

# REGIONAL FREIGHT TRANSPORTATION PLAN UPDATE

## *PERFORMANCE MEASURES*



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# Regional Freight Transportation Plan Update

## *Performance Measures*

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# 1 INTRODUCTION

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The Coastal Region Metropolitan Planning Organization (CORE MPO) region serves a gateway for global trade and for freight movement in the Southeast, due in large part to the Port of Savannah – the nation’s 4<sup>th</sup> largest container port. In addition to the Port of Savannah, the region contains a comprehensive multimodal network of freight railroads and railyards, major highways, cargo-serving airports, as well as a substantial warehousing/distribution/logistics industry to manage freight movements over that network. The region’s freight network enables it to serve as a manufacturing hub as those businesses are able to take advantage of local and imported resources to create and ship a diverse portfolio of finished products to clients around the globe. Overall, goods movement in the Savannah region has a major impact on the regional and state economy.

Since the 2015 Regional Freight Transportation Plan was completed, much has changed in the region. Among other developments, the Savannah Harbor Expansion Project (SHEP) has completed, the Mason Mega Rail Project has substantially increased on-dock rail capacity at the Port of Savannah, the Georgia Department of Transportation’s (GDOT) Modern Mobility Improvement Program (MMIP) is expanding and enhancing the region’s highway network, and the Hyundai Motor Group has plans to build an electric vehicle and battery manufacturing plant in Bryan County capable of producing up to 300,000 vehicles annually. Given those developments, the region’s continued economic and population growth, and the growing intensity of freight movements between the Savannah and Atlanta regions, it is critically important to update the Regional Freight Transportation Plan. To that end, the CORE MPO is developing the Regional Freight Transportation Plan Update to provide a comprehensive blueprint for meeting the region’s freight needs.

The purpose of this report is to provide a set of recommended freight performance measures for the CORE MPO region using recommended best practices for freight performance measurement. This includes determining what parameters should be measured, identifying the necessary tools and data to implement, and ensuring that they align with the region’s freight goals and objectives. In addition, it links the recommended performance measures to the region’s freight vision, goals, and objectives.

## 2 OVERVIEW OF FREIGHT PERFORMANCE MEASURES

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Transportation performance management (TPM) is a strategy used to guide investment decision-making by linking goals to quantifiable performance measures.<sup>1</sup> It ensures that data helps to drive a more informed and cost-effective decision-making process. Performance measures enable agencies to gauge system condition and use, evaluate transportation programs and projects, and help to identify beneficial projects and investments where funding is constrained. Some important outcomes that performance measures aid agencies in achieving include<sup>2</sup>:

- **Link Actions to Goals.** Performance measures help to link plans and actions to agency goals and objectives.
- **Prioritize Projects.** Performance measures can provide information needed to invest in projects and programs that provide the greatest benefits.
- **Manage Performance.** Applying performance measures can improve the management and delivery of programs, projects, and services.
- **Communicate Results.** Performance measures can help communicate the value of transportation investments by providing quantifiable, understandable indicators that the public can observe.
- **Strengthen Accountability.** Performance measures promote accountability by revealing whether transportation investments are providing the expected performance or demonstrate the need for improvement.

The application of TPM principles to freight planning require the development and use of freight performance measures. Freight performance may be broadly defined in terms of the characteristics and quality of freight system condition, utilization, operations, and economic outcomes. Figure 2.1 shows the categories of freight performance measures as defined and used in this report. They include measures of network supply, utilization, and condition that characterize the physical infrastructure and the freight volumes on it; measures of travel time and congestion that characterize the quality of freight mobility; measures of safety; environmental measures that gauge the environmental impacts of freight; and economic and freight demand measures that gauge the freight system's economic impacts.

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<sup>1</sup> <https://www.fhwa.dot.gov/tpm/>

<sup>2</sup> <https://dot.nebraska.gov/media/10761/nebraska-freight-plan.pdf>

**FIGURE 2.1 CATEGORIES OF FREIGHT PERFORMANCE MEASURES**

Network Supply, Utilization, and Condition	• Characterize the extent, usage, and state of good repair of the freight network
Travel Time and Congestion	• Ability of the freight network to provide for reliable, uncongested travel
Safety	• Ability of the freight network to facilitate the movement of goods with minimal incidents
Environmental Impacts	• Magnitude of negative externalities generated from goods movement
Economic and Freight Demand	• Magnitude of the economic impacts of the freight system

Source: Cambridge Systematics, Inc.

- **Network Supply, Utilization, and Condition.** These measures gauge the performance of the multimodal freight system by characterizing the extent, utilization, and condition of the system. In characterizing the extent and condition of the system, network supply and infrastructure condition-based measures provide insight into the accessibility of the multimodal freight system for its users.
- **Travel Time and Congestion.** Travel time and congestion-based freight performance measures are important as they have a direct impact on the cost of freight operations. Delays can be costly to shippers as they wait for delivery of time-sensitive goods and also to carriers as contracts for carriage typically include provisions for on-time deliveries that contain financial penalties for failing to do so. In addition, travel time and congestion-based freight performance measures reflect the costs associated with factoring buffer time into schedules (and the associated labor, fuel, and other vehicle costs) to account for unanticipated delays.
- **Safety.** Traffic incidents are a major cause of nonrecurring congestion and associated delay for freight operations. Furthermore, those incidents involving trucks or trains tend to be costlier in terms of the severity of crash outcomes and incident clearance times. Freight safety performance measures help to ensure the safety and security of people and goods movement on the multimodal transportation network.
- **Environmental.** Environmental freight performance measures are critical to mitigating the negative externalities caused by the movement of freight. Trucks account for just under 10 percent of annual

vehicle miles traveled,<sup>3</sup> but emit nearly 23 percent of all greenhouse gas emissions across all transportation modes.<sup>4</sup>

- **Economic and Freight Demand.** Economic and freight demand performance measures provide insight into the factors that drive shippers to consume freight services and ultimately result in the physical manifestation of that demand – freight vehicles operating on the multimodal transportation network. A region’s or state’s ability to provide a reliable freight network directly impacts available jobs, delivery times for consumer goods, standard of living, and other measures of economic competitiveness.

## 2.1 National Freight Performance Measures

The Moving Ahead for Progress in the 21<sup>st</sup> Century Act (MAP-21) and the Fixing America’s Surface Transportation (FAST) Act transformed the Federal-aid highway program. They required State Departments of Transportation (DOT) and Metropolitan Planning Organizations (MPO) to engage in performance-based planning. Performance-based planning is the process of integrating performance measures into the planning process to maximize return on investment and increase transparency and accountability to the public.<sup>5</sup> The performance management framework focuses on seven national performance goals: safety, infrastructure condition, congestion reduction, system reliability, freight movement and economic vitality, environmental sustainability, and reduced project delivery delays.

