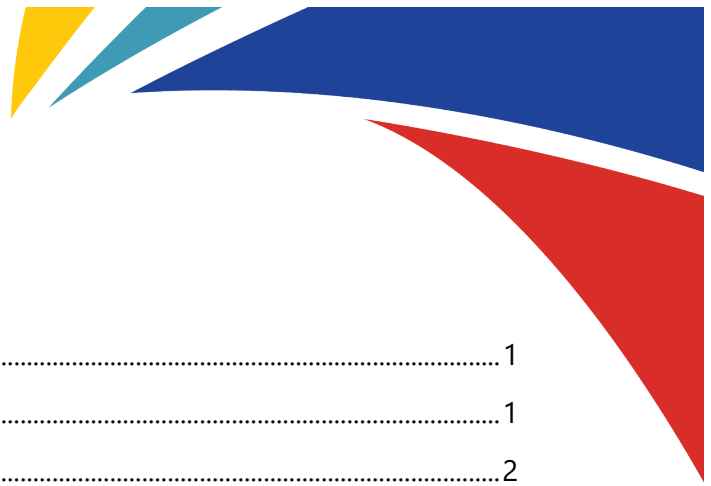




FREIGHT MOBILITY AND TRADE PLAN

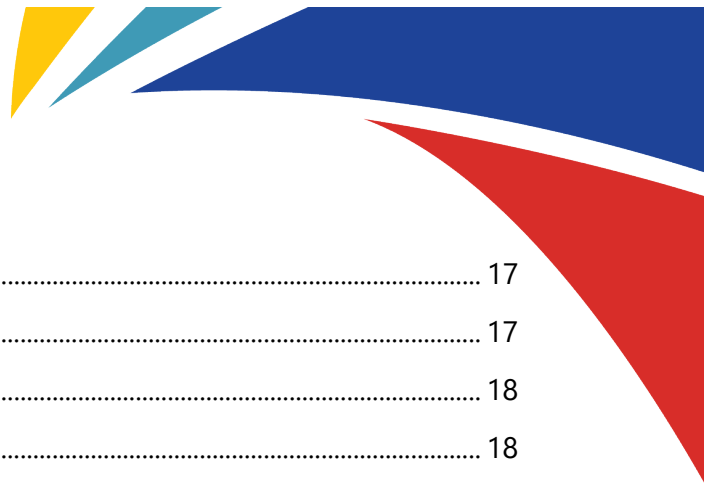
Technical Memorandum 4
Needs & Issues





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List of Acronyms

ADAS	Advanced Driver Assistance Systems
AI	Artificial intelligence
ATA	American Trucking Associations
ATRI	American Transportation Research Institute
CAVs	Connected and Autonomous Vehicles
CNG	Compressed Natural Gas
DATP	Driver-Assistive Truck Platooning
DDoS	Distributed Denial-of- Service
DFCs	District Freight Coordinators
EAA	Everglades Agricultural Area
EPA	Environmental Protection Agency
FAF	Freight Analysis Framework
FDOT	Florida Department of Transportation
FHP	Florida Highway Patrol
FLHSMV	Florida Department of Highway Safety and Motor Vehicles
FMT ² P	Freight and Mobility Trade Plan
FRA	Federal Railroad Administration
GDP	Gross Domestic Product
HATs	Highly Automated Trucks
IJA	Infrastructure Investment and Jobs Act
ILC	Intermodal Logistics Center
ITS	Intelligent Transportation System
LNG	Liquefied Natural Gas
LTL	Less-than-Truckload
MPO	Metropolitan Planning Organization
NHFP	National Highway Freight Program
NOFO	Notice of Funding Opportunity
P3s	Public Private Partnerships
RFID	Radio Frequency Identification
SAF	Sustainable Aviation Fuel
SWOT	Strengths, Weaknesses, Opportunities, and Threats
U.S.	United States



Introduction

This technical memorandum describes freight mobility and trade specific needs and issues that were identified through a review of current conditions, industry trends, stakeholder input, and past studies. The respective needs and issues in this memorandum are organized by mode, including multimodal considerations. This memorandum begins with an overview of the outreach conducted for stakeholder input, and concludes with a comprehensive Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis, which will be used to inform this plan's recommendations and implementation effort.

Outreach Overview

Stakeholder and public input on local needs, issues, and strategies improves the decision-making process and increases transparency to create a robust statewide freight plan update. A series of Regional Freight Forums were held to bring together freight stakeholders of all types: city, county, and Metropolitan Planning Organization (MPO) planners and transportation engineers; business owners; community redevelopment agencies; and other transportation users.

The Regional Freight Forums focused on regional trends, issues, needs, and opportunities. They took place around the state to obtain feedback from regional and local partners and the public to allow for regional specificity. The hosting Florida Department of Transportation (FDOT) District Freight Coordinators (DFCs) aided the FDOT Central Office staff in putting the forums together.

The Regional Freight Forums were held from June 12 through July 12, 2023. Figure 1 shows the specific date and location for each meeting.

