Mobility Measures Program

Overview

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Florida Department of Transportation

FORECASTING & TRENDS OFFICE

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1.0 Introduction

The Florida Department of Transportation (FDOT)'s Forecasting and Trends Office (FTO) has established the Mobility Measures Program (MMP) to develop and report on multimodal mobility performance measures. The objective of the program is to develop and regularly update measures, including analytic and reporting techniques for measures for all modes, and to ensure they are in accordance with state-of-the-art practices and national guidelines related to mobility performance measurement.

FDOT's Mobility Measures Program dates back to the 1990s. Over time, the MMP has evolved and expanded from a score of primarily roadway-related measures to over 70 multimodal measures and trends which are summarized in the annual *The FDOT Source Book* (Source Book).

The MMP and the Source Book feature a breadth of key indicators for how Florida's transportation networks are performing and also include critical safety figures. The Source Book also provides trend information that provides useful insights into factors affecting travel on FDOT's facilities. The Source Book tracks emerging technologies, such as electric vehicles and Transportation Network Companies (TNCs), to better understand their impacts on Florida's roadways. From mobility performance to factors affecting mobility, these measures help guide FDOT to prioritize projects that have a positive effect.

This MMP overview report describes several key components of the program:

- Overview of Performance Based Planning
- Purpose of a Mobility Measures Program
- Overview of Mobility Measures Program
  - Coordination between Central Office, Districts and Metropolitan Planning Organizations (MPOs)
  - Reports of Mobility Measures
  - Activities undertaken by the Mobility Measures Program
- Acronyms and Glossary

The details of these components have been discussed (and continue to be discussed) with various groups including FDOT Central and District offices and MPOs throughout the state.

2.0 Overview of Performance Based Planning[1]

While performance management has its roots in the private sector, where it is used to improve business outcomes, performance management has become increasingly common among public-sector agencies. Whether the process is public or private, the strategic objective of a performance-based approach is to use performance information to make decisions that are more effective and efficient and lead to improved outcomes.

Within transportation planning and programming, this means selecting investments to most effectively and efficiently achieve desired outcomes, as determined through public input and agency strategic direction.

Performance measures are central to implementing a performance-based planning process, since how performance is defined and measured will significantly affect the types of projects and strategies that are advanced. Moreover, performance results inform agencies if the types of projects and strategies that are implemented are in fact helping them achieve their strategic goals.

Performance measures serve five critical purposes within a performance-based planning approach:

1. **Clarify the definition of goals –** Performance measures are a tool that is used in converting broad goals into measurable objectives.

2. **To monitor or track performance over time –** Metrics are used to track performance on regular basis (e.g., yearly, monthly).

3. **As a reference for target setting –** Metrics are used as the basis for selecting a target that is intended to be achieved.

4. **As a basis for supporting policy and investment decisions by comparing alternative options –** Metrics are used as a basis for comparing alternative investments or policies in order to make decisions.

5. **To assess the effectiveness of projects and strategies –** Metrics are what enable measurement to assess whether projects and strategies have worked to further goals.

3.0 Overview of Mobility Measures Program

The MMP at the FDOT dates back to the 1990s. The key components of the MMP are summarized below and expanded in detail in later sections.

- Coordination between Central Office, Districts and Metropolitan Planning Organizations (MPOs)
    - Coordination between the agencies is vital to ensure consistency in understanding and approach towards mobility measures. The MMP conducts regular meetings with the partner agencies.

[1] FHWA's Performance Based Planning and Programming Guidebook
https://www.fhwa.dot.gov/planning/performance_based_planning/pbpp_guidebook/pbppguidebook.pdf

- Reports of Mobility Measures
  - Over time, the MMP has evolved and expanded from a score of primarily roadway-related measures to over 70 multimodal measures and trends which are reported in the Source Book. In addition to the Source Book, reports of mobility measures prepared by the MMP are: MPO Profiles, Demographic Analyses, MAP-21 Measures for Federal Highway Administration (FHWA) and Digital Source Book.
- Activities undertaken by MMP
  - The MMP undertakes research activities in coordination with FDOT's Research and Consultant teams to advance the MMP. Additionally, the MMP also participates in Pooled Fund Studies offered through National Cooperative Highway Research Program (NCHRP) and FHWA.

4.0 Purpose of the Mobility Measures Program

The purpose of FDOT's MMP is to:

- Develop statewide mobility measures for use by transportation agencies and other partners across the state;
- Report on statewide mobility performance annually;
- Ensure consistency in understanding of and approach towards mobility measures by the state and MPOs through a consensus building process;
- Provide support in evaluating alternatives and prioritizing projects in planning and programming processes;
- Use latest information for better understanding how certain emerging technologies, such as electric vehicles and Transportation Network Companies (TNCs), are being used on Florida's roadways; and
- Comply with Moving Ahead for Progress in the 21st Century Act (MAP-21) and the Fixing America's Surface Transportation Act (FAST Act) requirements related to mobility measures.

The FTO within FDOT Central Office is responsible for reporting on the statewide measures annually through the Source Book. Other offices and MPOs are encouraged to use the measures and results in their own planning and programming processes.

5.0 Roles of Forecasting and Trends Office and Statewide MMP Team

The FTO within FDOT Central Office leads the coordination efforts among the Central Office, Districts and MPOs, primarily through the Statewide MMP Team. Regular coordination meetings are held throughout the year to keep all the agencies updated on the progress being made.

The FDOT FTO Office will:

- Coordinate statewide efforts on the Mobility Measures Program;
  - Lead the development and update of measures and analysis techniques
  - Be the primary/official source of mobility measures for Florida
  - Conduct and share research activities and district case studies with all stakeholders
  - Engage other offices and support their data needs
  - Field technical questions from Districts and MPOs
- Produce *The FDOT Source Book* annually;
- Evaluate mobility measures and their methodologies to keep up with FDOT priorities, changing environment of the transportation industries and emerging technologies;
- Assist Districts, MPOs and program areas with mobility measures at a more granular geographic level;
- Support MPOs in providing MPO profiles annually;
- Develop and provide training to MMP team and others, as appropriate;
- Produce and report on statewide MAP-21/FAST Act System Performance measures; and
- Assist MPOs with their reporting of MAP-21/FAST Act System Performance measures, as needed.

The MMP Team is expected to:

- Provide input to FDOT FTO on the Mobility Measures program;
- Develop and use mobility measures, as appropriate;
- Provide technical support to FDOT and partners, when needed;
- Share best practices with FDOT FTO and other partners, as appropriate;
- Assist MPOs to comply with MAP-21/FAST Act through FDOT Administrator for Metropolitan Planning and MPO Advisory Council (MPOAC).

6.0 Primary Products of the MMP

This section summarizes the reports produced by FTO's MMP.

6.1 The FDOT Source Book

The FDOT has produced an annual Source Book for close to two decades. The product has evolved over time, and the culmination of all those years of producing the Source Book is evident in the 2019 edition. This Source Book describes the mobility conditions along Florida's state roadway networks – State Highway System, National Highway System and Strategic Intermodal System, transit network, airports, railways, spaceports and seaports. To account for the multimodal measures appearing in the Source Book, data was used from multiple sources including vehicle probes, traffic characteristics inventory, roadway characteristics inventory, and modal sources.