The performance-based planning requirements legislated by MAP-21 and the FAST Act were codified in the Code of Federal Regulations (CFR) through several final rulemakings. These rulemakings developed regulations on performance measures in the areas of highway safety, pavement and bridge performance, system performance, freight performance, and CMAQ program performance. They outline required performance measures, target setting procedures, data collection and management requirements, reporting requirements, and determination of significant progress. Furthermore, they require that MPOs work with their respective state DOTs to measure performance and achieve performance targets.

The System Performance/Freight/CMAQ Final Rule (System Performance Rule), codified in 23 CFR 490, established the national freight performance measure that states and MPOs must calculate as part of performance reporting. The Truck Travel Time Reliability (TTTR) Index is a type of travel time-based freight performance measure and is the only freight-specific measure required by federal mandate. Reporting for the TTTR Index is divided into five periods: morning peak (6-10 a.m.), midday (10 a.m.-4 p.m.) and afternoon peak (4-8 p.m.) Mondays through Fridays; weekends (6 a.m.-8 p.m.); and overnights for all days (8 p.m.-6 a.m.). The TTTR ratio is calculated by dividing the 95th percentile truck travel time by the 50th percentile truck travel time for each segment. The TTTR Index is calculated by multiplying each segment’s largest ratio of the five periods by its length, then dividing the sum of all length-weighted segments by the total length of Interstate. Higher values of the TTTR Index indicate less reliable truck travel while lower values indicate more reliable truck travel.

<sup>3</sup> <https://www.bts.gov/share-highway-vehicle-miles-traveled-vehicle-type>

<sup>4</sup> Bureau of Transportation Statistics, Freight Facts and Figures, Table 6-15, 2019, <https://www.bts.gov/us-greenhouse-gas-emissions-domestic-freight-transportation>. Note: Trucking accounted for approximately 429 million metric tonnes of CO2 equivalent in 2018, while the total for all domestic transportation was 1,887 million metric tonnes.

<sup>5</sup> [https://www.fhwa.dot.gov/planning/performance\\_based\\_planning/pbpp\\_guidebook/](https://www.fhwa.dot.gov/planning/performance_based_planning/pbpp_guidebook/)

## 2.2 State Freight Performance Measures

The Georgia Statewide Freight and Logistics Action Plan is currently undergoing a major update. As part of that update, the state's freight performance measures will be reevaluated. However, the 2018 Update of the Georgia Statewide Freight and Logistics Action Plan does outline recommended freight performance measures for the state. These measures are presented in Table 2.1.

**TABLE 2.1 GEORGIA STATEWIDE FREIGHT AND LOGISTICS ACTION PLAN (2018 UPDATE) RECOMMENDED FREIGHT PERFORMANCE MEASURES**

National Goal	State Goal	Performance Measure	Description
Improve the safety, security and resilience of freight transportation	Reduction in crashes resulting in loss of life	Annual Crashes involving Trucks	This measure tracks the number of truck-involved crashes in the state.
	Optimized throughput of people and goods through network assets throughout the day	Average Coordinated Highway Assistance and Maintenance Program (CHAMP) Response Time	This measure quantifies incident response time for CHAMP.
Use innovation and advanced technology to improve the safety, efficiency, and reliability of the National Multimodal Freight Network	Efficiency and reliability of freight, cargo, and goods movement	Intelligent Transportation System (ITS) Miles Managed/ Number of ITS Devices	This measure quantifies how much of the state's system is managed by its intelligent transportation system.
Reduce the adverse environmental impacts of freight movement on the national freight network	Reduce emissions, improve air quality statewide, limit footprint		
Improve the economic efficiency and productivity of the National Multimodal Freight Network	Efficiency and reliability of freight, cargo, and goods movement	Truck Travel Time Reliability Index	This is the national freight performance measure which gauges the reliability on Interstate highways for freight travel.

Source: Georgia Department of Transportation, Statewide Freight and Logistics Action Plan, 2018.

The 2018 Update of the Georgia Statewide Freight and Logistics Action Plan also observed that several statewide performance measures that are designated in the Statewide Transportation Plan (SWTP) and Statewide Strategic Transportation Plan (SSTP) impact goods movement. Furthermore, those measures are consistent with Georgia's goals as well as the goals of the National Multimodal Freight Policy and the National Highway Freight Program. These include the following: annual fatalities on Georgia's roadways, percent of state-owned bridges meeting GDOT standards, percent of non-interstate roads meeting GDOT maintenance standards, and percent of interstate roads meeting GDOT maintenance standards. State performance measures are listed in Table 2.2.

**TABLE 2.2 GEORGIA SWTP/SSTP PERFORMANCE MEASURES**

Performance Area	Performance Measure	Geographic Area
Safety	Reduction in Annual Highway Fatalities	Statewide

Maintenance	Average Highway Emergency Response Operators (HERO) Response Time	Statewide
	Percent of State-Owned Bridges Meeting GDOT Standards	Statewide
	Percent of Interstates Meeting Maintenance Standards	Statewide
	Percent of State-Owned Non-Interstate Roads Meeting Maintenance Standards	Statewide
Planning and Construction	Percent of Right-of-Way Authorized on Time	Statewide
	Percent of Construction Authorized on Time	Statewide
	Percent of Projects Constructed on Time	Statewide
	Percent of Projects Constructed on Budget	Statewide
	Annual Congestion Cost per Peak Auto Commuter	Statewide
	Morning Peak-Hour Speeds on General Lanes	Metro Atlanta
	Evening Peak-Hour Speeds on General Lanes	Metro Atlanta

Source: Georgia Department of Transportation, Statewide Transportation Plan/ Statewide Strategic Transportation Plan, 2021.

## 2.3 Best Practices in Freight Performance Management

The 2017 Freight Performance Measure Primer produced by the FHWA provides national best practices and recommendations to create a comprehensive freight performance measurement program. In order to increase infrastructure efficiency and guide future investments, the Primer recommended that agencies develop freight measures to predict and track the implications of investments across multiple modes. It noted that the aim of most DOTs and MPOs is to increase infrastructure efficiency through focused investments. Therefore, measures should be able to predict the impact of investment on transportation flows through the State or MPO region and to project potential modal shifts. The Primer further observed that predicting these impacts will require performance measures for multiple freight modes supported by data that relates transportation goals by mode.

