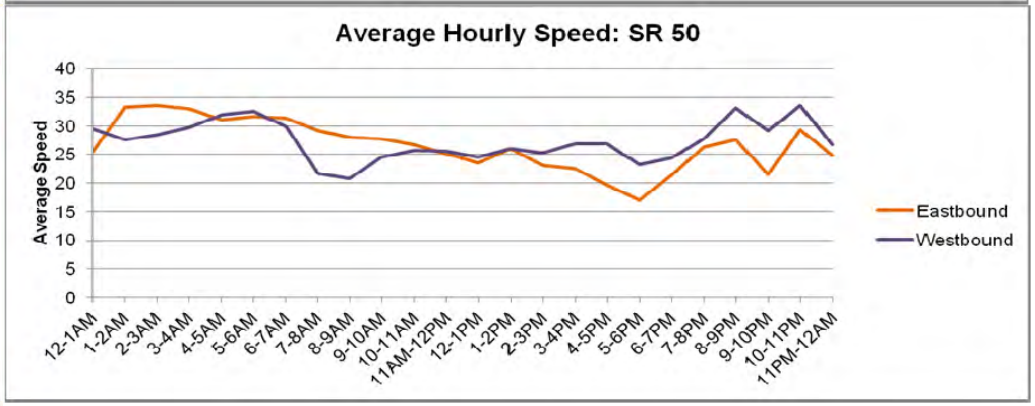


Figure 7.10 SR 50 at SR 408, Orange County

Hours/Day Below Congestion Threshold: **21** of 24
Slowest Speed/Free Flow Speed (Variability): **37%**
Volume Index: **49** of 100







At-Grade Rail Crossings

At-grade crossings are an issue for local communities throughout the region but especially in downtown Orlando. Not only do these crossings impact both freight and passenger mobility but they also create safety concerns for the traveling public. As rail freight is projected to increase overall in the region and the addition of passenger rail on the A line, the delays and safety concerns arising as a result of at-grade crossings will also continue to increase.

A summary list of railroad crossings in the study area by county and by railroad is presented in Table 7.2. The highway rail crossings were identified from the FDOT Rail Highway Crossing Inventory.

Table 7.2 Number of At-Grade Railroad Crossings by County

	Number of Railroad Crossings							
Railroad/County	Brevard	Lake	Orange	Osceola	Seminole	Sumter	Volusia	Total
CSXT	-	-	129	26	66	39	52	312
FEC	86	-	-	-	-	-	75	161
FCEN	-	92	142	-	-	-	-	234
NASA	2	-	-	-	-	-	-	2
OUC	-	-	38	-	-	-	-	38
Total	88	92	309	26	66	39	127	747

Source: FDOT Rail Highway Crossing Inventory.