Through the Source Book, a comprehensive report is provided for all major modes of travel in Florida. Some of these mobility measures are leveraged for making funding decisions, in planning analyses, and for studies when used at the segment level. Measures presented here are the aggregation of the individual data points and measures calculated for smaller geographies. The report is available at fdot.gov/planning/fto/mobility.

6.1.1 Mobility Performance Measures

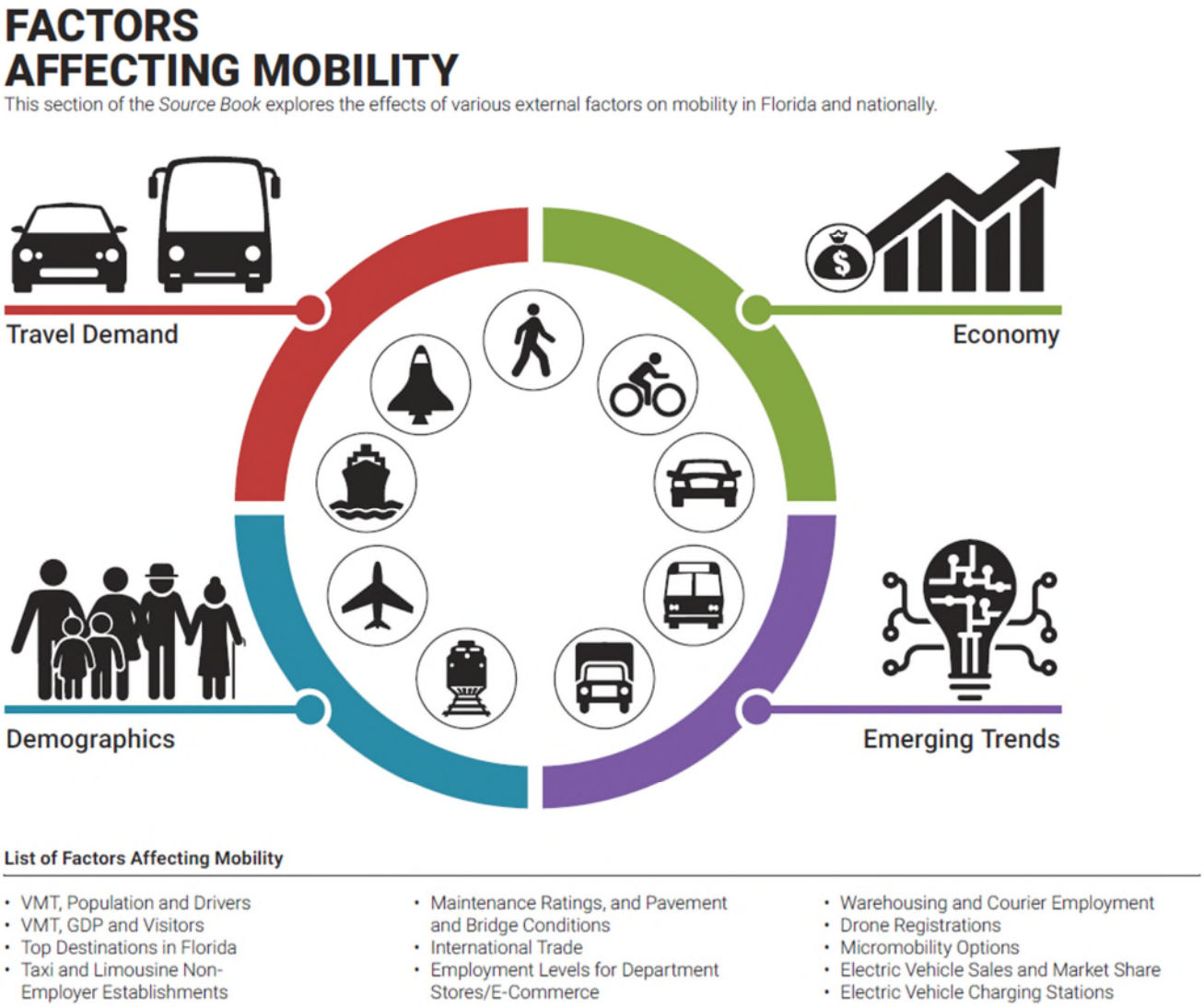
The mobility performance measures section of the Source Book provides the measures for each of the following modes of transportation: Auto, Aviation, Bicycle, Pedestrian, Rail, Seaport, Spaceport, Transit, and Truck. **Figure 1** lists the various performance measures reported in the Source Book.

Figure 1 Mobility Performance Measures

6.1.2 Factors Affecting Mobility

This section of the Source Book explores the impact of various external factors on mobility in Florida and nationally. **Figure 2** lists the various factors affecting mobility reported in the Source Book.

Figure 2 Factors Affecting Mobility



6.1.3 Forecasting

During coordination with multiple stakeholders, an interest was expressed in forecasting system performance. Measures were projected for 5- and 10-year increments to 2024 and 2029. These forecasted measures may support transportation planners and FDOT program offices in better understanding growth in transportation demand and guide transportation policy and investment strategies at all government levels.

6.2 Digital Source Book

Over the course of 2018, FDOT coordinated with Districts, MPOs, Transportation Planning Agencies (TPAs) and FDOT Central Office program offices to gather feedback for future Source Book updates. FDOT is transforming the current Source Book into an integrated web platform, with on-demand geographical and temporal breakdown as well as visualization of mobility measures and trends, increased data availability through querying capability, and personalized reporting. This platform will empower the stakeholders with an additional tool to improve their decision-making process. The digital Source Book is available at FDOTSourceBook.com.

6.3 MPO Profiles

Since 2017, FDOT Forecasting and Trends Office has assisted Florida's 27 MPOs (including TPAs, Metropolitan Transportation Planning Organizations (MTPOs) and Transportation Planning Organizations (TPOs)) with reporting on ten mobility measures. The measures for a specific year are reported by available data at the time of reporting. Each year, six core measures are reported for each MPO. Eight measures are rotated every other year with four measures reported in the odd year and four in the even year. For details, please visit fdot.gov/planning/fto/mpomeasures.

Table 1 Performance Measures for MPO Profiles

Six Core Measures	Odd Year Rotating Measures	Even Year Rotating Measures
• Daily Vehicle Miles Traveled (VMT) • Daily Truck Miles Traveled • On-Time Arrival • Planning Time Index (PTI) • Daily Vehicle Hours of Delay • Percent Miles Heavily Congested	• Percent Pedestrian Facility Coverage • Percent Bicycle Facility Coverage • Average Job Accessibility by Auto within 30 Minutes • Average Job Accessibility by Transit within 30 Minutes	• Person Miles Traveled • Combination Truck On-Time Arrival • Average Travel Speed • Percent Travel Meeting LOS Criteria in The Peak Hour

6.4 System Performance Measures for Federal Highway Administration

The MAP-21 and FAST Act transformed the Federal-aid highway and transit programs by establishing new performance-based planning requirements for State Departments of Transportation (DOTs), MPOs and providers of public transportation services.