Figure 1 | Regional Freight Forums Schedule

<p>CENTRAL FL– June 12, 2023 1PM-4PM</p> <p><i>FDOT Deland - Cypress A&B Conference Room</i></p> <p>719 South Woodland Blvd., Deland, FL 32720</p>	<p>NORTH FL– June 21, 2023 1PM-4PM</p> <p><i>FDOT Central Office - Auditorium</i></p> <p>605 Suwannee Street, Tallahassee, Florida 32399</p>
<p>SOUTHWEST FL– June 13, 2023 1PM-4PM</p> <p><i>FDOT Southwest Area Office (SWAO) Conference Room</i></p> <p>10041 Daniels Parkway, Ft. Myers, FL 33913</p>	<p>SOUTH FL– June 29, 2023 1PM-4PM</p> <p><i>Miami-Dade Public Library - Aventura Branch</i></p> <p>2930 Aventura Blvd., Aventura, FL 33180</p>
<p>NORTHEAST FL– June 15, 2023 9AM-12PM</p> <p><i>FDOT Jacksonville - Urban Office Training Center</i></p> <p>2198 Edison Avenue, Jacksonville, FL 32204</p>	<p>SOUTHEAST FL– June 30, 2023 1PM-4PM</p> <p><i>FDOT Fort Lauderdale - Auditorium</i></p> <p>3400 West Commercial Blvd., Ft. Lauderdale, FL 33309</p>
<p>WEST CENTRAL FL– June 19, 2023 1PM-4PM</p> <p><i>FDOT District 1 HQ Conference Room</i></p> <p>801 North Broadway Avenue, Bartow, FL 33830</p>	<p>VIRTUAL– July 12, 2023 9AM-12PM</p> <p><i>GoToWebinar – Register Here:</i></p> <p>FMT²P24 GoToWebinar Registration</p>

Forum Agenda

At each Freight Forum, Central Office staff or District Leadership opened the meeting with a welcome and introductions. Central Office staff introduced the importance of this plan to statewide freight planning and the FDOT freight planning process with slides on:

- The importance of freight;
- What the Freight and Mobility Trade Plan (FMT²P) is and who uses it;
- The National Highway Freight Program & Network;
- Last plan objectives and what’s changed for this update; and
- Themes for the updated plan.

Next, the District Freight Coordinator provided audience members with a regional perspective on the issues, challenges, and opportunities related to freight in their District. They touched on topics such as:

- The importance of freight at a regional level;
- How the District uses the FMT²P;
- What has been done since the last plan;
- Regional projects on their Needs Lists/bottlenecks; and
- Other District freight efforts.

The breakout portion of the agenda followed in two components. First, a live polling session was done to understand who was in the room and engage the audience on higher-level freight concepts. The live polling questions were:

- Who do you represent?
- Where in Florida are you located?
- What is your sphere of influence in the state?
- What type of goods do you deal with primarily?
- Which freight mode is most important to your operations?
- Which aspect of freight is most important to you?
- As a consumer, which shopping model provides you the most value?
- Rank the order in which you would address these infrastructure needs.
- On a 1-10 scale, how would you rate Florida's freight infrastructure?

Afterwards, participants separated into breakout groups where a facilitator prompted them on key regional issues related to freight. Participants were asked questions such as:

- What are the challenges you face within Florida with your supply chain flows?
- What opportunities do you see with freight?
- What are the most important needs in your region/community?
- What new and developing technologies should Florida support to enhance freight mobility?
- How can we leverage collaboration to improve freight mobility?
- Based on your growing business needs, how would you like to see the infrastructure of Florida change to suit your needs?
- What have you seen that works well to address severity of impacts of extreme weather and natural disasters on freight mobility?
- Do alternative fuels have a place in your supply chain?
- What are the impacts you've seen of e-commerce on freight infrastructure?
- FDOT has most purview over seaport connectivity and railroad capacity. How would you improve these?
- What work force development needs do you see in the freight industry?

Once the breakout session concluded, at the events with multiple breakout groups, a volunteer from each group gave a summary of his/her group discussion to the rest of the audience. The last agenda item was concluding remarks from Central Office staff to highlight topics discussed and provide information on the next steps for the creation of the FMTP24.

After the events, the breakout group conversation notes and live polling results were compiled to create a comprehensive look at trends, needs, issues, and opportunities for freight in Florida. This section focuses primarily on needs and issues. They are broken down by economic/policy needs and issues, and infrastructure needs and issues by mode. Table 1 provides an overview of the topics.

Table 1 | Summary Issues and Needs from the Regional Freight Forums

Type	Mode	Issues and Needs	
Economic/Policy	Multimodal	• Rising Costs	• Communication/Collaboration
		• Domestic Freight Imbalance	• Funding
		• Workforce Issues	• Freight Education/Messaging/Training
		• Land Use Conflicts	• Broadband/Cybersecurity
		• Environmental Stewardship and Community Concerns	• Statewide Approach
Infrastructure	Highway	• Congestion/Bottlenecks	• Crashes
		• Deficient Infrastructure	
		• Truck Parking	
	Maritime	• Port Access/Channel Depth	• Inland Ports
		• Operational Inefficiencies	• Panama Canal Water Issues
	Rail	• Passenger vs Freight Conflicts	• Crossing Safety
		• Blocked Crossings	
	Aviation	• Fuel Resilience	
	Space	• Oversized Cargo/Congestion	
	Pipeline	• Capacity	

Economic/Policy Needs & Issues

Economic and policy needs and issues tend to cut across the modes. Since 2020, there have been multiple events that have highlighted the importance of the supply chain. From bottlenecks of container ships anchored outside of ports to truck and train operations that were seeing significant price spikes, whole sectors of distribution and manufacturing were unable to be supplied with the inputs they needed to function. Coupled with a steep increase of consumer demand after the global lockdowns, freight issues and needs have been felt everywhere.

There are some global supply chain challenges that are felt more acutely in Florida, including congestion, domestic freight imbalances, workforce issues, and land use conflicts. By better understanding the issues impacting its freight systems, Florida can proactively plan for future volatility in the supply chain.

Rising Costs

The global inflation rate has been highly elevated. The shifting supply of and demand for goods and services prompted by the pandemic as well as global events, i.e., the War in Ukraine, trade sanctions with China, the Israeli war in Gaza, etc., have contributed to high inflation. The cost of doing business continues to rise, with both businesses and consumers feeling the pinch of the price increases. Inflation in the United States (U.S.) reached the highest annual rate (around 7 percent) since 1981¹ in 2021 and 2022, and even though the inflation rate has since fallen, it is still an issue that is felt at practically every level of the supply chain. In 2023, U.S. Business Logistics Costs reached 9.1 percent of the U.S. Gross Domestic Product (GDP), the highest share ever realized.² The transportation industry is then impacted by increased costs for fuel, labor/wages, insurance, maintenance, and equipment prices – which ultimately trickle down to the consumer.