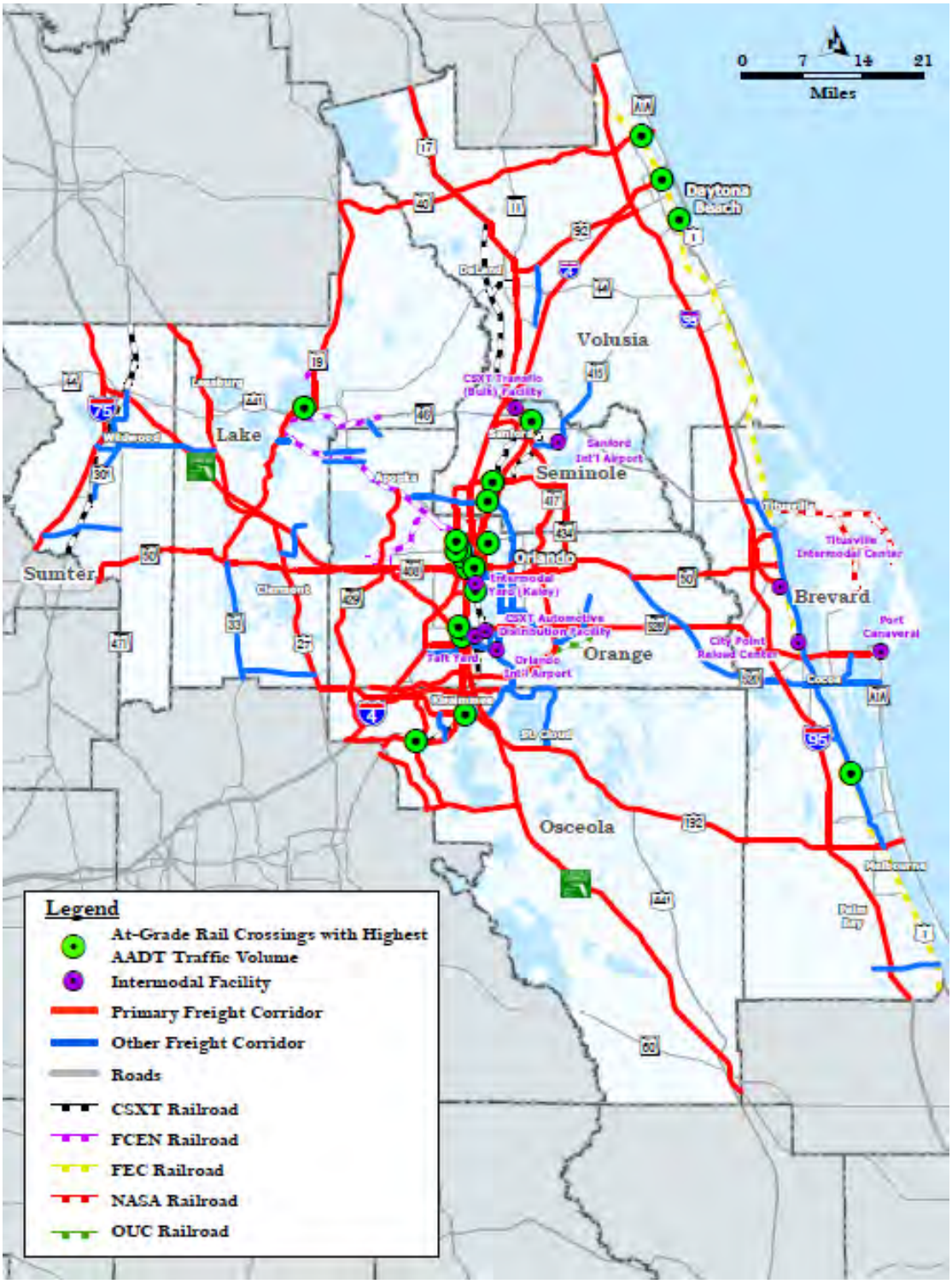
Table 7.3 displays the top twenty at-grade rail crossings in terms of AADT. Some key freight corridors have high volume at-grade crossings including US 17/92 which has five of the top twenty highest volume crossings. Nearly half of the top twenty high volume at-grade crossings are in the City of Orlando. Figure 7.11 shows the locations of these crossings.

Table 7.3 Top 20 At-Grade Rail Crossings by Average Annual Daily Traffic (AADT)

Roadway Crossing	2011 AADT	Location City
US-17/92 / OR. BLOSSOM TRL	61,000	ORLANDO
SR-436 / E ALTAMONTE DR	49,500	ALTAMONTE SPRINGS
US-441 / E BURLEIGH BLVD	44,500	TAVARES
US-192/441 / VINE ST	44,000	KISSIMMEE
CR-404 / PINEDA CSWY	41,000	MELBOURNE
SR-482 / W SAND LAKE RD	39,500	ORLANDO
SR-434	39,000	LONGWOOD
SR-423 / N JOHN YOUNG PKWY	36,500	ORLANDO
SR-426/527 / FAIRBANKS AVE	36,000	WINTER PARK
W MICHIGAN ST	35,500	ORLANDO
SR-423 / LEE RD	32,500	ORLANDO
US-17/92 / W COLONIAL DR	32,500	ORLANDO
SR-40 / W GRANADA BLVD	30,000	ORMOND BEACH
US-17/92 / W COLONIAL DR	29,500	ORLANDO
US-441 / OR. BLOSSOM TRL	27,000	ORLANDO
US-441 / OR. BLOSSOM TRL	26,500	ORLANDO
US-92 / INTL SPEEDWAY BLVD	25,500	DAYTONA BEACH
SR-421 / DUNLAWTON AVE	25,000	PORT ORANGE
US-17/92 / OR. BLOSSOM TRL	24,000	KISSIMMEE
US-17/92 / SR-15/46/600	23,500	SANFORD