As a part of the federal requirements, FDOT was required to submit the first Baseline Performance Period Report to FHWA by October 1, 2018 and additional reports every two years afterwards. FDOT prepared and submitted the first Baseline Performance Period Report to FHWA on October 1, 2018 and aims to submit additional reports to meet the federal requirements.

6.5 Demographic and Commuting Analysis

The FDOT's FTO conducts demographic analyses. As an affiliate of the State Census Data Center, FTO provides annual population estimates and 5-year projections based on the population study of the Bureau of Economic and Business Research (BEBR). The reports produced through this analysis are:

- Florida Population Summary Report,
- Florida Population Projections,
- FDOT District by County Population Estimates,
- MPO Population Estimates,
- Florida Urbanized Area Population Estimates - Areas with a population of 50,000 or more,
- Florida Urban Cluster Population Estimates - Areas with a population between 2,500 and 49,999,
- Florida County by City Population Estimates, and
- Commuting Trends in Florida.

Details are available at fdot.gov/planning/demographic/.

7.0 MMP's Activities

The FTO MMP undertakes research activities in coordination with FDOT's Research and Consultant teams to advance the MMP in the future. Additionally, the FTO MMP also participates in Pooled Fund Studies offered through NCHRP and FHWA. Additionally, FTO takes the lead in conducting studies and research activities, when the need arises.

This Section provides information on the MMP's activities during the last three years. This Section will be updated as and when additional activities are conducted by the MMP. Majority of the documents and final reports on the following projects is available at: https://www.fdot.gov/planning/fto/mobility/products.shtm.

7.1 Projects

7.1.1 Before and After Study (ongoing)

As part of an initiative to further understand transportation improvement's impact on mobility, FTO's MMP has conducted before and after studies. These studies take into account a project's purpose and need. Rarely does a post evaluation occur to assess whether a transportation improvement has actually met its original purpose and need. FTO staff work with district counterparts to identify projects and further understand the projects origins. The districts and FTO come to consensus on the measures that will best assist with assessing the project's overall impact. From there, FTO works to gather appropriate data from a timeframe that accounts for mobility conditions one year before the project's implementation. Similarly, data is gathered from the same sources for a time period one year after the project's completion. A quantitative

analysis is delivered to provide a clear and readily understandable picture on conditions before and after the project, and account for the amount of change. This could be repeatedly annually if there is enough interest.

7.1.2 Vehicle and Freight Bottlenecks (completed December 2019)

The overall objective of this study is to identify and rank the top statewide bottlenecks for all vehicles and for freight. A ranked list and maps of these top bottlenecks were made available to the Freight and Multimodal Operations Office, and the Forecasting and Trends Office. This report documented the methodology used to identify and rank these bottlenecks. FDOT may use this information to supplement the bottleneck evaluations being done as part of the update of the Freight Mobility and Trade Plan (FMTP). Ultimately, an understanding of statewide bottlenecks can be used to plan for strategies to reduce their duration and severity.

7.1.3 Weekend Congestion (completed December 2019)

While developing mobility performance measures such as reliability or delay, the Source Book has typically focused on weekday commuting patterns. Traditionally, it has been assumed that congestion happens during weekdays at certain given peak periods. *The FDOT Source Book* reports speed-based mobility performance measures for non-holiday weekdays only. However, the use of probe speed data in general, and the MAP-21 PM3 requirements in particular, has motivated a more nuanced understanding of congestion patterns. While developing initial targets for MAP-21 PM3 measures to meet the Federal Transportation Performance Management guidelines, FDOT examined travel time reliability measures for the weekend and weekday time periods, and observed that weekend congestion on Interstates is rare while weekend congestion on non-Interstate routes is common. FDOT then embarked on an effort to better understand weekend congestion by analyzing travel time data on Florida's roadways, together with FDOT's Roadway Characteristics Inventory data.

The results indicate that the weekend congestion is real and present. In fact, it was observed that peak weekend congestion is higher than peak weekday, especially for arterials. These findings reveal the need to acknowledge the importance of weekend congestion, initially through incorporating weekend performance measures as part of agencies' performance reporting and later by planning for and engaging in decision making informed by weekend congestion patterns. Based on the analysis, FDOT decided to measure and report weekend congestion as part of its annual Source Book starting in 2020.

7.2 Research Activities

7.2.1 Vehicle Trajectory Data Literature Synthesis (ongoing)

Vehicle trajectory data provide the precise location of each vehicle every one-tenth of a second, and are made available from several travel time vendors, known as path-processed data, breadcrumb data, waypoint data, etc. It is recognized that the state of the practice is limited in many respects. Developing a comprehensive understanding of the data and its uses will assist FDOT in its decision making.

The overall objective of the project is to conduct a synthesis on vehicle trajectory data that are being used by FDOT districts, at MPOs/TPAs, statewide and nationally. The data will be assessed for their use in existing FDOT analytic processes. This study is intended to assist FDOT and other transportation agencies to better understand and utilize the vehicle trajectory data. Based on the research results, next steps will be recommended.

7.2.2 Evaluation of Truck Tonnage Estimation Methodologies (completed December 2019)

For the Source Book, multi-source data sets – Freight Analysis Framework (FAF), Weigh-in-Motion (WIM), and Annual Average Daily Traffic (AADT) – are used to calculate the truck tonnage measure. This method combines the commodity-flow-based and vehicle-based characteristics to present a comprehensive picture. However, as the outdatedness of the FAF data has begun to affect the accuracy of the results derived from the method, FTO conducted a research project to develop a new method that can be easily updated to represent current truck tonnage in the State of Florida and can be more efficiently and accurately utilized for estimating truck tonnage volumes. Through research and analysis, the researchers have found that Weigh-in-Motion (WIM)-based method can provide the required modifications to the truck tonnage model that will yield more accurate results.

FDOT's WIM data was analyzed, and a conceptual and methodological framework was developed to provide general guidelines that can be implemented for the improvement or development of truck tonnage calculation model.

7.3 Pooled Fund Activities

7.3.1 Support for Urban Mobility Analyses (SUMA) Pooled-Fund Study (ongoing)

In 1997, FHWA in combination with several State DOTs and MPOs formed a pooled fund effort, Mobility Measurement in Urban Transportation (MMUT), to develop mobility performance measures and to collect and analyze the nation's urban congestion data in the most accurate and comprehensive way possible. FDOT has been a participant in this pooled fund effort since the early years, which has been led by Texas Transportation Institute (TTI). In 2019, this pooled fund study is renamed as Support for Urban Mobility Analyses (SUMA).

The pooled fund effort focuses on developing tools to monitor and evaluate urban congestion by identifying and evaluating the latest mobility data sources, developing and communicating comprehensive performance measures for congestion improvements and helping member agencies apply the study's research products to their congestion planning.