Many trucking companies are small businesses and lack negotiating power for purchasing fuel and other inputs. Per the American Trucking Associations (ATA), almost 96 percent of all trucking firms operate 10 or fewer trucks. The trucking industry has an acute commercial driver shortage, estimated to be 80,000 nationally by the ATA. Competition for drivers is fierce and carriers have increased wages to recruit and retain drivers. Carrier operating costs, for both trucking and rail, have increased significantly in recent years, and while transportation rates have also risen, it has been less than both industries need as evidenced by the recent bankruptcy of Yellow-Roadway, the nation's largest Less-than-Truckload (LTL) trucking firm, and the merger of Canadian Pacific and Kansas City Southern Railroads. Total carrier operating costs have

¹ Pew Research Center. ["In the U.S. and around the world, inflation is high and getting higher."](#), June 15, 2022.

² Council of Supply Chain Management Professionals Report, June 2023.

increased for both trucking and rail, have outpaced rate increases. Many shippers and receivers also experience labor availability issues. Overall, consumer demand is relatively high and many supply chains are constricted, which reduces the supply of containers, and is increasing the cost of transportation.

Airports and seaports are gateways for import and export of freight. As the volumes of freight have increased ports have become congested. Many have developed or entered business arrangements to immediately push inbound products to inland ports to maintain efficiency of throughput at the port. Ports that are clogged by inbound containers usually charge demurrage, which increases logistics costs for both shippers and receivers, but does not fully alleviate the congestion.

Domestic Freight Imbalance

There is a domestic trade imbalance between Florida and the rest of the U.S. Florida is a consuming state as its growing base of over 22 million residents and 130 million plus visitors require large volumes of goods and services. Key economic development agencies at the state and regional levels have long identified growth in manufacturing as a critical goal for the state.³

The trucking industry experiences this issue acutely. As seen in Tech Memo 2, on average, 41.9 percent of Class 9 trucks left Florida empty on I-95, I-10, and I-75 in 2022. Inbound loads must charge more to compensate for not having an outbound load. In addition, the increased costs of moving goods between modes leads to many shippers committing to a single mode. Reducing costs of such transfers can incentivize shippers to include a mode transfer in the goods movement.

Using technology to track the movement of trucks and other freight can help provide some predictability that can help shippers find potential partners in reducing empty loads. It can also help the industry in creating a modal shift for containers and other cargo.

Florida should continue to attract targeted industries to increase manufacturing, and support reshoring and next-gen manufacturing activities to strengthen the domestic supply chain. As the manufacturing sector grows in Florida, empty backhauls will be lessened with completed goods needing vehicle transport to leave the state.

Workforce Shortage

There is a lack of available labor throughout all aspects of the supply chain – drivers, mechanics, pilots, and railroad workers. An ATA study estimated that the national truck driver shortage hit a

³ FDOT's Intermodal Logistics Centers Serving Florida Seaports, 2023.

historic high of 80,000 drivers in 2021. By 2030, the shortage could surpass 160,000 drivers.⁴ Similarly, aircraft pilots are an aging workforce with a mandatory retirement age and high barriers to entry.⁵ The rail industry is also experiencing a serious labor issue, as a decimated railroad workforce and strikes over workplace policies hobble the already-delicate supply chain. Roughly 125,000 U.S. rail workers were on the verge of walking off the job in August 2022 when negotiations between their unions and rail companies soured over the long-running issues of sick leave and attendance policies.⁶

The impacts of an industry-wide workforce shortage are felt widely, from the cost of consumer goods to shipping delays, to increased stress on workers. There is a need for new technical skills as equipment becomes more advanced, but staffing shortages are a challenge at all levels of the skills hierarchy. In many cases, the issues are more about pay/working conditions/working hours than a lack of available personnel. Florida can support workforce development solutions through improving conditions for drivers and other operators, and promoting training initiatives that will help close essential workforce gaps, strengthen the talent pipeline, and ultimately enhance the state's economic competitiveness.

Land Use Conflicts

Freight considerations are often left out of land use planning conversations. In general, local development tends to be focused on residential development, which removes land for industrial areas. As new laws make it easier to develop residential instead of industrial lands, good planning practices are threatened and ensuing incompatibly leads to safety issues down the line. The issue can be boiled down to land costs rising faster than the profit margins of freight facilities, making them commercially unviable.

In South Florida, stakeholders mentioned that land is extremely valuable and the competition for development is tight. Industrial space and warehouse space prices in the Miami area are millions of dollars per acre, and these cost increases have spread into Broward and Palm Beach counties.⁷ Golf courses and retail centers are being redeveloped into warehouses to keep freight moving. An enormous challenge is to improve first and last mile connectivity/access for all modes in urban areas where the geometries are already set, and the environment has already been built. Development boundaries in the Miami area are limited by the ocean on one side and the Everglades on the other side. Limited access/egress by throughfares leads to a lack of redundancy in routing options. There are environmental constraints in the form of protected

⁴ ATRI. ["Critical Issues in the Trucking Industry – 2021,"](#) October 2021.

⁵ [After Covid-19, Aviation Faces A Pilot Shortage \(oliverwyman.com\)](#)

⁶ Bloomberg Law. ["Rail Strike Threat Brings New Focus on Work Attendance Policies,"](#) October 7, 2022.

⁷ [Florida Chamber of Commerce Trade & Logistics 2030 Study](#)

areas – such as the aquifer in the South-Dade area – and the susceptibility to flooding due to the low land elevation (and the need to dedicate stormwater drainage/retention to property) that need to be considered with development.