Source: FDOT Central Office, At-Grade Crossing Inventory, 2011

Figure 7.11 Location of Top 20 At-Grade Rail Crossings by AADT



Source: HDR mapping using FDOT Central Office, At-Grade Crossing Inventory, 2011

Need for Regional Freight Subsystem

A designated regional freight subsystem or roadway truck route system is instrumental in supporting the efficient and reliable movement of freight. Commercial vehicles rely on properly engineered and constructed roads to move through the region to deliver freight in a timely and safe manner. Identifying, designating and designing truck routes can be an important component of freight mobility and mitigation of freight-passenger conflicts. Designated truck routes should consist of the following:

- Targeted design standards: Truck routes provide a means for targeting truck supporting design standards and policies towards for specific corridors rather than across-the board
- Cost effectiveness: Improving roads to accommodate larger trucks requires significant investment. Designated routes provide a means to more rationally allocate resources to specific corridors with higher benefits. Truck routes also allow favorable opportunities to implement the use of ITS systems.
- Safety: Improving design standards and segregating freight traffic along specific corridors would also reduce operating incompatibilities and diminish the incidence of accidents.
- Productivity: Improving truck operations within trade corridors leads to increased productivity, lower truck operating costs and improved reliability.

The routes and facilities identified through the stakeholder and system user interviews discussed in Chapter 3 are summarized in Table 7.4 which includes comments on key issues, concerns or opportunities outlined in the interviews.

Table 7.4 Central Florida Regional Freight Subsystem Agency and System User Identified Routes and Deficiencies

Roadway	Issue/Concern
Critical Routes Identified by Agency Interviews	
1. Hancock Extension/Turkey Farm Road	Emerging subsystem connection due to new connection to Hancock Road Extension and new interchange at Florida Turnpike. Model shows diversion from US 27 to this route.
2. New Turnpike Interchange/Hancock Ext.	Emerging subsystem connection due to new interchange at Florida Turnpike which intercepts traffic from US 19 interchange.
3. CR 470	Heavy truck route between US 27 in Lake County to I-75 interchange in Sumter County.
4. Sadler Ave, Duda Road, CR 48, CR 448	Heavy cut-through of trucks from sand mine operations from Lake County into Orange County at US 441.
5. US 301	North South truck route through Sumter County. PD&E study completed.
6. CR 531/CR 471	Local truck route from US 301 and CR 470 to I-75.
7. CR 673	Interchange at I-75 and Truck route to CR 35. County identifies issues with wear/tear on substandard roadway.
8. CR 478	Truck route from CR 35 to CR 471. Truck wear/tear on substandard roadway.
9. SR 33	Heavy truck use as alternate to US 27 because of few signals. Inadequate turn lanes and safety concern.
10. CR 474	Truck route between SR 33 and US 27. Sand mine operations put heavy usage on this route.
11. Weikiva Parkway (Section 2c)	Connection from SR 46 to Wekiva Parkway SR 429.
12. Martin Luther King Jr. Blvd (DeLand)	Designated Bypass around Downtown DeLand
13. Innovation Way Corridor	Primary connection from ICP to Airport. Model predicts high truck volume on this route due to land use assumptions.
14. CR 415	SR 417 and Industrial areas around Sanford Airport. Also, service route to Deltona.
15. Hoagland Boulevard	Plans to realign Hoagland from south of Kissimmee airport to US 192. Provide airport support access and improves truck route to US 192 from US 17.
16. Southport Connector	New expressway facility from Turnpike to I-4. Major reliever to other E/W routes in Osceola County
17. US 1	Important to Industries along US 1 from Melbourne to Titusville.
18. Banana River Drive	Local truck but Brevard County has complaints of through truck usage. Port runs shuttle from Canaveral to Merritt Island Mall through this route. Narrow 2-lane bridges and residential area.
19. Viera Boulevard	New Interchange planned at I-95 will induce more truck travel. Intersection at US 1 closely located to FEC rail line (=/- 100ft.) creates intersection performance and safety concern.
20. Ellis Road	Important connection to improve access to Melbourne Airport. New interchange at I-95 along with 2L to 4L widening.