The Freight Performance Measure Primer recommended several performance measures split across five categories. Those categories and a sample of recommended performance measures are listed below:

- **Safety.** Recommendations included the number of heavy truck-related fatalities, train derailments per ton moved, and the total cost of freight loss and damage per vehicle miles traveled (VMT), among others.
- **Maintenance and Preservation.** Percent of pavement in good condition on freight-significant highways, number of weight-restricted bridges per total number of bridges, and percent of bridges that are in good condition were among the recommendations.

- **Mobility, Reliability, and Congestion.** Recommendations included the percent of Interstate providing reliable travel times, incident clearance times, and percent of rail track-miles with 286,000-pound railcar capacity, among others.
- **Accessibility and Connectivity.** Triple trailer VMT as a percent of total freight VMT, percent of shippers within 50 miles of a freight rail intermodal terminal, and average travel time delay for trucks on airport access roads were among the recommendations.
- **Environmental.** Recommended measures included total tons of emissions reduced from Congestion Mitigation and Air Quality Improvement Program (CMAQ) projects, pounds of greenhouse gas emissions, increase in energy consumed or costs related to energy consumption, and increase in air pollution impacts/costs.

A complete list of the FHWA's Freight Performance Measure Primer recommendations is provided in the Appendix.

The American Association of State Highway and Transportation Officials (AASHTO) also developed freight performance measure recommendations through its Standing Committee on Performance Management Task Force on Performance Measure Development, Coordination, and Reporting (SCOPM Task Force). The SCOPM Task Force was formed following the passage of MAP-21 to help inform the USDOT rulemaking process on freight performance measures. Specifically, the purpose of the SCOPM Task Force was to serve as a single clearinghouse for recommended national-level performance measures identified by those AASHTO committees with in-depth knowledge of the technical aspects of the individual performance measure areas. It included representatives from each performance management area and other leaders within the AASHTO organization.

For freight, the AASHTO SCOPM Task Force recommended two performance measures: Annual Hours of Truck Delay (AHTD) and Truck Reliability Index (RI<sub>80</sub>). AHTD is the amount of extra time spent by each truck traveling on a corridor based upon a pre-determined threshold of what constitutes congestion. AHTD is a summation of the number of truck-hours of delay due to congestion along Interstate corridors within a State. The Truck Reliability Index is defined as the ratio of the 80<sup>th</sup> percentile worst travel time recorded during the weekday peak periods each year to a pre-determined threshold travel time. It reflects the total travel time needed to ensure on-time arrival at a desired destination. Because the Truck Reliability Index performance measure is independent of distance, it can be used to measure and compare corridors of any length.

### 3 ASSESSMENT OF CURRENT FREIGHT PERFORMANCE MEASURES

The 2015 Regional Freight Transportation Plan did not establish freight performance measures for the region. Instead, it recommended that the region adopt a subset of its existing long-range transportation plan's – Mobility 2045 – measures as freight performance measures. This section of the report examines the Mobility 2045 performance measures and assesses their ability to serve as freight performance measures. It is important to note that CORE MPO is in the process of developing a new long-range plan – Mobility 2050. However, the goals, objectives and performance measures being revised as part of that initiative are expected to be largely consistent with Mobility 2045.

Table 3.1 contains the goals, objectives, and performance measures developed as part of Mobility 2045, the region's long-range transportation plan. Performance measures were developed across Mobility 2045's six goal areas: system performance; safety and security; accessibility, mobility, and connectivity; environment and quality of life; state of good repair; and intergovernmental coordination.

**TABLE 3.1 MOBILITY 2045 PERFORMANCE MEASURES**

Goal	Objective(s)	Performance Measures
<p><b>System performance:</b> An efficient, reliable, multi-modal transportation system that supports economic competitiveness and enhances tourism.</p>	<ul style="list-style-type: none"> <li>• Minimize work and freight trip congestion</li> <li>• Promote projects which provide the maximum travel benefit per cost</li> <li>• Improve efficient access to job centers</li> <li>• Enhance tourism offering efficient multi modal options to visit the region</li> <li>• Maximize efficiency of signalized intersections</li> </ul>	<ul style="list-style-type: none"> <li>• Project cost/vehicle miles of travel (VMT)</li> <li>• Reductions in VMT</li> <li>• Reductions in work trip vehicle hours of travel (VHT)</li> <li>• Increased Sustainable development incorporating mixed-use, pedestrian-oriented design</li> <li>• Level of Service (LOS)</li> <li>• Percent of person-miles traveled on the interstate system that are reliable</li> <li>• Percent of person-miles traveled on the non-interstate NHS that are reliable</li> <li>• Reductions in travel times</li> <li>• Truck Travel Time Reliability (TTTR) Index</li> <li>• Percent of jobs within 1/2 miles access to frequent transit service</li> <li>• Percent of the system actively managed with ITS</li> <li>• Increase access to alternative transportation options to job centers (transit, bike facilities, sidewalks)</li> <li>• Maximize transportation system mobility during</li> </ul>



		<p>disruptive events (such as reductions in time to clear major crashes from through lanes, CHAMP clearance times)</p> <ul style="list-style-type: none"> <li>Increased modal options and amenities assisting tourist travel (for examples wayfinding, sidewalks, bike sharing, airport bus express route, car sharing, shuttles, ferry etc.)</li> </ul>
<p><b>Safety and Security:</b> A safe, secure, and resilient transportation system for all types of users and for freight.</p>	<ul style="list-style-type: none"> <li>Eliminate at-grade railroad crossings</li> <li>Minimize frequency and severity of vehicular accidents</li> <li>Minimize conflicts and increase safety for non-motorized users</li> <li>Promote projects which aid in hurricane evacuation</li> <li>Adequately prepare for coordinated responses to incidents</li> <li>Monitor vulnerable infrastructure through visual and other inspection methods</li> <li>Enhance tourism offering a safe multi modal options to visit the region</li> </ul>	<ul style="list-style-type: none"> <li>Reduce number of fatalities</li> <li>Reduce number of serious injuries</li> <li>Increased implementation of safety projects</li> <li>Number of at-grade crossings reduced</li> <li>Reduce rate of serious injuries per 100 million VMT</li> <li>Reduce rate of fatalities per 100 million VMT</li> <li>Reduce number of non-motorized fatalities and serious injuries</li> <li>Hurricane evacuation route status (The project enhances or improve reliability on a hurricane evacuation route)</li> <li>Improved emergency responses (e.g., ambulance travel times to hospitals, emergency signal preemption)</li> <li>Minimize clearance times during disruptive events to avoid secondary crashes (such as reductions in time to clear major crashes from through lanes, CHAMP clearance times)</li> <li>Reduction in vulnerability of the transportation system (such as implementation of actively monitoring infrastructure, shoulder stabilization, battery backup for signals etc.)</li> </ul>
<p><b>Accessibility, Mobility and Connectivity:</b> Access and mobility, equitably and reliably available, for people and for freight, through a range of travel options and an integrated, connected transportation system.</p>	<ul style="list-style-type: none"> <li>Minimize congestion delays</li> <li>Maximize regional population and employment accessibility</li> <li>Provide efficient and reliable freight corridors</li> <li>Minimize delays in corridors served by transit</li> <li>Encourage use of transit and non-motorized modes, focusing on areas with low rates of automobile ownership</li> </ul>	<ul style="list-style-type: none"> <li>Base year vs. future year volume/capacity ratios for various modes</li> <li>Percent of population within ½ mile of a multimodal (transit or bicycle) route or facility connecting to regional activity center(s)</li> </ul>