All the deliverables prepared as a part of the pooled fund effort are available as a *.zip file at this web address: https://tti.tamu.edu/documents/umi/data/mmut/files.htm

7.3.2 National Accessibility Evaluation Pooled-Fund Study (ongoing)

Another pooled-fund project which FDOT has been a part of is the National Accessibility Evaluation study, led by the Minnesota Department of Transportation. This study will implement a measurement of accessibility to jobs across the entire U.S. As a part of this study, FDOT has been granted digital access to detailed accessibility datasets as well as annual reports summarizing patterns and trends in accessibility across the country and for Florida.

Additional information on this pooled fund study is available at this web address: http://access.umn.edu/research/pooledfund/index.html.

Florida's data and reports can be accessed through: https://www.fdot.gov/planning/fto/accessibility/.

Appendix A. Acronyms

AADT Annual Average Daily Traffic

ATRI American Transportation Research Institute

BEBR University of Florida's Bureau of Economic and Business Research

BEV Battery Electric Vehicles

CRS Computerized Reservations Systems

CTMT Combination Truck Miles Traveled

CTTMT Combination Truck Ton Miles Traveled

FAF Freight Analysis Framework

FCEV Fuel Cell Electric Vehicles

FDOT Florida Department of Transportation

FHWA Federal Highway Administration

GDP Gross Domestic Product

HEV Hybrid Electric Vehicles

LOS Level of Service

MPGE Miles per Gallon Gasoline Equivalent

MPH Miles per Hour

MPO Metropolitan Planning Organization

NHS National Highway System

NHTSA National Highway Traffic Safety Administration

NTD National Transit Database

PHEV Plug-in Hybrid Electric Vehicles

PMT Person Miles Traveled

PTI Planning Time Index

RCI Roadway Characteristics Inventory

SHS State Highway System

SIS Strategic Intermodal System

TCI Traffic Characteristics Inventory

TEU Twenty-foot Equivalent Unit

TMT Truck Miles Traveled

TNC Transportation Network Company

UAS Unmanned Aircraft System

VMT Vehicle Miles Traveled

WIM Weigh In Motion

Appendix B. Glossary

95th Percentile Travel Time: The travel time that is higher than 94% of travel time observations or equivalently lower than 4% of the average speed observations.

Annual Average Daily Traffic (AADT): The average daily traffic for an entire year, 24 hours per day, 7 days a week. AADT is determined using measurements at thousands of locations each year by FDOT.

Area Type: Statewide, urbanized areas of the 7 largest MPOs, other urbanized areas, and non-urbanized areas for the purpose of the Source Book.

Arterials: Signalized roadways that primarily serve through-traffic with average signalized intersection spacing of 2.0 miles or less.

Auto (automobile): a highway travel mode that includes motor vehicle traffic including motorcycles, passenger cars, and four tire, single units (FHWA Vehicle Category Classification, Classes 1- 3).

Auto/Truck: a combination of the auto and truck modes (FHWA Vehicle Category Classification Classes 1-13).

Average Weighted Speed: Calculated as the average speed weighted by the hourly vehicle miles traveled.

Centerline Miles: The total length of roads, without regard to number of lanes.

Combination Trucks: A truck tractor pulling any number of trailers (including a “bobtail” truck tractor not pulling any trailers) or a straight truck pulling at least one trailer. These are vehicles classified as Classes 8-13 by FHWA.

Congestion: Condition in which traffic demand causes the LOS to be at or below FDOT’s LOS target.

Connectors: Highways, rail lines, or waterways linking hub-to-corridor, hub-to-hub, or strategic military installation-to-corridor.

Corridors: Highway, rail line, waterway, and other exclusive-use facilities that connect major origin/destination markets within Florida or between Florida and other states/nations.

Daily VMT: The product of a road’s length and its AADT. If a ten-mile long road has an AADT of 5,000 vehicles, then its daily VMT is 50,000.

Delay: Any additional travel time experienced by a traveler.

Drone: Also known as Unmanned Aircraft Systems (UAS), which include an unmanned aerial vehicle (aircraft without a human pilot on board), a ground-based controller, and a system of communications between the two.

Empty Backhaul Tonnage: Amount of empty available tonnage that could have been carried by a truck while on a return trip from its original destination to its original point of origin.

E-scooter Operations: Motorized bicycles propelled by human power or by a combination of human power and an electric motor.

Facility: Roadway composed of points and segments, seaports, airports, spaceports, railyards, transit stations.

Fixed Route Transit: A system of transporting individuals (other than by aircraft) on which a vehicle is operated along a prescribed route according to a fixed schedule.

Free-Flow Travel Time: The average time spent by vehicles not under the influence of speed reduction conditions over a facility length.

Freeway: A multilane, divided highway with at least two lanes for exclusive use of traffic in each direction and full control of ingress and egress.

Freight: Any commodity being transported.

Gross Domestic Product: The total market value of the goods and services produced within Florida or the United States in a year.

Heavily Congested: Arterial segments operating at LOS E or worse in urbanized areas and D or worse in non-urbanized areas; highways operating at LOS E or worse; and freeways operating at 45 mph or worse.

Highways: High speed roadways with signal spacing greater than 2 miles per signal.

Lane Miles: The product of the centerline miles and the number of lanes. A four-lane road that is 10 miles long has 40 lane miles.

Level of Service: A quantitative stratification of the quality of service to a typical traveler of a service or facility into six letters, with “A” describing the highest quality and “F” describing the lowest quality.

Micromobility: All shared-use fleets of small, fully or partially human-powered vehicles such as bikes, e-bikes and e-scooters

Mobility Performance Measure: A metric that quantitatively describes something about the movement of people or goods.

National Highway System (NHS): The Interstate Highway System as well as other roads important to the nation’s economy, defense, and mobility. A roadway on the NHS may not be on the SHS.

Passengers:

> **Aviation –** The total number of revenue passengers boarding aircraft, which includes only passengers boarding at a Florida airport. If a passenger has to transfer between planes to reach a destination, the passenger is counted as making two passenger boardings.
>
> **Transit –** The total number of passenger trips on transit vehicles. A trip is counted each time a passenger boards a transit vehicle. Thus, if a passenger has to transfer between buses to reach a destination, the passenger is counted as making two passenger trips.

Seaport – The total number of passenger movements at Florida's eight cruise ports.

Rail – The total number of revenue paying rail passengers for SunRail, Amtrak, and Tri-Rail.

Reporting Periods:

Peak Hour – 5:00 p.m.-6:00 p.m. on a weekday. This hour is chosen to allow consistent comparisons among transportation modes. It may not be the hour of greatest travel for any given roadway or mode.

Peak Period – A multi-hour period (4:00 p.m.-6:00 p.m.) in which travel is greatest. These peak period hours are chosen based on the hours of greatest travel in different area types.

Daily – For the average 24-hour day.

Yearly – Includes all the calendar days in a 365 year, except holidays and weekends.

Serious Injury: Disabling/incapacitating injuries from traffic crashes that prevent the injured individuals from normal activities and require hospitalization.

Seven (7) Largest Counties: The Seven (7) Largest Counties are: Broward, Hillsborough, Orange, Miami-Dade, Palm Beach, Pinellas, and Duval.