Roadway	Issue/Concern
Critical Routes Identified by Agency Interviews	
21. Tradeport Drive	Access to Airport support development, FedEx, USPS, and AIPO
22. SR 520	SR 50 to I-95 connection
23. Landstreet Road	Primary route through Taft Industrial Park
24. Central Florida Parkway	Weight Restricted – needed to serve tourist corridor
25. Boggy Creek Road	Route to AIPO and south airport, also Medical City
26. SR 15 (Narcoossee Road, Hoffner Avenue, Conway Road)	Medical City, Airport and Innovation Way. Portions of 2L corridors are constrained
27. Taft Vineland Road	Connection between Tradeport, OBT and Central Florida Parkway and Taft Industrial Area
28. SR 405 (NASA Causeway)	Connection from US 1 to Canaveral Air Station, weight restricted draw bridge.

Source: Stakeholder interview and consultant team observations

7.2 LAND USE CONFLICTS

Given the desire for industrial, warehouse, and distribution activities and associated economic opportunities to continue to grow in the Central Florida region it is important for municipalities, counties, and the region to plan for these activities. Moreover, it is important for those who shape urban design through municipal and regional policies and plans to provide guidance for accommodating these activities. When structured appropriately, such guidance can help reduce the sprawl of freight activities by developing goods and trade-related distribution facilities within existing transportation corridors and zones. This can also help ensure a balance between the movement of people and the movement of goods across key corridors in the region and create an environment that enhances economic competitiveness and sustainability. Two key areas of concern with regards to land use conflicts impacting freight mobility are noted below.

Encroachment of Traditionally Industrial Corridors/Areas

One distributor interviewed complained of noise abatement policies interfering with delivery times in certain areas. Such noise abatement policies restrict deliveries before and after certain times of the day in areas where there is a residential population, often preventing drivers from arriving at a location before or after rush hour. Noise abatement policies are just one of many issues arising from the encroachment of residential areas on freight areas. These land-use conflicts are commonplace and are becoming increasingly problematic in locations where freight traffic can no longer access established industrial areas

due to neighborhood restrictions, no-truck routes requiring a circuitous approach, and heavy congestion along previously adequate access routes.

The issue is not really that industrial and residential areas need to be made separate, which may be undesirable and probably is impractical. From a freight logistics standpoint, the issue is access, through the retention of clear, efficient truck routes into industrial centers as residential areas move in. The Yeehaw Junction area case study presented in Chapter 5 provides an example of how freight uses can be collocated with residential uses. The increase desire for mixed use developments throughout the region will lead to increasing conflicts if freight movement is not explicitly considered when planning these developments.

Protect and Promote Freight Intensive Areas

Given the significance of logistics and distribution in the Central Florida economy, it is vital that distribution companies continue to be attracted to the region and can operate efficiently in the future. Development growth for distribution and other industrial facilities is occurring in several areas as discussed in Chapter 5. Specifically, there has been a significant increase in these types of activities just outside our study region in Polk and Marion Counties. While these areas represent viable options for serving the Central Florida region, it does increase the number and distance of cross region trips required to service the region, especially the economic centers of Orlando and Orange County. To facilitate the co-location of these activities with ultimate end users or consumers, it is vital for the counties in the study region to preserve existing freight land uses as well as lands for future freight or cargo oriented development.

The result of this ongoing pattern of locating away from the congestion and tourist areas in Central Florida is that companies have begun to find themselves facing possible locations that are too far away from the local market. The solution to this is redevelopment of older freight areas. One problem facing redevelopment of industrial areas is that large distributors want new facilities that are nicer and larger than un-used facilities currently in place. This is particularly evident in the downtown Orlando area where there are several small pieces of land held by different owners.

7.3 SAFETY

Safety is always a focus of both planning organizations and private sector freight stakeholders. Carriers wish to operate effectively and efficiently and maintain high safety standards. Any breach in safety standards place carriers in a vulnerable position and at high risk to be liable for damage endured as result of a driver's negligence. Accidents lead to high insurance premiums as well as potential settlements which raise costs tremendously. Therefore the freight industry has a vested interest in ensuring the region's infrastructure is conducive for safe travel for all motorists.