	<p>or high population of elderly and/or disabled populations</p> <ul style="list-style-type: none"> <li>• Expand transit service area and increase service frequency</li> <li>• Ensure access to essential services</li> <li>• Expand use of Traveler information to accommodate people, freight and tourism</li> </ul>	<ul style="list-style-type: none"> <li>• Percent of last mile and other freight strategies identified in the Freight Plan completed</li> <li>• On time performance of the transit and paratransit system</li> <li>• Increase in transit ridership</li> <li>• Expanded coverage of ITS to share traveler information (On time bus arrival, way finding, commercial vehicle systems)</li> <li>• Fewer transit user complaints</li> <li>• Increase access and connectivity to alternative transportation options to job centers (transit, bike facilities, sidewalks)</li> </ul>
<p><b>Environment and Quality of Life:</b> A healthy sustainable environment through the compatible integration of land use and transportation while taking into consideration the impact of transportation including that of stormwater.</p>	<ul style="list-style-type: none"> <li>• Protect wetlands, historic resources, neighborhoods, recreational facilities and other important resources</li> <li>• Support infill development</li> <li>• Implement green infrastructure to reduce region's impact on stormwater pollution and address potential impacts from a changing climate.</li> <li>• Reduce negative impacts of transportation on stormwater</li> <li>• Reduce emissions and maintain a healthy air quality</li> <li>• Reduce energy consumption</li> </ul>	<ul style="list-style-type: none"> <li>• Less impacts to natural environment (such as rate of development of greenspace compared to the rate of greenspace preservation).</li> <li>• Less impacts to historic and cultural and natural resources (tree canopies, waterways and historic roadways)</li> <li>• Increase in promoting infill and brownfield development</li> <li>• Flood zone risk status</li> <li>• Decreased vehicle miles of travel through increased use of alternative modes to single occupancy vehicles</li> <li>• Project exceeds local and or state storm water management plan requirements</li> <li>• Increased percent of green infrastructure (GI) and/or Low Impact Development (LID) installation (swales (GI), permeable pavements (LID), green streets (LID) etc.)</li> <li>• Increased percent of low emission projects (such as electric buses, bike share etc.)</li> <li>• Total emissions</li> </ul>
<p><b>State of Good Repair:</b> Maintain a state of good repair.</p>	<ul style="list-style-type: none"> <li>• Maintain a state of good repair for bridges</li> <li>• Maintain a state of good repair for pavement</li> <li>• Maintain a state of good repair for non-motorized facilities</li> <li>• Maintain a state of good repair for transit vehicles and facilities</li> </ul>	<ul style="list-style-type: none"> <li>• Bicycle and pedestrian facility surface conditions</li> <li>• Percent of NHS Bridges in Poor condition as a percentage of total NHS bridge deck area</li> <li>• Percent of NHS Bridges in Good condition as a percentage of total NHS bridge deck area</li> </ul>

<p><b>Intergovernmental Coordination:</b> Wise use of public funds through coordination and a performance-based planning process.</p>	<ul style="list-style-type: none"> <li>Enhance coordination between CORE MPO, Georgia Department of Transportation, County departments, City governments, Georgia Ports Authority, modal agencies (CAT and airport) and advocacy groups (Savannah Bicycle Campaign)</li> <li>Implement transportation performance management utilizing a performance based planning and programming process</li> </ul>	<ul style="list-style-type: none"> <li>Percent of interstate NHS pavements in POOR condition</li> <li>Percent of interstate NHS pavement in GOOD condition</li> <li>Percent of NHS pavements in POOR condition</li> <li>Transit assets considered in a state of good repair</li> <li>Percent of NHS pavements in GOOD condition</li> <li>CORE MPO represented at project development meetings (concept meetings and public information meetings)</li> <li>Establishment of coordination policies to promote communications between various agencies</li> <li>Establishment of a prioritization process based on cooperatively developed objectives and performance measures.</li> </ul>
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Many of the region’s current measures can be applied to freight performance as shown in Table 3.2. In several cases, many of these measures can simply be modified to focus on freight vehicles or on portions of the region’s multimodal network that serve a significant share of freight activity. For example, several current Mobility 2045 safety performance measures (such as the number and rate of serious injuries and fatalities) are applicable to freight performance and could be modified to focus on crashes involving freight vehicles. Measures that reflect the condition of pavement and bridges are relevant for freight from a network supply, utilization, and condition standpoint. Pavement and bridge conditions can impact routing decisions and can result in loss or damage to goods and vehicles. From the perspective of travel time and congestion, existing Mobility 2045 measures such LOS and TTTR reflect freight mobility and are consistent with recommended best practices and federal guidelines. Regarding environmental impacts of freight, total emissions is a relevant freight performance measure as trucks account for a substantial share of greenhouse gas emissions.