Seven (7) Largest MPOs: The urbanized geographic areas with a population of at least 500,000 people covered by Florida's seven most populous Metropolitan Planning Organizations (MPOs): Broward MPO, Hillsborough MPO, MetroPlan Orlando, Miami-Dade TPO, North Florida TPO, Palm Beach TPA, and Forward Pinellas.

Shared-Use Paths: A shared-use path, also referred to as a multiuse trail, is typically 12 feet wide, but may commonly vary from 10 feet to 14 or more feet depending upon constraints or volume of use. It is differentiated from a sidewalk in that it is generally wider, is part of a larger regional and statewide systems of trails, and is accompanied by a higher level of facilities including trailheads, parking, wayside areas and other amenities.

Speed: Velocity in miles per hour. The daily average speed is the average for travel 24 hours of the day. The peak hour speed is the average speed from 5:00 p.m.-6:00 p.m.

State Highway System (SHS): All roadways maintained and operated by the FDOT.

Strategic Intermodal System (SIS): Florida's transportation system composed of facilities and services of statewide and interregional significance, including appropriate components of all modes. A roadway on the SIS may not be on the SHS.

Transit: A travel mode in which vehicles (including buses, streetcars, and street-running light rail) pick up and drop off passengers at regular stops/stations.

Travel Time Reliability:

On-Time Arrival – For the seven largest MPOs, on-time arrival is defined as the percentage of freeway trips traveling at least 45 mph. For all others, on-time arrival is defined as the percentage of

freeway trips traveling at greater than or equal to 5 mph below the posted speed limit. For example, 80% on-time arrival indicates the traveler is anticipated to arrive at the destination on time in 4 out of 5 trips.

Planning Time Index – Planning Time Index is the ratio of 95th Trucks: Vehicles classified as Classes 4-13 by FHWA.

Trucks: Vehicles classified as Classes 4-13 by FHWA.

Twenty-Foot Equivalent Unit: The standard measure used for containerized cargo. One Twenty-Foot Equivalent Unit includes an 8-foot by 8-foot by 20-foot intermodal container.

Urban: An area with a population of at least 5,000 people.

Urbanized Area: An area with a population of at least 50,000 people.

Vehicle Occupancy: The average number of persons in a vehicle, using a countywide average from the National Household Travel Survey conducted in 2009.

Volume: The number of vehicles crossing a segment of road during a specified time period.

Appendix C. Summary of Multimodal Mobility Measures

Measure	Description	Calculation	Reporting Period	Sources
People-Related Mobility Measures: Auto/Truck				
Vehicle Miles Traveled	Vehicle miles traveled (VMT) is determined using vehicle traffic volume and segment length.	$\sum(Segment\ Length \times Volume)$	• Peak Hour • Daily	• FDOT – *Traffic Characteristics Inventory* • FDOT – *Roadway Characteristics Inventory*
Person Miles Traveled	Person Miles Traveled (PMT) is determined by multiplying VMT by the average vehicle occupancy.	$\sum(Segment\ Length \times Volume \times Average\ Vehicle\ Occupancy)$	• Peak Hour • Daily	• FDOT – *Traffic Characteristics Inventory* • FDOT – *Roadway Characteristics Inventory* • U.S. DOT – *National Household Travel Survey 2009 Florida Add-On*
% of Travel Meeting Level of Service (LOS) Criteria	The percentage of travel meeting LOS criteria is determined by summing the VMT on roadways operating acceptably and then dividing it by the total system VMT. The term "acceptably" is defined as LOS D (two-hour peak and daily) for the 7 largest MPO urbanized areas, LOS D (one-hour peak and daily) for other urbanized areas, and LOS C (one-hour peak and daily) everywhere else.	$\frac{\sum_{\geq Acceptable\ LOS\ Criteria\ Threshold}(VMT\ duirng\ Peak\ Performance)}{\sum VMT} \times 100$	• Urbanized Areas of the 7 largest MPOs – Peak Period – Daily • All Others – Peak Hour – Daily	• FDOT – *Traffic Characteristics Inventory* • FDOT – *Roadway Characteristics Inventory* • HERE Technologies – *Travel Time Data*
% of Miles Meeting LOS Criteria	The percentage of miles meeting LOS criteria is determined by summing the centerline miles of roadways operating acceptably and then dividing by the total system centerline miles. The term "acceptably" is defined as LOS D (two-hour peak and daily) for the 7 largest MPO urbanized areas, LOS D (one-hour peak and daily) for other urbanized areas, and LOS C (one-hour peak and daily) everywhere else.	$\frac{\sum_{\geq Acceptable\ LOS\ Criteria\ Threshold}(Segment\ Length\ during\ Peak\ Performance)}{\sum Segment\ Length} \times 100$	• Urbanized Areas of the 7 largest MPOs – Peak Period • All Others – Peak Hour	• FDOT – *Traffic Characteristics Inventory* • FDOT – *Roadway Characteristics Inventory* • HERE Technologies – *Travel Time Data*

Measure	Description	Calculation	Reporting Period	Sources
Travel Time Reliability: On-Time Arrival	For the urbanized areas of the 7 largest MPOs, on-time arrival is defined as the percentage of freeway trips traveling at least 45 mph. For all others, on-time arrival is defined as the percentage of freeway trips traveling at greater than or equal to 5 mph below the posted speed limit. For example, 80% on-time arrival indicates that the traveler is anticipated to arrive at the destination on time on 4 out of 5 trips.	• Urbanized Areas of the 7 largest MPOs $\frac{\sum(VMT\ at\ a\ Travel\ Speed\ \geq 45\ mph)}{\sum VMT} \times 100$ • All Others $\frac{\sum(VMT\ at\ a\ Travel\ Speed\ \geq (Speed\ Limit - 5\ mph))}{\sum VMT} \times 100$	• Urbanized Areas of the 7 largest MPOs – Peak Period – Daily • All Others – Peak Hour – Daily	• FDOT – *Traffic Characteristics Inventory* • HERE Technologies – *Travel Time Data*
Travel Time Reliability: Planning Time Index	Planning time index is defined as the ratio of the 95th percent peak period/hour travel time to the free flow travel time. This measure represents the additional time that a traveler should budget to ensure on-time arrival 95 percent of the time.	$\frac{Travel\ Time_{95th\ percentile}}{Travel\ Time_{free-flow}}$	• Urbanized Areas of the 7 largest MPOs – Peak Period – Daily • All Others – Peak Hour – Daily	• FDOT – *Traffic Characteristics Inventory* • HERE Technologies – *Travel Time Data*
Vehicle Hours of Delay	Delay is estimated on an hourly basis by determining the difference between delay threshold travel time and actual travel time along a facility.	$\sum Vehicle\ Volume \times (Daily\ or\ Peak\ Travel\ Time - Travel\ Time\ at\ LOS\ B)$	• Peak Hour • Daily • Yearly	• FDOT – *Traffic Characteristics Inventory* • HERE Technologies – *Travel Time Data*
Person Hours of Delay	Person hours of delay is calculated as the product of directional hourly volume, average vehicle occupancy, and the difference between travel time at "threshold" speeds and travel time at the actual speed. The thresholds are based on LOS B as defined by FDOT.	$\sum Average\ Vehicle\ Occupancy \times Vehicle\ Volume \times (Daily\ or\ Peak\ Travel\ Time - Travel\ Time\ at\ LOS\ B)$	• Peak Hour • Daily • Yearly	• FDOT – *Traffic Characteristics Inventory* • U.S. DOT – *National Household Travel Survey 2009 Florida Add-On* • HERE Technologies – *Travel Time Data*