In addition, as explored in Tech Memo 3, the number of e-commerce facilities is growing. E-commerce facilities, especially delivery stations, are getting closer to urban developments to make delivery times shorter. Unlike traditional warehouses, they can operate 24/7 with tractor-trailers, delivery vans, and on-call drivers generating an enormous amount of activity.⁸ This can contribute to further freight and residential conflicts.

Florida will require improved land-use planning that considers future freight. This is inclusive of more land, but also considers innovative freight solutions such as multi-story and multi-use freight facilities⁹ and new freight delivery methods that can take existing infrastructure and maximize its potential.

Environmental Stewardship and Community Concerns

Freight facilities generate externalities that may impact surrounding land uses. For example, community concerns about truck parking facilities can stem from impacts of the externalities on surrounding neighborhoods (i.e., roadway impacts from increased truck traffic, nighttime light pollution, noise and air pollution from idling trucks, trash and dumping at the site, perceptions of security and crime issues, equity impacts to neighborhoods adjacent to freight-intensive land uses, etc.). Through zoning, some cities have forced freight intensive land uses (warehousing, manufacturing, distribution centers, etc.) to move away from urban population centers in response to citizen complaints about noise and traffic. Balancing residents' livability and freight mobility is important, given the continued growth of the state's population.¹⁰

Additionally, Florida has species that need to be protected, such as the gopher tortoise, snail kites, and manatees. During outreach, there was mention of repaving projects that required monitoring of local wildlife, which is an expensive process that is difficult to maintain throughout the duration of the project. More resources are needed for this type of monitoring. For the health of Florida's ecosystems, it is critical that the state evaluates measures to combat the negative impacts of construction projects and invests in wildlife protection measures surrounding freight infrastructure.

⁸ ["What to Do When an E-Commerce Warehouse Comes to Town", Planning Magazine, 2021](#)

⁹ [Prologis has built the nation's first multi-level warehouse. Will the tenants come? - FreightWaves](#)

¹⁰ FMTP 2020.

Supply Chain Visibility

Supply chain visibility is the ability to view or track inventory as it moves through the supply chain. Real-time supply chain visibility is the complete, end-to-end view of a company's logistics, inventory and warehouse management processes, and people in real time. This visibility increases in resolution depending on how many technologies are involved in the tracking process. Investments such as Radio Frequency Identification (RFID) sensors and Bluetooth technology help in the tracking of systems but are an increased cost burden to private industry.

Most of these investments are made to improve the functionality and efficiency of private businesses and that information is kept from the public. Proprietary algorithms and other systems keep their business models competitive with other businesses. In states such as Florida, sunshine laws make it difficult for private partnerships to form around these data streams as there is a fear that the data could then be utilized by other organizations at no cost.

Communication/Collaboration

Communication and collaboration were discussed as both are a challenge and an opportunity across the state. Multi-jurisdictional coordination for planning, administration, and funding means that different organizations/agencies represent overlapping areas, and stakeholders may not know who to contact or may have conflicting priorities. Additionally, getting the right people to the table is difficult, especially across the public/private sector divide. One inhibitor is planning timelines; the industry plans for more immediate futures, while the public sector tends to plan with much longer horizons. There is also a perception from the public sector that the freight industry will handle certain issues, and a perception from private industry that the public sector will help solve certain issues; the reality is that most of these issues are interwoven and require public private partnerships. Public Private Partnerships (P3s) are a key collaborative effort that FDOT and supply chain stakeholders have been attempting to utilize for some time. There are significant legislative hurdles at both federal and state levels before this can happen.

Legislative reform could allow more leeway in cost, profit, and maintenance sharing for P3 facilities. By identifying industry champions that can facilitate information exchange on projects and changes to the legislative environment, Florida can position itself to affect change in these arenas, paving the way for innovative new partnerships.

Funding

Funding is a primary consideration for all transportation projects, but freight funding has historically received a smaller percentage of dedicated state and federal funds than other investment types. The National Highway Freight Program (NHFP) is the state's primary funding

source for freight projects, but it provides just a fraction of the need. As various costs increase across the sector, funding becomes tighter year over year.

One of the biggest opportunities is the amount of grant funding coming through the Infrastructure Investment and Jobs Act (IIJA). FDOT can take advantage of the competitive grants by proactively preparing and getting applications out quickly with projects that are ready to go, applying for multiple types of grants per project, and collaborating with stakeholders pre-NOFO (Notice of Funding Opportunity). FDOT District offices have created Grant Coordinator positions to better prepare for competitive grants and ensure that the most successful application possible can be submitted with local partnerships.

Freight Education/Messaging/Training

The global pandemic and issues with the supply chain have brought more attention to freight. It has become a topic that requires guidance in the messaging since, in many cases, it is mentioned in a negative light. With the increasing number of universities offering supply chain and logistics degrees there are more people than ever that know the importance and needs of the industry to be a primary planning consideration.

Education and trade schools will be an important piece to resupplying the workforce, but it will also be necessary to work towards changing the public's negative perception of freight. Many issues in the freight industry stem from people not understanding freight mobility and its impact on quality of life and services. Recognizing the interdependency between economic vitality, quality of life, and goods movement can help paint a picture of the importance of the freight network.