**TABLE 3.2 APPLICABILITY OF CURRENT MEASURES TO FREIGHT PERFORMANCE**

Network Supply, Utilization, and Condition	Travel Time and Congestion	Safety	Environmental Impacts
<ul style="list-style-type: none"> <li>Percent of NHS Bridges in Poor condition as a percentage of total NHS bridge deck area</li> <li>Percent of NHS Bridges in Good condition as a percentage of total NHS bridge deck area</li> <li>Percent of interstate NHS pavements in POOR condition</li> <li>Percent of interstate NHS pavement in GOOD condition</li> </ul>	<ul style="list-style-type: none"> <li>Level of Service (LOS)</li> <li>Reductions in travel times</li> <li>Truck Travel Time Reliability (TTTR) Index</li> <li>Percent of the system actively managed with ITS</li> </ul>	<ul style="list-style-type: none"> <li>Reduce number of fatalities</li> <li>Reduce number of serious injuries</li> <li>Increased implementation of safety projects</li> <li>Number of at-grade crossings reduced</li> </ul>	<ul style="list-style-type: none"> <li>Total emissions</li> </ul>

- Percent of NHS pavements in POOR condition
- Percent of NHS pavements in GOOD condition
- Reduce rate of serious injuries per 100 million VMT
- Reduce rate of fatalities per 100 million VMT
- Reduce number of non-motorized fatalities and serious injuries
- Minimize clearance times during disruptive events to avoid secondary crashes (such as reductions in time to clear major crashes from through lanes, CHAMP clearance times)
- Reduction in vulnerability of the transportation system (such as implementation of actively monitoring infrastructure, shoulder stabilization, battery backup for signals etc.)

## 4 RECOMMENDED GOALS, OBJECTIVES, AND FREIGHT PERFORMANCE MEASURES

This section of the report contains the recommended freight vision, goals, objectives, and performance measures for the CORE MPO region. Mobility 2045 served as the foundation for these recommendations as its vision, goals and objectives, and performance measures were augmented to suit the needs of the multimodal freight system. Consideration was also made to also align with goals established through the Georgia Statewide Freight and Logistics Action Plan as well as requirements related to the recently passed Bipartisan Infrastructure Law (BIL).<sup>6</sup> In addition, the CORE MPO's Economic Development and Freight Advisory Committee (EDFAC) provided guidance on the development of these recommendations. The freight vision, goals and objectives, and performance measures presented in the sections that follow reflect their input. It is important to note that while all of Mobility 2045's measures are useful and relevant for general transportation decision making, the measures developed as part of this effort are intended to focus on freight.

### 4.1 Freight Vision

The vision for the Regional Freight Transportation Plan reflects the 2045 Metropolitan Transportation Plan's vision. That vision emphasized the importance of taking a comprehensive approach to addressing transportation needs that incorporates community values, needs, land use and modal alternatives. To that end, the freight vision for the CORE MPO region is as follows:

*The vision for the Regional Freight Transportation Plan is to promote sustainable economic growth throughout the region by ensuring safe, equitable, and quality access to an efficient and resilient shared multimodal network for people and goods.*

### 4.2 Goals and Objectives

Defining goals and objectives is a critical first step for determining the strategic direction of the Regional Freight Transportation Plan and generally for taking a TPM-based approach to long range planning<sup>7</sup>. Goals and objectives establish the means to measure and manage performance. Goals are broad statements

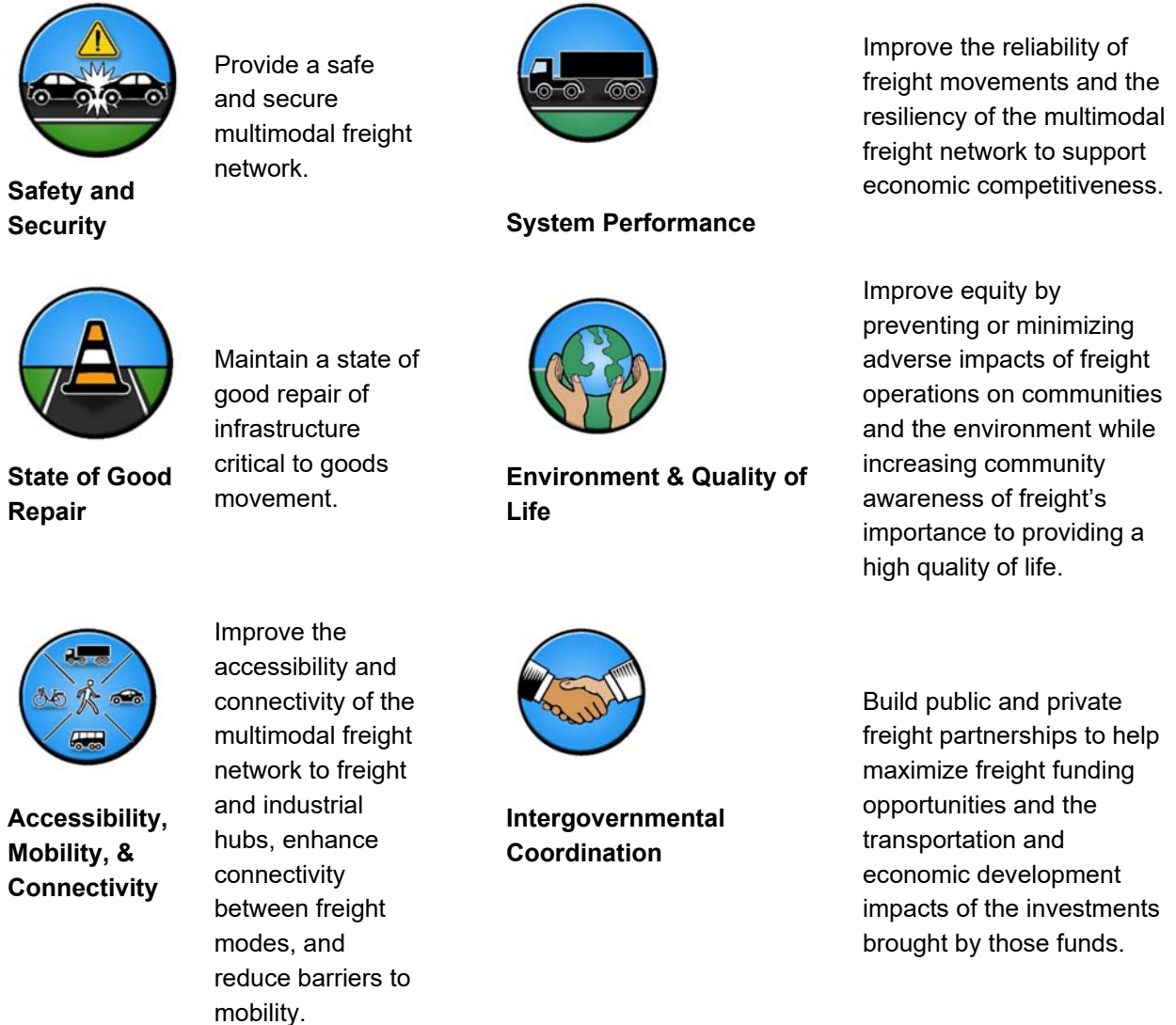
<sup>6</sup> Sec. 21104, Each State freight plan under this section shall include a requirement that the State, in carrying out activities under the State freight plan: enhance reliability or redundancy of freight transportation; or incorporate the ability to rapidly restore access and reliability with respect to freight transportation; determine strategies and goals to decrease (A) the severity of impacts of extreme weather and natural disasters on freight mobility; (B) the impacts of freight movement on local air pollution; (C) the impacts of freight movement on flooding and stormwater runoff; and (D) the impacts of freight movement on wildlife habitat loss.