Measure	Description	Calculation	Reporting Period	Sources
Average Travel Speed	Average travel speed is the average of all hourly segment travel speeds captured by probe data or modeled through speed-volume functions.	$\frac{\sum(VMT \times Average\ Travel\ Speed)}{\sum VMT}$	• Urbanized Areas of the 7 largest MPOs – Peak Period • All Others – Peak Hour	• FDOT – *Traffic Characteristics Inventory* • FDOT – *Roadway Characteristics Inventory* • HERE Technologies – *Travel Time Data*
Number of Fatalities	Total number of fatalities on Florida's roadways as a direct result of a traffic crash within thirty days of the crash occurrence.	$\sum Fatalities$	• Yearly	• Florida Department of Highway Safety and Motor Vehicles – *Traffic Crash Facts Annual Report*
Number of Serious Injuries	Number of disabling/incapacitating injuries from traffic crashes that prevent the injured individuals from normal activities and require hospitalization.	$\sum Serious\ Injuries$	• Yearly	• Florida Department of Highway Safety and Motor Vehicles – *Traffic Crash Facts Annual Report*
Rate of Fatalities	Total number of fatalities on Florida's roadways per 100 million VMT.	$\frac{\sum Fatalities}{100\ million\ VMT}$	• Yearly	• Florida Department of Highway Safety and Motor Vehicles – *Traffic Crash Facts Annual Report*
Serious Injuries Rate	Total number of serious injuries (non-fatal) on Florida's roadways per 100 million VMT.	$\frac{\sum Serious\ Injuries}{100\ million\ VMT}$	• Yearly	• Florida Department of Highway Safety and Motor Vehicles – *Traffic Crash Facts Annual Report*

Measure	Description	Calculation	Reporting Period	Sources
Job Accessibility: Auto	Job accessibility is a "cumulative opportunity" metric — it reflects the total amount of jobs reachable by auto within a 30-minute travel time threshold. It is calculated for each census block, and the results are aggregated to provide a statewide average. This calculation assumes a departure time of 8:00 a.m. in order to represent job accessibility during the morning peak period.	$\frac{\sum Block\ Level\ Number\ of\ Jobs \times Number\ of\ Workers}{\sum Number\ of\ Workers}$	• Yearly	• FDOT Pooled Fund Study – *University of Minnesota Access Across America*
% of Travel Heavily Congested	The percentage of travel heavily congested is determined by summing the VMT on roadways operating at defined LOS thresholds and then dividing it by the total system vehicle miles traveled. The defined thresholds are identified as LOS E in urbanized areas (or worse) based on the travel speeds associated with LOS E thresholds, and LOS D in all other areas (or worse) based on the travel speeds associated with 'D'. • Posted > 40 mph: – LOS E: <= 18 mph – LOS D: <= 23 mph • Posted < 40 mph: – LOS E: <= 13 mph – LOS D: <= 17 mph	$\frac{\sum(VMT\ during\ Peak\ Performance\ at\ defined\ LOS\ thresholds}{\sum VMT} \times 100$	• Urbanized Areas of the 7 largest MPOs – Peak Period – Daily • All Others – Peak Hour – Daily	• FDOT – *Traffic Characteristics Inventory* • FDOT – *Roadway Characteristics Inventory* • HERE Technologies – *Travel Time Data*

Measure	Description	Calculation	Reporting Period	Sources
% of Miles Heavily Congested	The percentage of miles heavily congested is determined by summing the miles of roadway operating at defined LOS thresholds in the peak hour/peak period and then dividing by the total system miles. The defined LOS thresholds are the same as % of Travel Heavily Congested.	$\frac{\sum(Segment\ Length\ during\ Peak\ Performance\ at\ defined\ LOS\ thresholds)}{\sum(Segment\ Length)} \times 100$	• Urbanized Areas of the 7 largest MPOs – Peak Period • All Others – Peak Hour	• FDOT – *Traffic Characteristics Inventory* • FDOT – *Roadway Characteristics Inventory* • HERE Technologies – *Travel Time Data*
Hours Heavily Congested	The vehicle hours heavily congested is estimated as the average number of hours in which segments operate at defined LOS thresholds, weighted by lane-miles. The defined LOS thresholds are the same as % of Travel Heavily Congested.	$\sum_{t=1}^{24} Hourly\ Performance\ at\ defined\ LOS\ threholds$	• Daily • Yearly	• FDOT – *Traffic Characteristics Inventory* • FDOT – *Roadway Characteristics Inventory* • HERE Technologies – *Travel Time Data*
Vehicles Per Lane Mile	The vehicles per lane mile is calculated as the summation of each roadway segment's peak hour vehicle miles traveled divided by the number of lane miles.	$\frac{\sum(\frac{Volume}{Number\ of\ Lanes} \times Lane\ Miles)}{\sum Lane\ Miles}$	• Peak Hour	• FDOT – *Traffic Characteristics Inventory* • FDOT – *Roadway Characteristics Inventory*
People-Related Mobility Measures: Transit				
Transit Passenger Trips	Annual number of passenger boarding on transit vehicles. A trip is counted each time a passenger boards a transit vehicle. Thus, if a passenger must transfer between buses to reach a destination, the passenger is counted as making two passenger trips.	$\sum Passengers\ Boading\ Transit\ Vehicles$	• Yearly	• FDOT – *Florida Transit Information and Performance Handbook*
Transit Revenue Miles	Number of annual miles of vehicle operation while in active service (available to pick up revenue passengers).	$\sum Revenue\ miles\ of\ vehicle\ operation\ while\ in\ active\ service$	• Yearly	• FDOT – *Florida Transit Information and Performance Handbook*