Broadband

Reliable broadband Internet access is necessary for economic development in a modern economy, and it is increasingly becoming as critical to basic infrastructure needs such as modern roads, water and wastewater services, and energy. Broadband Internet plays a central role in business development, jobs, education, health, housing, and other publicly desired services, as it is the communities' connection to future economic growth. Current lack of broadband Internet contributes to the digital divide for entire communities, and the expansion of broadband Internet represents a tremendous opportunity particularly for rural and underserved communities across Florida, including their ability to grow and recruit businesses and generate high-quality and sustainable jobs. The Florida Strategic Plan for Broadband identifies how the

state will support and facilitate the task communities have before them in recognizing and planning how to meet their broadband Internet needs.¹¹

Cybersecurity

The need for cybersecurity increases as quickly as the digital technology evolves. As discussed in Tech Memo 3, as the supply chains become more digitized, they also become more vulnerable to disruptions from cyberattacks. These cyberattacks can be as sophisticated as an attack from a foreign actor bringing down domestic pipelines to brute force attacks such as ransomware and distributed denial-of- service (DDoS) attacks that are meant to overwhelm systems using data. Cybersecurity is a growing field that requires significant cost investment to stay ahead of the attackers. One of the primary issues is that many of the more damaging attacks are increasingly rare and cost prohibitive to prevent, and smaller firms do not have the capability to fund security against even the smaller kinds of attacks let alone the highly sophisticated variations. Due to the disparate nature of the many firms and their control of data and information, it is difficult to establish a centralized (federal or state) security system for the full network. In the face of an ever-increasing number of attacks from those with malicious intent, these costs become more prohibitive while not doing anything is also costly.

¹¹ [The Florida Strategic Plan for Broadband \(floridajobs.org\)](http://floridajobs.org)

Statewide Approach

With its extensive coastline, statewide seaport system planning includes coordinating with statewide freight planning, project management, and coordinating seaport infrastructure projects with Florida's 16 publicly owned seaports (14 deepwater, 2 inactive). While the number and location of seaports offers a broad range of services for potential businesses, it can also garner competition among them as they vie for resources. Other southeastern states have a central port authority allowing for more cohesive planning.¹² Florida faces increasing competition from these states, such as Georgia, who can prioritize all their seaport investments into a unified source. Efforts such as the Florida Seaport Transportation and Economic Development (FSTED) Program strengthen Florida's position, allowing the ports to play to their strengths while working as one. Additional funding towards the annual grant program and/or enhanced flexibility on match requirements could allow for greater competition with other states.

¹² Intermodal Logistics Centers Serving Florida's Seaports, June 2023.



Infrastructure Issues/Needs

Infrastructure issues and needs were another subset of the freight forum discussions. The topics discussed overlap significantly with the needs identified through the performance and conditions analyses outlined in Tech Memo 2, and specific examples brought up by stakeholders are highlighted in this section.

Highway

Highways are the most utilized mode of freight movement in Florida. According to the Freight Analysis Framework (FAF) data presented in Tech Memo 3, trucks make up 78 percent of total tonnage movement in Florida. This level of movement is predicted to grow across the state, as e-commerce continues to gain popularity, increasing the burden in areas where there is little room for development. Florida's unique geography creates multiple bottlenecks throughout the state highway system; FDOT is working to reduce these bottlenecks and improve the flow.

Congestion/Bottlenecks

Congestion was the number one recurring issue brought up with stakeholders and partners around the state. According to the American Transportation Research Institute's (ATRI) Cost of Congestion to the Trucking Industry: 2023 Update, the national trucking industry combined for 1.27 billion hours of delay in 2021. The analysis of Florida's trucking congestion in Tech Memo 2 shows the top 100 bottlenecks in the state.

Stakeholders in District 5 brought up congestion on SR34, and stakeholders in District 1 mentioned freight backups in LaBelle due to capacity and weight restrictions, as well as insufficient capacity on I-75, I-4, US27, SR33, and SR60.

Florida is experiencing rapid population growth, particularly in the central and southern regions, which is an issue greatly affecting freight demand, capacity, and mobility. With this growth comes an increase in accidents and more roadway construction to prepare for the future, both of which are major causes of congestion.

Some of the needs discussed during outreach were improved access to transit and passenger rail opportunities to remove vehicles from the road,

reducing contact between freight and passenger modes. Additionally, there has been an increased focus on the possibility of separating freight traffic from highways by use of truck bypasses or truck-only lanes. Many of these changes are expensive to implement due to the high cost of land. Florida could also rely on the use of technologies like freight signal priority to keep freight flowing without having to incur the costs of further infrastructure investments. Increased use of Artificial intelligence (AI) could help truckers route around congestion and

assist in shipping some of the more time-sensitive supply chain items. Technology can also be utilized to reduce the costs of modal shifts so that freight may move to a separate mode as needed, based on congestion and other factors.

Deficient Infrastructure

Deficient infrastructure can be an issue for Florida's transportation system. The analysis from Tech Memo 2 shows that while Florida has most of its bridges in a state of good repair, there are still some that need maintenance and investment.

The roads and bridges most in need of repair are the more rural roads in the farming and industrial hinterlands. The reduced capacity of rural infrastructure negatively impacts growers and manufacturers as part of their daily operations and increases concern about safety of their employees as they travel to and from facilities.

Stakeholders in District 4 mentioned several roads in the Everglades Agricultural Area (EAA) that needed repair, including CR880, SR80, and Airport Road in Belle Glade.

Aging bridge and roadway infrastructure can also be found in metropolitan areas of Florida, particularly in lower income areas where the local government may not have the funds to improve conditions. Many low-income neighborhoods are located near freight generating facilities and, as such, their roadway systems take an inordinate amount of heavyweight traffic compared to other neighborhoods. This leads to increased maintenance costs for local vehicles in an already economically suppressed area.

As truck traffic continues to increase across the state, care should be taken to retain Florida's quality road network including through continued leveraging of federal funds for emergency repairs, given the cost to develop new interstate in urban and/or rural areas.