<sup>7</sup> <https://www.tpmtools.org/guidebook/chapter-01/>

articulating a desired end state that provide strategic direction for an agency. Objectives are specific, measurable statements that support achievement of a goal.<sup>8</sup>

The goals and objectives of the 2045 Metropolitan Transportation Plan are the foundation for the Regional Freight Transportation Plan's goals. The goals and objectives, presented in Figure 4.1 and Figure 4.2 respectively, follow the same 6 major goal areas established in the 2045 Metropolitan Transportation Plan: Safety and Security; State of Good Repair; Accessibility, Mobility, and Connectivity; System Performance; Environment and Quality of Life; and Intergovernmental Coordination.

**FIGURE 4.1 REGIONAL FREIGHT TRANSPORTATION PLAN GOALS**



<sup>8</sup> [https://www.fhwa.dot.gov/planning/performance\\_based\\_planning/pbpp\\_guidebook/](https://www.fhwa.dot.gov/planning/performance_based_planning/pbpp_guidebook/)

**FIGURE 4.2 REGIONAL FREIGHT TRANSPORTATION PLAN OBJECTIVES**

Safety and Security	State of Good Repair	Accessibility, Mobility, and Connectivity	System Performance	Intergovernmental Coordination	Environment and Quality of Life
<ul style="list-style-type: none"> <li>Reduce the number and rate of fatalities and injuries involving freight movements.</li> <li>Improve access to truck parking in the region.</li> </ul>	<ul style="list-style-type: none"> <li>Maintain freight assets at acceptable conditions.</li> </ul>	<ul style="list-style-type: none"> <li>Reduce the number and magnitude of freight bottlenecks.</li> <li>Increase the number and improve the quality of connections between freight modes.</li> <li>Improve and enhance the safety, mobility and system connectivity through integration of intelligent transportation systems (ITS) technologies.</li> </ul>	<ul style="list-style-type: none"> <li>Provide reliable and predictable travel times along freight corridors using intelligent transportation systems (ITS) technologies and other methods.</li> <li>Improve system resiliency by increasing redundancy and reducing the risk of disruptions due to environmental conditions and man-made events.</li> </ul>	<ul style="list-style-type: none"> <li>Facilitate partnerships between CORE MPO, GDOT, Georgia Ports Authority, freight service providers (including motor carriers, railroads, and others), and city and county governments.</li> </ul>	<ul style="list-style-type: none"> <li>Prevent (where possible) and reduce disproportionate negative freight impacts to environmental justice communities.</li> <li>Reduce emissions and other environmental impacts associated with freight movements.</li> </ul>

### 4.3 Performance Measures

Performance measures are another component of the first step to determining the strategic direction of the Regional Freight Transportation Plan. Performance measures are based on metrics that are used to track progress toward goals, objectives, and achievement of established performance targets.<sup>9</sup> They should be manageable, sustainable, and based on collaboration with partners and stakeholders. Also, it is important that measures are selected so that they rely on data that is timely, available, and of good quality. Otherwise, the measures will provide little value for determining progress towards meeting targets and generally for managing performance. If measures are supported with reliable data of good quality, then they provide an effective basis for evaluating strategies for performance improvement.

The recommended performance measures for the Regional Freight Transportation Plan are shown in Table 4.1. Table 4.1 also shows how the measures align with the region's freight goals and objectives as well as identifies the data needed to support the measures. Importantly, the recommended measures reflect the modes and performance outcomes over which the CORE MPO has the most influence. As a result, the recommended measures have a greater focus on highway freight, environmental, and equity impacts. While non-highway freight modes are critical, other agencies or the private sector have greater influence on their performance outcomes.

<sup>9</sup> <https://www.tpmttools.org/guidebook/chapter-01/>

**TABLE 4.1 FREIGHT PERFORMANCE MEASURES**

Goals and Objectives	Performance Measures	Data (Sources)
<p><b>Safety and Security:</b> Provide a safe and secure multimodal freight network.</p> <ul style="list-style-type: none"> <li>Reduce the number and rate of fatalities and injuries involving freight movements.</li> <li>Improve access to truck parking in the region.</li> </ul>	<ul style="list-style-type: none"> <li>Annual rate of crashes involving heavy trucks</li> <li>Annual rate of serious injury crashes involving heavy trucks</li> <li>Annual rate of fatal crashes involving heavy trucks</li> <li>Annual number of highway-rail crashes</li> <li>Number of public truck parking facilities and spaces</li> </ul>	<ul style="list-style-type: none"> <li>Crashes by severity (GDOT Numerics)</li> <li>Annual average daily traffic (GDOT Traffic Analysis and Data Application, FHWA Highway Performance Monitoring System [HPMS])</li> <li>Truck parking inventory (FHWA Jason's Law Truck Parking Survey; UC Berkeley Transportation Sustainability Research Center American Truck Parking; Field surveys conducted by CORE MPO and GDOT)</li> </ul>
<p><b>State of Good Repair:</b> Maintain a state of good repair of infrastructure critical to goods movement.</p> <ul style="list-style-type: none"> <li>Maintain freight assets at acceptable conditions.</li> </ul>	<ul style="list-style-type: none"> <li>Annual percentage of bridges on freight corridors in good condition</li> <li>Annual percentage of pavements on freight corridors in good condition</li> </ul>	<ul style="list-style-type: none"> <li>Bridge inventory and conditions (FHWA National Bridge Inventory)</li> <li>Pavement inventory and conditions (FHWA HPMS)</li> </ul>
<p><b>Accessibility, Mobility, and Connectivity:</b> Improve the accessibility and connectivity of the multimodal freight network to freight and industrial hubs, enhance connectivity between freight modes, and reduce barriers to mobility.</p> <ul style="list-style-type: none"> <li>Reduce the number and magnitude of freight bottlenecks.</li> <li>Increase the number and improve the quality of connections between freight modes.</li> <li>Improve and enhance the safety, mobility and system connectivity through integration of intelligent transportation systems (ITS) technologies.</li> </ul>	<ul style="list-style-type: none"> <li>Annual Mean Truck Travel Time Index (MTTI) on freight corridors</li> <li>Annual total truck delay on freight corridors</li> <li>Annual percentage of freight corridors actively managed with ITS</li> </ul>	<ul style="list-style-type: none"> <li>Truck travel times (FHWA NPMRDS)</li> <li>Inventory of ITS devices and corridors (GDOT Office of Traffic Operations)</li> </ul>
<p><b>System Performance:</b> Improve the reliability of freight movements and the resiliency of the multimodal freight network to support economic competitiveness.</p> <ul style="list-style-type: none"> <li>Provide reliable and predictable travel times along freight corridors using intelligent transportation systems (ITS) technologies and other methods.</li> </ul>	<ul style="list-style-type: none"> <li>Truck Travel Time Reliability (TTTR) Index on Interstate corridors</li> </ul>	<ul style="list-style-type: none"> <li>Truck travel times (FHWA NPMRDS)</li> </ul>