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The study region has a lower incidence of commercial vehicle crash fatalities than does the state of Florida as a whole. While the study region accounted for about 18 percent of overall DVMT in the state of Florida[28], it accounted for approximately 15 percent of total commercial vehicle crash related fatalities[29]. Reducing the number of crashes, injuries and fatalities is very important to the study region. Per the National Safety Council estimates, for year 2010, the motor vehicle crashes cost residents and businesses in the study region approximately $3.0 billion in wage and productivity losses, medical expenses, administrative expenses, motor vehicle damage, and employers' uninsured costs.[30]

Locations on the state highway network that have relatively high truck-crash rates are shown in Figure 2.16 and displays the cumulative number of truck-involved crashes from the years 2006 through 2010 per every 0.1 mile roadway segment. Roadway segments with more than 20 truck-involved crashes are highlighted in red. The greatest concentration of crashes involving trucks has occurred in the following areas:

- U.S. 17-92/441 between SR 50 and Orange/Osceola County Line; and
- SR 423 (John Young Pkwy) between SR 50 and SR 408.

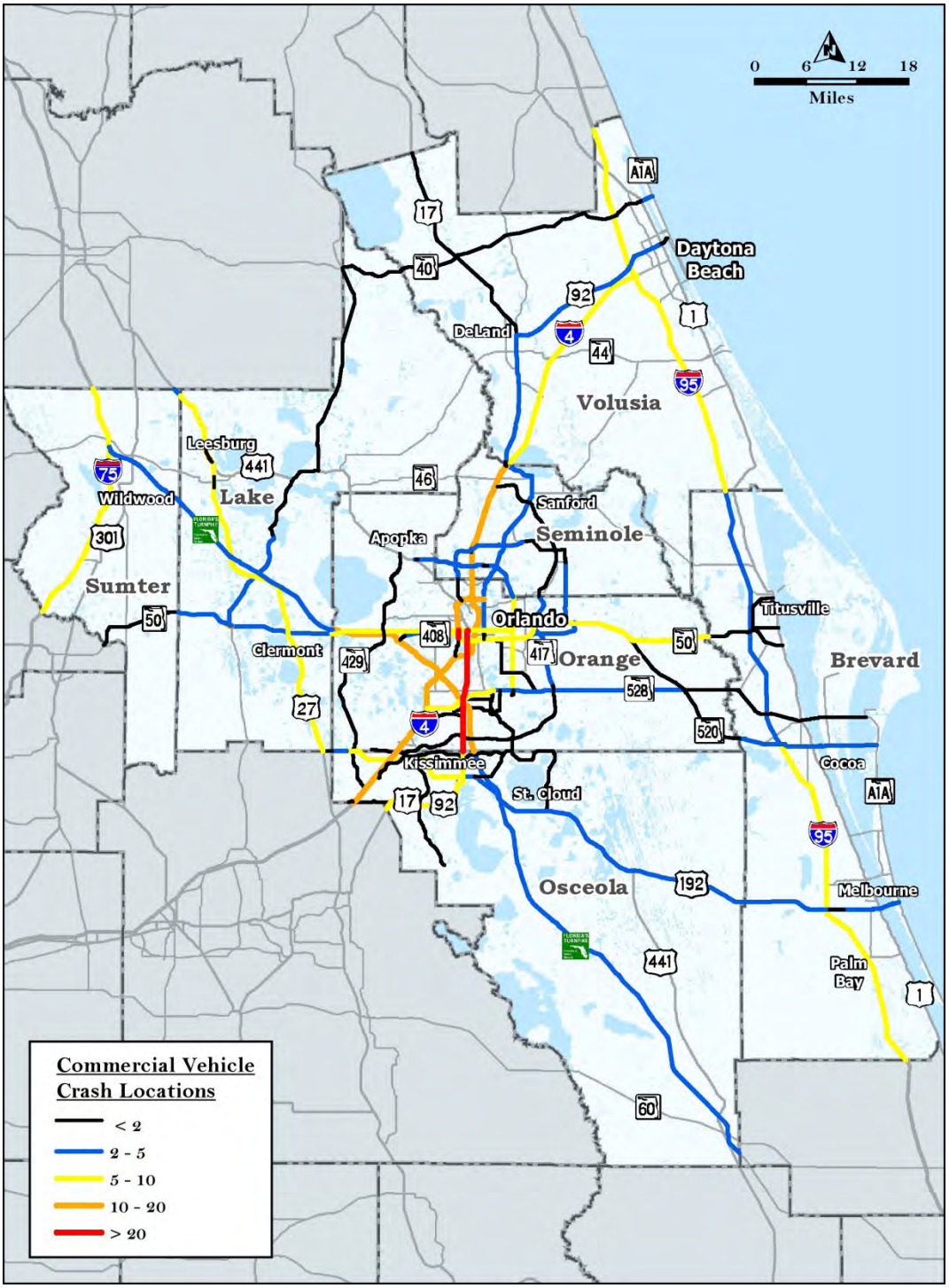
The section of U.S. 17-92/441 between SR 50 and the Orange/Osceola County Line that currently exists as a 6-lane with a two-way left turn lane is being modified as median-divided roadway and will significantly help improve the safety on this section. Interviews with trucking companies also identified the U.S. 17-92/ U.S. 441 corridor (through Orange County) as an area where drivers are advised to avoid, especially during peak hours and between midnight to 3 AM due to the high percentage of nightclubs and bars along this corridor. Their concern is to avoid potential crashes and costly liability and several companies are monitoring driver routes to manage this risk.