Truck Parking

Commercial drivers nationally ranked truck parking as the number two concern in the industry (after driver compensation), according to ATRI's "Critical Issues in The Trucking Industry – 2023."¹³ The primary concerns of truck parking are a lack of spaces in the places that need it the most, and a significant cost barrier to establishing more parking infrastructure in those areas. This is exacerbated by regulations that are incompatible with current industry demands and consumer expectations due to wait times at shipper/receiver facilities and congestion. Truck drivers must wait to load/unload at distribution centers, and those hours are counted towards total driver hours of service, per the Federal Motor Carrier Safety Regulations, before taking a

¹³ ATRI. Critical Issues in the Trucking Industry, 2023.

mandatory rest period. Despite improvements with both public and private facilities adding more truck parking, the demand for e-commerce continues to grow, increasing the number of trucks on state and local roads that need safe places to park.

During outreach events, stakeholders suggested that, prior to certification of occupancy to any new facility (distribution center, etc.) that anticipates truck processing/deliveries as part of its operations, land planners should ensure that the facility has provided designated areas for overnight truck parking. While this is a potential solution, it is an increased cost to bear on the businesses, particularly in areas where land costs are expensive. Resolution of the truck parking dilemma will continue to require a multitude of solutions.

Crashes

There are a growing number of vehicles on the road, but also an increasing mix of freight, local, and tourist traffic leading to unpredictability in travel times and a high rate of incidents. According to the analysis done in Tech Memo 2, Florida's roadways witnessed around 197,513 commercial vehicle collisions between 2018 and 2022, leading to 1,465 fatalities. FDOT's primary goal is to create a safe transportation system for the people of Florida. While these crash numbers are increasing in totality, they are reducing as a rate compared to the total number of drivers on the roads. Even so, it is important that FDOT focus on partnership with Florida Department of Highway Safety and Motor Vehicles (FLHSMV) and Florida Highway Patrol (FHP) to improve enforcement and to stay at the forefront of technology to enhance safe operations. Specifically, Advanced Driver Assistance Systems (ADAS), Highly Automated Trucks (HATs), Connected and Autonomous Vehicles (CAVs), and Driver-Assistive Truck Platooning (DATP) hold great promise in reducing accidents for motor carriers.

Maritime

Florida's seaports represent key domestic and international gateways for Florida's supply chains. As stated in Tech Memo 2, Florida's seaports moved 112.5 M tons and 4.3 M TEUs in 2022. The capability of Florida's seaports to compete for business and continue to grow in the coming years is predicated on their ability to provide state of the practice services and capacities (e.g., water depth, terminal capacity and equipment, roadway, and rail connections) and the ability of their host communities and the state of Florida to ensure efficient access to markets.¹⁴

¹⁴ 2020 Seaport System Plan.

Port Access/Channel Depth

According to the 2020 Seaport System Plan, the most frequent categories of seaport issues by stakeholders are on channel and harbor dredging and deepening and intermodal access which impact capacity, access, and efficiency concerns. These concerns largely stem from the worldwide trend of building larger ships, which must fit into existing channels and port infrastructure. These waterway capacity projects have a downstream effect on terminal and landside operations. Larger vessels lead to the need for larger cranes, longer berths, additional terminal laydown areas, and efficient road and rail access.

Stakeholders in District 1 brought up the need for widening and deepening Port Everglades, as well as a need for connectivity from Port Everglades to US27.

Operational Inefficiencies

Florida's seaports have experienced increases in waterway traffic but are constrained by operational inefficiencies. Port hours of operation conflict with consumer demand, creating inefficient hours when truckers wait to pick-up their loads. The time needed to get in/out of the ports puts pressure on the port-side infrastructure, particularly short sea trade operations. Short-haul rail is preferred to help mitigate truck traffic moving into and out of a seaport, reducing congestion and wait times. 24/7 service can also create greater operational flexibility for shippers, though the workforce shortages have made it difficult to supply workers around the clock. Technology such as truck reservation systems integrated with mapping technology ("assistive intelligence") can also help provide the ports the ability to move goods quicker and easier (and therefore at less cost) to inland markets and destinations.

Inland Ports

Most of Florida's ports are located in urban areas. As such, truck trips generated at/near the port are impacted by and create increasing levels of congestion. To help alleviate these issues that were exacerbated by the pandemic, stakeholders have identified the need for increased inland distribution options – including the development of inland ports. Inland ports are specialized locations developed to serve the intermodal freight transportation network, often with a direct connection to a seaport, that provide off-port terminal capacity.¹⁵ They allow containers to be shuttled between the ports and an area of the state with less highway congestion and lower land/operating costs.

Florida has one Intermodal Logistics Center (ILC), in Winter Haven, and several other locations have developed extensive master plans to determine future buildouts. The Winter Haven ILC is strategically located in Polk County in the central region of Florida near the major consuming

¹⁵ FDOT's Intermodal Logistics Centers Serving Florida Seaports, 2023.

markets of Orlando and Tampa. The development of additional inland ports could provide improved intermodal connectivity and relieve congestion. There is a need for policy direction to provide funding for new ILCs.

Panama Canal Water Issues

Low water levels have hampered the Panama Canal operations in recent years, impacting an estimated 5 percent of seaborne trade. El Niño has caused hotter and drier weather in Panama, but scientists believe that climate change may be prolonging dry spells and raising temperatures in the region. Fewer passages being allowed through the canal has deprived Panama's government of tens of millions of dollars in annual revenue, pushing up the cost of shipping as ships travel longer routes to avoid the shortcut altogether. The canal authority is also limiting how far a ship's hull can go below the water, which significantly reduces the weight it can carry.¹⁶

Before the water problems, as many as 38 ships a day moved through the canal. In July 2023 the canal authority cut the average to 32 vessels. In November 2023, the canal's managing authority announced increasingly drastic restrictions for the depleted thoroughfare, including holding auctions for those wishing to jump to the front of the line. One ship owner paid a record \$4 million to skip to the front of the line.¹⁷

Rail

Florida's 3,858-mile rail network facilitates movement of people and goods within the state as well as to and from other regions of North America and around the world, through links with seaports and airports. Rail transportation continues to expand its role as a mode in Florida, though it faces the challenges of shared use passenger and freight tracks, limited space, and high costs to lay new tracks, and safety at crossings.