- Improve system resiliency by increasing redundancy and reducing the risk of disruptions due to environmental conditions and man-made events.

**Environment and Quality of Life:** Improve equity by preventing or minimizing adverse impacts of freight operations on communities and the environment while increasing community awareness of freight’s importance to providing a high quality of life.

- Prevent (where possible) and reduce disproportionate negative freight impacts to environmental justice communities.
- Reduce emissions and other environmental impacts associated with freight movements.

**Intergovernmental Coordination:** Build public and private freight partnerships to help maximize freight funding opportunities and the transportation and economic development impacts of the investments brought by those funds.

- Facilitate partnerships between CORE MPO, GDOT, Georgia Ports Authority, freight service providers (including motor carriers, railroads, and others), and city and county governments.

- Annual rate of total crashes, serious injury crashes, and fatal crashes involving heavy trucks in environmental justice communities.
- Annual number of highway-rail incidents in environmental justice communities.

- Annual amount of external grant funds for projects impacting freight.
- Activity level with Economic Development and Freight Advisory Committee (EDFAC) meetings/communication.

- Crashes by severity (GDOT Numerics)
- Highway-rail crashes (Federal Railroad Administration Highway/Rail Grade Crossing Incidents)
- Sociodemographic data by Census tract (U.S. Census Bureau Decennial Census)

- Amount of external funding for freight projects (CORE MPO)
- Number of EDFAC meetings and count of attendance (CORE MPO)

The recommended performance measures provide the ability to track the region's freight performance, determine progress towards meeting established targets, and to manage the region's multimodal freight network's performance. More detail on the recommended freight performance measures is included in the list below:

- Safety and Security.** These measures capture the safety and resiliency of the CORE MPO multimodal freight network. Measures include the annual rate of truck-involved crashes (*Total No. of Truck Involved Crashes/100 Million Vehicle Miles*), annual rate of serious injury crashes involving heavy trucks (*Total No. of Serious Injury Truck Involved Crashes/100 Million Vehicle Miles*), annual rate of fatal crashes involving heavy trucks (*Total No. of Fatal Truck Involved Crashes/100 Million Vehicle Miles*), annual number of highway-rail crashes, and the annual number of truck parking facilities and spaces. The crash and traffic data on which these measures rely are regularly collected and maintained by GDOT, FHWA, and the FRA. Data on truck parking is also collected as part of FHWA and other initiatives but would benefit from routine field surveys led by the CORE MPO and GDOT to collect data on commercial truck parking facilities.
- State of Good Repair.** Measures in this goal area reflect the condition of the region's freight network. They include the annual percentage of bridges in good<sup>10</sup> condition and the annual percentage of pavements in good<sup>11</sup> condition. "Good" conditions for pavements and bridges are as defined in the final transportation performance management rulemakings. The data necessary for these measures are collected annually by state DOTs and FHWA as part of the National Bridge Inventory (NBI) and the Highway Performance Monitoring System (HPMS) databases.
- Accessibility, Mobility, and Connectivity.** These measures capture the ease, or difficulty, of freight travel and primarily rely on travel time data. Measures include the annual mean truck travel time index on freight corridors ( $\text{Mean Truck Travel Time}_{\text{Segment}} / \text{Reference Truck Travel Time}_{\text{Segment}}$ )<sup>12</sup>, total annual truck delay on freight corridors ( $\text{Truck VHT}_{\text{Segment}} - [\text{Truck Volume}_{\text{Segment}} \times \text{Reference Truck Travel Time}_{\text{Segment}} \times \frac{1}{60}]$ )<sup>13</sup>, and the annual percentage of freight corridors actively managed with ITS ( $[\text{Miles of Freight Corridors Managed with ITS} / \text{Total Miles of Freight Corridors}] \times 100\%$ ). The travel time data needed for these measures is available through the FHWA's National Performance Management Research Data Set (NPMRDS) and the ITS data can be obtained from the GDOT Office of Traffic Operations.
- System Performance.** The system performance measure is the TTTR, which is the designated metric under FHWA's transportation performance management final rulemakings<sup>14</sup>. It is calculated as the ratio of the 95<sup>th</sup> percentile travel time to the 50<sup>th</sup> percentile travel time (*95th Percentile Truck Travel Time /*

<sup>10</sup> U.S. Department of Transportation, Federal Highway Administration. Code of Federal Regulations, 23 CFR 490; Final Rulemaking, 82 FR 5886, <https://www.federalregister.gov/documents/2017/01/18/2017-00550/national-performance-management-measures-assessing-pavement-condition-for-the-national-highway>.

<sup>11</sup> Ibid.

<sup>12</sup> U.S. Department of Transportation, Federal Highway Administration. Freight Performance Measure Approaches for Bottlenecks, Arterials, and Linking Volumes to Congestion Report. FHWA-HOP-15-033, <https://ops.fhwa.dot.gov/publications/fhwahop15033/fhwahop15033.pdf>.

<sup>13</sup> Ibid.

<sup>14</sup> U.S. Department of Transportation, Federal Highway Administration. Code of Federal Regulations, 23 CFR 490; Final Rulemaking, 82 FR 5970, <https://www.federalregister.gov/documents/2017/01/18/2017-00681/national-performance-management-measures-assessing-performance-of-the-national-highway-system>.

50th Percentile Truck Travel Time). The TTTR relies on travel time data which is available through the NPMRDS.