[28] FDOT, Reports of Highway Mileage and Travel (DVMT) 2010.

[29] FLHSMV Traffic Crash Statistics Report 2010.

[30] "Estimating the Costs of Unintentional Injuries, 2010," National Safety Council.

Figure 7.12 Commercial Vehicle Crash Locations on State Roads
2006-2010



Source: FDOT, FLHSMV Traffic Crash Statistics Report 2010.

7.4 COMMUNITY AND ENVIRONMENTAL IMPACTS

Goods movement is essential to supporting the region's economy and quality of life. However, growth in goods movement activities (from manufacturing to truck traffic) also gives rise to negative community impacts. In addition to safety (discussed above) and air quality concerns (discussed below), freight activities can cause excessive noise and vibration along significant goods movement corridors. As population continues to grow and expand outside the urban core and Orange County so will commercial centers, leading to more widespread dispersion of freight-intensive impacts such as truck traffic.

Air Quality Impacts

The freight sector is associated nationally with increasing pollution, especially emissions of criteria pollutants (and is a particularly significant source of NOx and particulate matter (PM) due to the prevalence of diesel engines), air toxics, and greenhouse gases. This includes emissions from both mobile sources such as trucks, and stationary sources such as rail yards. Truck traffic is a significant contributor to damaging emissions and emissions mitigation strategies must address truck emissions. Newer equipment and advanced fuels are tools to reduce the emissions arising from truck traffic. However, these technologies can be costly and may lead to decreased fuel efficiency and other engine maintenance concerns, leading the private sector to be slow in adoption. There is a strong interest in the trucking industry to shift toward alternative fuels – both for the environmental benefits and the economic benefit of lower fuel costs from certain alternatives.[31]

Research in recent years has continued to explore the health effects related to the freight sector, especially PM, and concerns about toxic "hot spots" is often an issue when regions explore expansion of freight transportation facilities. Although Central Florida is currently an attainment area under United States Environmental Protection Agency standards (EPA), the threat of negative regulatory effects of non-attainment coupled with the negative health consequences for residents proximate to freight facilities make air quality impacts a growing concern for the region. The following sections discuss the results of the air quality analysis for the Central Florida region by mode.

Truck Emissions

Truck emissions are based on emission rates from the EPA's MOVES vehicle emissions model and vehicle-miles traveled (VMT) from the district-wide travel demand model. Emission rates for CO2 from the MOVES model are adjusted to

[31] Interviews with several carriers

account for new fuel economy standards for both light and heavy duty vehicles since EPA has not had time to include these standards in the MOVES model yet.

Truck emissions were estimated using output from the CFRPM for 2040 and emission rates from EPA's MOVES model. Truck emission results for the seven-county study area and the three-county MetroPlan area are presented in Table 7.5. Even though truck emission rates for carbon dioxide are lower in the future, the large increase in VMT lead to an overall increase in carbon dioxide emissions from trucks. Truck emission rates for PM_{10} are much lower in the future and therefore PM_{10} emissions from trucks are lower in the future, despite the increase in VMT.