Passenger vs Freight Conflicts

Most of Florida's rail mileage is owned and maintained by freight railroads. The freight rail network provides interstate and intrastate transportation of goods, as well as intermodal connections for water and highway transfers, allowing the state's businesses to reach markets across the world. However, Florida's passenger rail system plays an increasingly important role in addressing the mobility needs of a growing state. It moves large numbers of people while also reducing roadway congestion and pollution, providing safer travel options, and promoting

¹⁶ ["Drought Saps the Panama Canal, Disrupting Global Trade", 2023](#)

¹⁷ ["The Panama Canal is so congested that one ship owner just paid a record \\$4 million to skip to the front of the line", 2023](#)

economic development.¹⁸ As the desire for passenger rail rises along with a decreasing availability of land/infrastructure, there is mounting pressure on the existing and privately owned freight rail tracks to consider co-location options. As communities outline passenger rail desires and potential funding opportunities, FDOT and communities must facilitate conversations with freight railroads to determine if co-location and increased use of tracks is an option. In most cases, freight railroad infrastructure would need to be improved to ensure rail lines are an economic option for the movement of goods and people, both now and in the future.

Blocked Crossings

Stakeholders in District 3 brought up blocked crossings in Escambia County.

Just as ship size has increased, train length and train frequency has also increased to handle more cargo. Longer trains can block traffic at railroad-grade crossings, impede emergency responders and trucks, and prompt unsafe pedestrian behavior, such as climbing through stopped trains.¹⁹ It is critical for planners to ensure the correct crossings are closed to ensure a safe environment for both train and traffic, and where a crossing cannot be closed further interdiction systems are installed where grade separation is not feasible.

Railroad Crossing Safety

According to Federal Railroad Administration (FRA) inventory statistics, Florida has 4,990 highway railroad at-grade crossings, making up 2.4 percent of the at-grade crossings on the U.S. railroad system.²⁰ Florida had the fourth highest number of highway-rail grade crossing collisions in 2022. There were 117 collisions with 21 fatalities and 51 injuries.²¹ Stakeholders across the Districts expressed the need for grade-separated crossings to reduce delays and safety challenges but understand the high cost of such investments. Other technologies such as positive train control and smart apps that can redirect traffic are needed to ensure that the systems can stay efficient and safe.

Stakeholders in District 4 brought up a rail crossing at SR84 and Andrews. Stakeholders across the state stressed the need for grade-separated crossings.

¹⁸ FDOT Rail System Plan, 2022.

¹⁹ Government Accountability Office. "Rail Safety: Freight Trains Are Getting Longer, and Additional Information Is Needed to Assess Their Impact", 2019.

²⁰ [8.05 - Crossing Inventory By State \(dot.gov\)](#)

²¹ [Collisions & Fatalities by State | Operation Lifesaver \(oli.org\)](#)

Aviation

Florida relies on an extensive, robust, and evolving airport system to support the state's economy and drive economic growth. The airports support access for millions of out-of-state visitors each year as well as immense air cargo volumes flowing through the airports and the military's aviation activities at several installations across the state. As the gateway to the South, it is imperative that air freight remain a primary consideration of Florida's airport growth needs, particularly in the face of fuel challenges and technological advances.

Fuel Resilience

There have been significant fluctuations in aviation fuel costs due to a lack of refinery infrastructure nationally. In Florida, limited pipeline infrastructure carries aviation fuel to the state's airports. During emergencies, the reliance on trucks/highways to bring in fuel to the airports creates a resilience issue. If the highways are cut off or inaccessible, getting fuel into and out of airports becomes a hindrance to critical response and recovery efforts. By increasing pipeline and other redundant fueling infrastructure to Florida's airports and staying ahead of the curve with alternative fuels such as Sustainable Aviation Fuel (SAF) and electric options, these issues can be addressed.

Space

Florida's space industry is booming. Tech Memo 2 highlights the 279 percent increase in Space Coast launches between 2017 and 2023. To maximize efficiency with this increased tempo, Space Florida has promoted and incentivized manufacturing and refurbishing in closer proximity to the Cape Canaveral spaceport. Over the next three years, the project is expected to bring 2,100 spacecraft manufacturing jobs to Brevard County in a new \$300 million manufacturing facility near the Orlando-Melbourne International Airport.²² While space freight brings excellent opportunities to the state, issues such as congestion during launch days and transporting oversize and overweight cargo have become correspondingly more prominent and demanding of solutions.

Congestion/Oversized Cargo

As the private sector of space travel continues to grow, launches become more frequent, and with larger launch vehicles, the necessity of freight avenues capable of supporting an annually expanding launch tempo become more significant. Projects in proximity to launch sites include dredging nearby ports and development of intermodal connections for larger vessels, or for near-source manufacturing assembly. On public highways around spaceports already congested,

²² ["Space Florida aims to bring 2,100 manufacturing jobs to Brevard County,"](#); ["'Project Griffin' seeks to invest \\$300 million into Melbourne spacecraft facility."](#)

investment is required for revision of existing infrastructure and for new construction to ensure that oversized and overweight launch equipment and cargo can move safely and securely. Florida must incorporate Intelligent Transportation System (ITS) solutions such as freight signal priority, dynamic message signage, capacity improvements, and designate super haul routes with enhanced infrastructure.