Measure	Description	Calculation	Reporting Period	Sources
Transit Revenue Miles Between Failures	Number of total annual revenue miles divided by the number of revenue vehicle system failures; an indicator of the average frequency of delays because of a problem with the equipment.	$\frac{\sum Total\ Annual\ Revenue\ Miles}{\sum Number\ of\ Revenue\ Vehicle\ System\ Failures}$	• Yearly	• FDOT – *Florida Transit Information and Performance Handbook*
Transit Weekday Span of Service	The number of hours that transit service is provided on a representative weekday in the operation of the transit agency. This indicator is determined by computing the number of hours between the time service begins and the time service ends for an average weekday.	$\frac{\sum Service\ Spans}{\sum Transit\ Agencies}$	• Yearly	• FDOT – *Florida Transit Information and Performance Handbook*
Resident Access to Transit	The percentage of the population within a half-mile of fixed-route transit.	$\frac{\sum Population\ within\ a\ half\ mile\ of\ Transit}{\sum Total\ Population}$	• Yearly	• FDOT – *Florida Transit Information and Performance Handbook*
Job Accessibility: Transit	Job accessibility is a "cumulative opportunity" metric — it reflects the total amount of jobs reachable by transit within a 30-minute travel time threshold. It is calculated for each census block, and the results are aggregated to provide a statewide average. This analysis uses the 7:00 a.m. - 9:00 a.m. time period. The data are averaged across that window from minute-by-minute departures.	$\frac{\sum Block\ Level\ Number\ of\ Jobs \times Number\ of\ Workers}{\sum Number\ of\ Workers}$	• Yearly	• FDOT Pooled Fund Study – *Access Across America*
Transit Passenger Trips Per Revenue Mile	The ratio of annual transit passenger trips to total annual transit revenue miles of service; a key indicator of service effectiveness that is influenced by the levels of demand and the supply of service provided.	$\frac{\sum Annual\ Transit\ Passenger\ Trips}{\sum Annual\ Transit\ Revenue\ Miles}$	• Yearly	• FDOT – *Florida Transit Information and Performance Handbook*

Measure	Description	Calculation	Reporting Period	Sources
People-Related Mobility Measures: Pedestrian/Bicycle				
Pedestrian Level of Service	Pedestrian Level of Service (LOS) is based on pedestrians' perceptions of the roadway or nearby roadside environment.	$\sum Miles\ of\ Each\ LOS\ Letter\ Grade$	• Peak Hour	• FDOT – *2013 Quality/Level of Service Handbook* • FDOT – *Pedestrian LOS Model*
Pedestrian Fatalities and Serious Injuries	Total number of pedestrian fatalities and serious injuries (non-fatal) on Florida's roadways.	$\sum Pedestrian\ Fatalities\ and\ Serious\ Injuries$	• Yearly	• Florida Department of Highway Safety and Motor Vehicles – *Traffic Crash Facts Annual Report*
% Pedestrian Facility Coverage	The percentage of centerline miles of non-freeway SHS facilities in urban areas (5,000+ population) that have sidewalks and/or shared-use paths available to pedestrians.	$\frac{\sum Pedestrian\ Facility\ Miles\ in\ Urban\ Areas}{\sum Centerline\ Miles\ in\ Urban\ Areas} \times 100$	• Yearly	• FDOT – *Roadway Characteristics Inventory*
Bicycle Level of Service	Bicycle Level of Service (LOS) is based on bicyclists' perceptions of the roadway or nearby roadside environment.	$\sum Miles\ of\ Each\ LOS\ Letter\ Grade$	• Peak Hour	• FDOT – *2013 Quality/Level of Service Handbook* • FDOT – *Bicycle LOS Model*
Bicyclist Fatalities and Serious Injuries	Total number of bicyclist fatalities and serious injuries (non-fatal) on Florida's roadways.	$\sum Bicyclist\ Fatalities\ and\ Serious\ Injuries$	• Yearly	• Florida Department of Highway Safety and Motor Vehicles – *Traffic Crash Facts Annual Report*
% Bicycle Facility Coverage	The percentage of centerline miles of non-freeway SHS facilities that have bike lanes, paved shoulders, or shared pathways available to bicyclists.	$\frac{\sum Bike\ Lane\ Miles}{\sum Centerline\ Miles} \times 100$	• Yearly	• FDOT – *Roadway Characteristics Inventory*

Measure	Description	Calculation	Reporting Period	Sources
% Population Within 1 Mile of Bike Lanes and Shared-Use Paths	Ratio of population within one mile of bike lanes and shared-use paths to Florida's total population. The bike lane and shared-use path miles include those on the SHS and a limited number of non-SHS miles deemed of interest to FDOT.	$\frac{Population\ within\ One\ Mile\ of\ Bike\ Lane\ and\ Shared-Use\ Paths}{Total\ Population\ in\ the\ State\ of\ Florida} \times 100$	• Yearly	• FDOT – *Roadway Characteristics Inventory* • U.S. Census Bureau – *American Community Survey*
People-Related Mobility Measures: Aviation				
Aviation Passenger Boardings	The total number of revenue passengers who board an aircraft at a Florida airport. If a passenger has to transfer between planes to reach a destination, the passenger is counted as making two passenger boardings.	$\sum Revenue\ Passengers\ Boarding\ Aircraft$	• Yearly	• Federal Aviation Administration – *Air Carrier Activity Information System (ACAIS)*
Aviation Departure Reliability	Departure is deemed reliable if the flight departs within 15 minutes after the scheduled time shown in the carrier's Computerized Reservations Systems (CRS). In the aviation industry, this is commonly known as on-time departure. Departure reliability is based on departure from the gate and can be influenced by various factors such as heavy traffic volume, weather, and mechanical reasons beyond the control of the airport.	$\frac{\sum Departures < 15\ Minutes\ of\ Schedule}{\sum Departures} \times 100$	• Yearly	• U.S. Bureau of Transportation Statistics
People-Related Mobility Measures: Rail				
Rail Passengers	Annual number of revenue-paying rail passengers. For the purpose of this performance measure, rail passengers include those riding on Amtrak, SunRail, and Tri-Rail. SunRail began operations in 2015.	$\sum Rail\ Passengers$	• Yearly	• Amtrak – *Amtrak Fact Sheet* • The National Transit Database (NTD) - Federal Transit Administration • SunRail – *Ridership Data*

Measure	Description	Calculation	Reporting Period	Sources
Passenger Rail On-Time Arrival	Rail on-time arrival (Amtrak, SunRail and tri-Rail) captures the on-time performance of a passenger rail system operating within Florida. A train is considered on-time if arrival is within a specified threshold timeframe of scheduled arrival time. The threshold timeframe varies based on the trip length.	$\frac{\sum On\ Time\ Trains}{\sum Trains} \times 100$	• Yearly	• Amtrak – *Amtrak Fact Sheet*
People-Related Mobility Measures: Seaport				
Seaport Passenger Movements	Annual number of passengers embarking and disembarking on cruise ships at Florida's seven cruise ports.	$\sum Cruise\ Passenger\ Movements$	• Yearly	• Individual Florida Seaports • Florida Ports Council – *Five-Year Florida Seaport Mission Plan*
Freight-Related Mobility Measures: Truck				
Truck Miles Traveled	Truck Miles Traveled (TMT) is computed by multiplying daily VMT by a truck factor, also known as the heavy vehicle percentage or T factor.	$\sum (Segment\ Length \times Volume \times \%\ of\ Trucks)$	• Daily	• FDOT – *Traffic Characteristics Inventory* • FDOT – *Roadway Characteristics Inventory*
Combination Truck Miles Traveled	Combination Truck Miles Traveled (CTMT) is computed by multiplying VMT by the combination truck factor.	$\sum (Segment\ Length \times Volume \times Combination\ Truck\ Factor)$	• Daily	• FDOT – *Traffic Characteristics Inventory* • FDOT – *Roadway Characteristics Inventory*
Combination Truck Ton Miles Traveled	The product of combination truck tonnage and the combination truck miles traveled.	$\sum AvgLoadofAllCombTR \times CTMT \times 365 \div 1000$	• Yearly	• FDOT – *Traffic Characteristics Inventory* • FDOT – *Roadway Characteristics Inventory* • FDOT – *Weigh-In-Motion Data*