Table 7.5 Estimated Total Emissions for Trucks and Autos, Metric Tons

	2010				2040			
	7 County Area		3 County Area		7 County Area		3 County Area	
Type of Vehicle	CO_2	PM_{10}	CO_2	PM_{10}	CO_2	PM_{10}	CO_2	PM_{10}
Passenger Vehicles	51,298	4.54	21,791	2.01	64,794	7.17	28,553	3.32
Trucks	24,591	8.10	10,324	3.45	54,112	4.56	22,828	2.14
Single Unit Trucks	*12,730*	*3.61*	*6,476*	*1.87*	*25,759*	*2.57*	*13,195*	*1.37*
Combination Trucks	*11,861*	*4.49*	*3,849*	*1.58*	*28,354*	*1.99*	*9,633*	*0.77*
All Vehicles	**75,890**	**12.63**	**32,116**	**5.46**	**118,907**	**11.73**	**51,381**	**5.45**
Percent Truck Emissions*	32.4%	64.1%	32.1%	63.2%	45.5%	38.9%	44.4%	39.1%
*Percent Single Unit Truck Emissions**	*16.8%*	*28.6%*	*20.2%*	*34.3%*	*21.7%*	*21.9%*	*25.7%*	*25.1%*
*Percent Combination Truck Emissions**	*15.6%*	*35.5%*	*12.0%*	*28.9%*	*23.8%*	*17.0%*	*18.7%*	*14.1%*

*As a percent of emissions from all vehicles

Source: Cambridge Systematics analysis using output from the CFRPM

Rail Emissions

The freight rail sector is associated with emissions of criteria pollutants (and is a significant source of NO_x and PM due to the prevalence of diesel locomotives), air toxics, and greenhouse gases. Increasing interest in the health effects of emissions from the freight sector, especially PM, has resulted in many agencies considering emissions and health impacts as a decision factor in the expansion of freight rail facilities. This assessment provides an emissions inventory and forecast for line-haul and switcher locomotives operating on Class I, Class II, and Class III railroads within the seven counties in the Central Florida region.

Forecast data developed as part of the current effort was used to project rail tonnage. To convert tons to ton-miles, based on Class I the rail miles within the region (103 miles – CSX A-line, 28 miles – CSX S-line, 10 miles – CSX Aloma) we assume the average trip length per ton in the region is 51 miles. This represents half the distance of the A-line within the region. The energy intensity of Class I railroads is summarized by American Association of Railroads, Annual Fact Book. This data is used to estimate the average gallons of diesel fuel consumed per freight rail ton-mile.

To convert gallons consumed to emissions, emission rates for PM and CO_2 are utilized from the following sources:

PM_{10} – 2010: 5.7 grams per gallon, 2020+: 4.9 grams per gallon[32]

CO_2 – 2,778 grams per gallon (no assumption is made regarding the future carbon content of diesel fuel)

The rail emission results for the seven-county region are presented in Table 7.6.

Table 7.6 Estimated Rail Emissions, 2009-2040 (tons, exclusive of through freight)

	2009		2040 (Forecast 1)		2040 (Forecast 2)	
	PM_{10}	CO_2	PM_{10}	CO_2	PM_{10}	CO_2
Total	5.5	2,663	4.6	2,663	5.9	3,335

Source: Cambridge Systematics

Port

This assessment provides an emissions inventory and forecast for Port Canaveral. Consistent with recent guidance from EPA, a streamlined inventory approach was followed given that the port is not located in an ozone or PM non-attainment area or in a maintenance area.[33] Such an inventory requires some measure of port-specific activity data but applies "typical" port emission

[32] http://www.fhwa.dot.gov/environment/air_quality/publications/effects_of_freight_movement/chapter02.cfm

[33] *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories Final Report*, U.S. Environmental Protection Agency, April 2009.

parameters by sector. The methodologies for this inventory are tailored to the amount of data publically available.

The port boundary for this assessment considers landside and ocean side. The landside boundary includes at least the first intermodal point and thus includes trucks, rail, gates, etc. By doing so, improvements such as reducing wait times into and out of gates and distribution centers, reducing truck vehicle miles traveled (VMT) due to intermodal shifts, and other mitigation strategies can be evaluated. On the ocean side, the boundary includes at least the first 25 nautical miles from where the pilot boards the ship for entry into the port.

Based on the *Future Regional Freight and Goods Flow Profile*, total port tonnage is estimated to increase from 1,780 tons in 2010 to 2,247 tons in 2040, a growth rate of 22 percent.