Pipelines

While FDOT has no formal role in pipeline governance, stakeholders suggested that pipelines should play a greater role in the movement of Florida's liquid and natural gas. As discussed in the aviation section, pipelines provide a lifeline during times of emergency. Hurricane Ian left many of the railways in South Florida destroyed, leaving areas such as Ft. Myers without a heavy freight connection. Rail lines are significant movers of certain fuels such as Compressed Natural Gas (CNG) and Liquefied Natural Gas (LNG) as well as many of the aggregates that are required in the recovery from a disaster. Many of these commodities can also be moved by pipeline (including aggregates), which can be buried and can provide a cheap and consistent method of delivering needed supplies.

Capacity

Florida's main issue with pipelines is a lack of capacity. Pipeline infrastructure can be difficult to establish as it requires expensive right of way as well as a large distribution point to other modes to be effective. In areas such as South Florida, the geology of the drainage system makes pipeline capacity specifically challenging. However, Florida should consider pipelines as an alternative delivery method for fuels, particularly in areas where other infrastructure can be difficult.

SWOT Analysis

A Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis was conducted based on stakeholder input, technical analysis, and trends identification in the previous tech memos.

Strengths	Weaknesses	Opportunities	Threats
Location	Trade Imbalance	Alternative Fuels	User Conflicts
Diverse & Versatile Freight Assets	Congestion	Automation	Cyber Security
Strong Market Demand	Lack of Available Land	Inland Ports	Geopolitics
State's Culture of Public & Private Sector Collaboration	Truck Parking Availability	Grade Separations	Climate Impacts
	Workforce Availability	Aerospace Industry	Increasing Logistics Costs
		Public Transit	

Strengths

- **Location**
 - Florida is the primary gateway to South America and the Caribbean. Air cargo and maritime shipping utilize Florida's airports and seaports as transfer facilities to supply the U.S.
 - During the pandemic, delays to offload prompted some vessels to change their port of call, and international shipping companies increased their presence in Florida to avoid the overcrowded West Coast ports
 - Florida benefits from good highway and freight rail access to the Midwest
- **Diverse and versatile freight assets**
 - Florida is versatile in having multimodal options and being able to accommodate a variety of issues
 - Prominence of good railway and highway access in rural areas to promote growth
 - Many deep-water ports that are diverse and have their own areas of focus
 - An air cargo global gateway to the Americas
 - Florida is the only state to have legislatively designated a "Strategic Intermodal System," supporting critical facilities on the multimodal system

- **Strong market demand**
 - Florida is the third most populous state and growing
 - Diverse economic industries include tourism, agriculture, international trade, aerospace and aviation, life sciences (e.g., pharmaceuticals and R&D), and financial services
- **State culture of public & private sector collaboration**
 - The state has a proactive approach to goods movement issues that involve all modes - seaports, highway, freight rail, aviation, and spaceports
 - Florida has been proactive with funding infrastructure projects to increase capacity and resiliency at intermodal hubs across the state

Weaknesses

- **Trade Imbalance**
 - As a high-consumption state, inbound goods movement volume outweighs outbound goods movement volume, and empty backhaul is a by-product
- **Congestion**
 - The population in Florida has grown quickly, and the cost of infrastructure has risen even faster
 - Roadway congestion has a significant impact on cargo movement in the form of hours of wasted time in traffic and increased cost
- **Lack of available land**
 - As the state grows, land has become extremely valuable and the competition for development is tight
- **Truck parking availability**
 - Truck parking demand exceeds supply, particularly along the I-4, I-10, I-75, and I-95 corridors
- **Workforce development**
 - Florida's logistics industry is facing a workforce shortfall throughout the supply chain – pilots, mechanics, railroads workers, and truck drivers
 - Many members of this workforce are older than in other industries and getting aged out, with younger generations not filling in the gaps

Opportunities

- **Alternative fuels**
 - Growth of biodiesel fuels and continued research in hydrogen cells and electricity in lieu of diesel and gas are showing promise for freight modes
- **Automation**
 - Connected and automated vehicles and systems have the potential to reduce crashes, and alleviate aspects of the workforce shortage
 - ITS solutions have the potential to increase the operational capacity and safety of the transportation network
 - Technology can assist in some of the more time-based shipping of the supply chain
 - AI can help truckers route around congestion
 - Automation and use of machine learning to schedule appointments can reduce queue times so trucks do not waste time, money, and burn fuel
- **Inland ports**
 - The development of inland ports and similar facilities could provide improved intermodal connectivity and relieve congestion
- **Grade separations**
 - Grade-separated crossings could improve safety and provide congestion relief
- **Aerospace industry**
 - Florida's leadership in space launch activity offers a strong opportunity to further develop the aerospace industry
 - Florida has the infrastructure and the expertise to support and test early-phase developments within aerospace
- **Public transit**
 - Increased use of public transit to absorb population growth in alternative transportation modes will reduce congestion and relieve freight movement
 - Florida's population has grown and aged faster than the national average

Threats

- **User conflicts**
 - Florida has experienced increasingly frequent conflicts between users (railroad, highway, bike, pedestrian) as well as between passenger and freight movement
- **Cybersecurity**
 - The threat of cyberattacks continues to increase in supply chain processes
- **Geopolitics**
 - World geopolitical impacts may continue affecting the industry
- **Weather impacts**
 - Extreme weather has been increasingly disruptive to Florida's operations at ports, highways, railroads, warehouses, and manufacturing facilities
- **Increasing logistics costs**
 - Florida consumers have felt the trickle-down impacts of increased costs for fuel, labor/wages, insurance, maintenance, and equipment prices

Top Challenges

The SWOT analysis provides an overview of Florida's strengths, weaknesses, opportunities, and threats based on the stakeholder input, technical analysis, and trends identification. The weaknesses and threats specifically provide insight into the state's top challenges. Congestion, truck parking, trade imbalance, and on-going supply chain disruptions will be the focuses of the implementation effort coming out of this planning document. These topics will be a fundamental component of the strategies laid out in the following Tech Memo, as well as the action items broken out in Tech Memo 8.

*FMT***P24**

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