- **Environment and Quality of Life.** These measures apply the safety and security freight performance measures to environmental justice communities. The purpose is to determine if there are disproportionate negative impacts of goods movement on those communities. In addition to the GDOT, FHWA, and FRA data sources needed for the safety and security freight performance measures, socioeconomic data must also be obtained from the U.S. Census Bureau to identify environmental justice communities.
- **Intergovernmental Coordination.** The intergovernmental coordination freight performance measures indicate the level of involvement of the region's freight stakeholders. It is measured as the number of EDFAC meetings and average attendance.

It should be noted that while a freight emissions-specific measure was not included, this is something that should be investigated as part of future work. Freight transportation contributes significantly to greenhouse gas emissions. As such, having a measure that tracks freight-related emissions would be a useful component of the CORE MPO's freight program. However, because a substantial portion of truck traffic (and related emissions) travels through the region along its Interstate highways without stopping, a measure that focuses on freight movements with an endpoint in the region would be more responsive to interventions implemented by the MPO. This would require collecting data and developing methods to estimate emissions for those specific movements.

## 5 SUMMARY AND NEXT STEPS

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Using recommended best practices for freight performance measurement, this task developed a recommended set of freight performance measures for the CORE MPO region. It determined what parameters should be measured, identifying the necessary tools and data to implement them, and ensured that they align with broader regional, state, and national freight goals and objectives. In addition, the recommended performance measures were linked to the region's freight vision, goals, and objectives. Moving forward, the region should continually test and refine these measures to keep up with the region's changing needs, take advantage of new technologies for collecting and managing data, and to ensure that they reflect the region's current priorities.

## 6 APPENDIX

**TABLE 6.1 FHWA FREIGHT PERFORMANCE PRIMER RECOMMENDED MEASURES**

Category	Measure
<b>Safety</b>	
<b>Highway</b>	Motor carrier crash rate
	Motor carrier truck at-fault rate
	Number of heavy truck-related fatalities
	Capacity of weigh stations (number of trucks processed per hour)
	National highway system pavement conditions
	National highway bridge conditions
	National highway system intermodal connector condition
<b>Railway</b>	Total cost of freight loss and damage from accidents/Vehicle Miles Traveled (VMT)
	Total loss and damage from accidents per route-mile
	Total loss and damage from accidents per ton moved
	Number of at-grade railroad crossings along freight significant corridors such as freeways and interregional corridors
	Number of rail fatalities
<b>Water</b>	Train derailments per ton moved
	Value of cargo lost or damaged per ton or value of cargo moved
<b>Air</b>	Containers damaged or lost per containers handled/total containers
	Total loss and damage from accidents divided by value of freight
<b>Air</b>	Percent of study airports meeting Traffic Safety Administration (TSA) guidelines for general aviation security
	Incidents per 1,000 operations at freight-significant airports
<b>Maintenance and Preservation</b>	
<b>Highway</b>	Percent of pavement in good condition on freight significant highways
	Number of weight restricted bridges divided by total number of bridges
	Percent of bridges that meet good and poor structural condition thresholds
	Service life remaining on highway pavement
<b>Railway</b>	Benefit of truck weight enforcement on pavement service life
	Miles of track in expected or Federal Railroad Administration (FRA) Class I divided by total miles of Class I track
<b>Water</b>	Number of double-stack tunnel restrictions divided by number of tunnels
	Percent of tons on river moving through locks with constraints
	Unscheduled lock closure time (hours)
<b>Air</b>	Channel depths at the port divided by depths at competitive ports
	Percent of pavement in fair or poor condition at freight-significant airports
<b>Mobility, Reliability, and Congestion</b>	
<b>Highway</b>	Percent of interstate providing reliable travel times

	Percent of interstate where peak hour travel times meet expectations*
	Percent of non-interstate National Highway System (NHS) providing reliable travel times
	Percent of non-interstate NHS where peak hour travel times meet expectations
	Annual hours of excessive delay per capita
	Urban: Average hours of delay per day for freight vehicles on freight-significant links
	Urban: Travel Time Index (TTI) on freight-significant links (ratio of the peak travel time to free-flow travel time)
	Percent of interstate mileage providing for reliable truck travel times
	Percent of interstate mileage that is uncongested
	Clearance time for incidents, crashes, or hazardous materials
	Number of intersections and ramps with inadequate turning radii for large trailers on freight significant corridors
	Urban: Buffer Index on freight-significant links (ratio of the 95th percentile travel time to average travel time or free flow travel time)
	Rural: Average hours of delay per day for freight vehicles on freight-significant links
	Number of truck rest areas and their capacities
	Rural: Average travel time on freight-significant links
<b>Railway</b>	Tons or ton-miles of freight over relevant period
	Average terminal dwell time train-hours of delay
	Percent of rail track-miles with 286,000-pound railcar capacity rating
	Railroad corridor level of service
<b>Water</b>	Tons of traffic arriving at a port
	Twenty-Foot Equivalent Units (TEUs) passing through port (port throughput)
	Gate reliability or truck turn time
	Ship unload rate (time per container)
	Ship load rate (time per container)
	Average delay per barge tow on river
<b>Air</b>	Flight frequency by airlines with cargo capacity (number per day)
	Average time between flights by airlines with cargo capacity (minutes)
	Percent of on-time departures at freight significant airports
	Percent of on-time arrivals at freight significant airports
	<b>Accessibility and Connectivity</b>
<b>Highway</b>	Triple trailer VMT as a percent of total freight VMT
	Percent of major generators with appropriate roadway access to interregional corridors and major highways
	Percent of shippers with access to triple network
<b>Railway</b>	Class I: Ratio of unit train carloads (or tons) divided by total carloads (or tons)
	Percent of shippers within 50 miles of intermodal trailer-on-freight-car (TOFC) facility

	Percent of major freight generators with appropriate rail access
	Number or capacity of intermodal facilities
<b>Water</b>	Shippers within 50 miles of river port (for barge accessibility)
	Availability of container-handling capability and/or bulk transfer capability
<b>Air</b>	Flight frequency by airlines with cargo capacity (number per day)
	Average time between flights by airlines with cargo capacity (minutes)
	Average travel time delay for trucks on airport access roads
	Number of docks or acres of cargo-handling facilities
	<b>Environmental</b>
<b>All</b>	Total tons of emissions reduced from Congestion Mitigation and Air Quality Improvement Program (CMAQ) projects for applicable criteria pollutants and precursors
<b>All</b>	Pounds of greenhouse gas emissions
<b>All</b>	Increase in energy consumed or costs related to energy consumption
<b>All</b>	Increase in air pollution impacts/costs