In 2010, there were 448 cruise departures at Port Canaveral.

The approach to estimate emissions for the port is as follows:

E = P x LF x A x EF

Where E = Emissions (grams [g])

P = Maximum Continuous Rating Power (kilowatts [kW])

LF = Load Factor (percent of vessel's total power)

A = Activity (hours [h])

EF = Emission Factor (grams per kilowatt-hour [g/kWh])

The emission results are presented in Table 7.7. They assume no changes in the carbon content or fuel or efficiency of engines. Forecasts of cruise traffic at Port Canaveral in 2040 are unavailable.

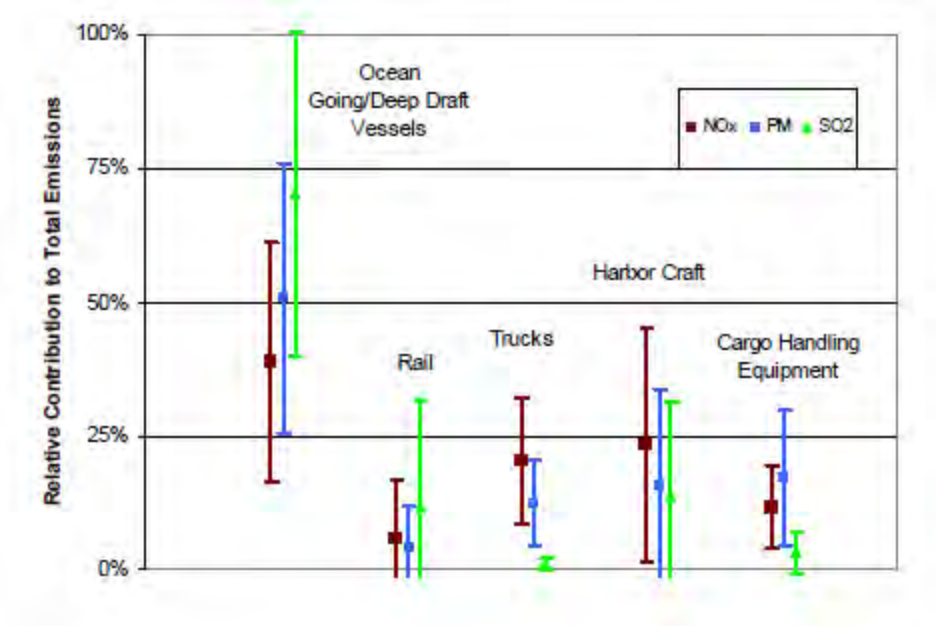
Harbor craft are assumed to represent approximately 47 percent of total ocean going vessel emissions based on Figure 7.13. In total ocean side emissions represent on average 75 percent of port emissions, with landside (rail, trucks, cargo handling) representing the remaining 25 percent.

Table 7.7 Total Estimated Port Emissions, 2010-204 (tons)

	2010		2040	
	PM_{10}	CO_2	PM_{10}	CO_2
Ocean Going Vessels				
Cargo	2.3	1,758.3	2.9	2,219.6
Cruise	111.5	87,239.1	N/A	N/A

Source: Cambridge Systematics

Figure 7.13 Typical Emission Contribution by Mode at Ports



Source: Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories Final Report, U.S. Environmental Protection Agency, April 2009.

7.5 NEED FOR REGIONAL APPROACHES

The freight mobility needs assessment revealed many needs across a wide spectrum of issues and potential responses. While there is much diversity among the categories of needs, ranging from new capacity to improved operations to integrated land-use, there is one common theme – the need for a regional approach to freight mobility and all the planning factors that impact the freight subsystem. Because of the interstate and intra-regional nature of freight movement, bottlenecks or inefficiencies in one local community impacts freight mobility throughout the seven-county region. Therefore, ensuring the efficiency

of freight mobility throughout the region necessitates addressing the needs and issues at a regional as opposed to local level. However, many of the specific issues enumerated above are the domain of local governments and not subject to regional approval. While this may limit the role that the MPOs and TPOs can play in implementing responses, it does not eliminate the possibility to influence the outcomes. Given the role of MPOs, TPOs and the District as regional planning bodies, they has access to resources to assist local governments in developing and implementing local plans. It is through these resources that regional planning agencies can influence and promote planning to accommodate and enhances freight mobility.