Measure	Description	Calculation	Reporting Period	Sources
Combination Truck Tonnage	Freight tonnage carried by trucks. The Freight Analysis Framework (FAF) tonnage data is interpolated using a combination-truck-miles-traveled factor and an average truck load factor to calculate truck tonnage.	$\sum Tonnage_{2012} \times \left(\frac{AvgLoadofFullCombTR_{2017}}{AvgLoadofFullCombTR_{2012}}\right) \times \left(\frac{CTMT_{2017}}{CTMT_{2012}}\right)$	• Yearly	• FHWA – *Freight Analysis Framework 2012* • FDOT – *Weigh-In-Motion Data*
Combination Truck Value of Freight	The value of truck freight in dollar amount is obtained from the FAF cargo value data, truck tonnage, and annual factors for CTMT average truck load.	$\sum Value\ of\ Truck\ Tonnage$	• Yearly	• FHWA – *Freight Analysis Framework 2012* • FDOT – *Weigh-In-Motion Data* • FDOT – *Traffic Characteristics Inventory* • FDOT – *Roadway Characteristics Inventory*
Combination Truck Travel On-Time Arrival	On-Time Arrival is the percent of truck miles traveled for which the travel speed is greater than or equal to 45 mph for freeways within 7 largest MPO urbanized areas, and greater than or equal to 5 mph below the posted speed limit for freeways in all other areas.	• Urbanized Areas of the 7 largest MPOs $\frac{\sum VMT \mid Travel\ Speed\ \geq 45\ mph}{\sum VMT} \times 100$ • All Others $\frac{\sum VMT \mid Travel\ Speed\ \geq (Speed\ Limit - 5\ mph)}{\sum VMT} \times 100$	• Urbanized Areas of the 7 largest MPOs – Peak Period – Daily • All Others – Peak Hour – Daily	• FDOT – *Traffic Characteristics Inventory* • HERE Technologies – *Travel Time Data*
Combination Truck Planning Time Index	Combination Truck Planning Time Index is the same as Planning Time Index (PTI), defined as a ratio of the 95th percent peak period/hour travel time to the free flow travel time. This measure represents the additional time that a shipper should budget to ensure on-time arrival 95% of the time.	$\frac{Travel\ Time_{95th\ percentile}}{Travel\ Time_{free-flow}}$	• Urbanized Areas of the 7 largest MPOs – Peak Period – Daily • All Others – Peak Hour – Daily	• FDOT – *Traffic Characteristics Inventory* • HERE Technologies – *Travel Time Data*

Measure	Description	Calculation	Reporting Period	Sources
Combination Truck Hours of Delay	Combination Truck Hours of Delay is estimated on an hourly basis by determining the difference between delay threshold travel time and actual travel time along a facility.	$\sum Combination\ Truck\ Volume \times (Daily\ Combination\ Truck\ Travel\ Time - Travel\ Time\ at\ LOS\ B)$	• Daily	• FDOT – *Traffic Characteristics Inventory* • FDOT – *Roadway Characteristics Inventory* • HERE Technologies – *Travel Time Data*
Combination Truck Average Travel Speed	The combination truck average speed is estimated assuming that the free flow speed for automobile is set as the posted speed limit plus 5 mph, and the free flow speed for combination trucks is the posted speed limit.	$\frac{\sum CTMT \times Combination\ Truck\ Average\ Travel\ Speed}{\sum CTMT}$	• Urbanized Areas of the 7 largest MPOs – Peak Period • All Others – Peak Hour	• FDOT – *Traffic Characteristics Inventory* • FDOT – *Roadway Characteristics Inventory* • HERE Technologies – *Travel Time Data*
Combination Truck Cost of Delay	Cost of delay comes from calculating the average marginal cost of labor per hour and multiplying that by the number of hours of delay for combination trucks.	$\sum Combination\ Truck\ Hours\ of\ Delay \times Average\ Marginal\ Cost\ of\ Labor\ per\ Hour$	• Yearly	• FDOT – *Traffic Characteristics Inventory* • FDOT – *Roadway Characteristics Inventory* • HERE Technologies – *Travel Time Data* • American Transportation Research Institute (ATRI) –*An Analysis of the Operational Costs of Trucking*
Truck Empty Backhaul Tonnage	In the trucking industry, backhaul is the return movement of a truck from its original destination to its point of origin, When the truck is not hauling cargo during this movement, it is considered an empty backhaul. This measure represents the available carrying capacity that is not being utilized by trucks leaving Florida.	$\sum Truck\ Empty\ Backhaul\ Tonnage$	• Yearly	• FDOT – *Weigh-in-Motion Data* • FHWA – *Freight Analysis Framework 2012*

Measure	Description	Calculation	Reporting Period	Sources
Freight-Related Mobility Measures: Aviation				
Aviation Tonnage	The weight of all cargo handled at Florida airports.	$\sum Tons\ Handled\ at\ All\ Florida\ Airports$	• Yearly	• U.S. Bureau of Transportation Statistics
Aviation Value of Freight	Aviation value of freight is the product of aviation tonnage and average value of cargo per ton. Average value per ton is calculated using FAF data.	$\sum Tonnage \times Average\ Value\ per\ Ton$	• Yearly	• FHWA – *Freight Analysis Framework 2012*
Freight-Related Mobility Measures: Rail				
Rail Tonnage	The tons of freight carried by rail mode originated and/or terminated in Florida.	$\sum Rail\ Tonnage$	• Yearly	• American Association of Railroads – *Rail Fast Facts*
Freight-Related Mobility Measures: Seaport				
Seaport Tonnage	International and domestic waterborne tons of cargo handled at Florida's public seaports.	$\sum Seaport\ Tonnage$	• Yearly	• Individual Florida Seaports • Florida Ports Council – *Five-Year Florida Seaport Mission Plan*
Seaport Twenty-Foot Equivalent Units	Twenty-foot equivalent unit (TEU) represents the cargo capacity of a standard intermodal container, twenty feet long and eight feet wide. It is the inexact unit of the capacity of a container ship, or a container terminal.	$\sum Twenty - Foot\ Equivalent\ Units$	• Yearly	• Florida Ports Council – *Five-Year Florida Seaport Mission Plan*
Seaport Value of Freight	Seaport value of freight is the dollar value of international waterborne cargo handled at Florida's public seaports.	$\sum Value\ of\ International\ Seaport\ Commerce$	• Yearly	• Florida Ports Council – *Five-Year Florida Seaport Mission Plan*
% of Seaports with Active Rail Access	Seaport active rail access accounts for the percentage of Florida's seaports served by an active railroad. An active railroad is determined by the presence of trains operating on the facility.	$\frac{Seaports\ with\ Active\ Rail}{\sum Seaports}$	• Yearly	• FDOT Freight and Multimodal Operations Office • Florida Department of Transportation, Seaport Office