



## 2045 METROPOLITAN TRANSPORTATION PLAN

St. Joseph Area Transportation Study Organization

Adopted November 2019

# Appendix F

## Transportation Performance Management – System Performance Report

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## Introduction

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This appendix updates the status of performance-based planning for the SJATSO. While still a relatively new aspect of the transportation planning process, the 2045 MTP supports progress toward reaching the federally mandated performance measures targets and establishes a baseline for the on-going evaluation of the future performance of the transportation system.

## Transportation Performance Management

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With the passage of the Moving Ahead for Progress in the 21st Century Act (MAP-21), and continuing as part of the FAST Act, Congress established Transportation Performance Management (TPM). Federal Highway Administration (FHWA) defines TPM as a strategic approach that uses system information to make investment and policy decisions to achieve national performance goals.

Another new requirement is Performance Based Planning and Programming (PBPP), which impacts the development of the 2045 MTP, as well being incorporated into the Transportation Improvement Program (TIP) process. PBPP refers to the application of performance management principles within the planning and programming processes of transportation agencies to achieve desired performance outcomes for the multimodal transportation system.

Transportation performance measures and targets describe how well the transportation system is functioning in quantitative terms and then set future targets for system performance based on calculated values, recent trends, and assumed future funding levels. States and Metropolitan Planning Organizations (MPOs) are required to incorporate FHWA and Federal Transit Administration (FTA) performance measures and targets into their planning practices. MPOs may either support statewide targets set by the state or set its own, along with assuming the responsibility of achieving them.

## Federal Highway Performance Goals

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According to FHWA, TPM represents the opportunity to prioritize needs and align resources for optimizing system performance in a collaborative manner. The national Federal highway program performance goals as established by Congress are:

### Safety

- To achieve a significant reduction in traffic fatalities and serious injuries on all public roads.

### Infrastructure Condition

- To maintain the highway infrastructure asset system in a state of good repair.

### Congestion Reduction

- To achieve a significant reduction in congestion on the National Highway System.

### System Reliability

- To improve the efficiency of the surface transportation system.

### Freight Movement & Economic Vitality

- To improve the national freight highway network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.

### Environmental Sustainability

- To enhance the performance of the transportation system while protecting and enhancing the natural environment.

### Reduced Project Delivery Delays

- To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices.

SOURCE: Federal-Aid Program [23USC §150(b)]

## SJATSO Performance Measures

The following discusses the current state of the SJATSO performance measures. This section highlights transportation planning/investments that move the area toward achieving these measures and identifies future opportunities through the MTP planning process that can be leveraged to meet established targets.

### Safety Targets

Consistent with MoDOT and KDOT goals, safety is a priority for the SJATSO region. In establishing the 2045 MTP goals, and setting weights for the project evaluation criteria, the SJATSO Technical and Coordinating Committees confirmed the importance of prioritizing a safe transportation network.

National safety performance measures reinforce the importance of prioritizing safety for the traveling public. The five safety performance measures that need to be addressed are:

1. Number of Fatalities
2. Fatality Rate per 100 Million Vehicle Miles Traveled (VMT)
3. Number of Serious Injuries
4. Serious Injury Rate per 100 Million VMT
5. Number of Non-Motorized Fatalities and Serious Injuries

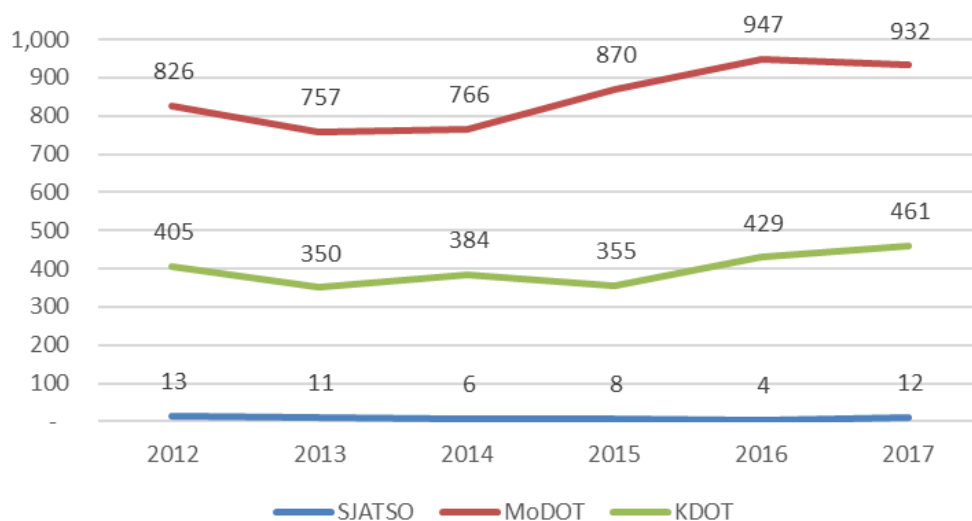
**Table 1** summarizes the safety performance targets for MoDOT and KDOT. A five-year rolling average (2013 to 2017) was compared to CY 2019 target. **Figures 1 through 5** show the statewide data compared to the SJATSO MPA results.

**Table 1. Safety Performance Targets**

	5-Year Rolling Average (2013 to 2017)		5-Year Rolling Average Statewide Target for CY 2019	
	MoDOT	KDOT	MoDOT	KDOT
Number of Fatalities	854.4	395.8	872.6	403.0
Fatality Rate per 100 Million VMT	1.176	1.260	1.160	1.280
Number of Serious Injuries	4756.4	1,211.8	4433.8	1002.0
Serious Injury Rate per 100 Million VMT	6.566	3.88	6.168	3.850
Number of Non-Motorized Fatalities and Serious Injuries	441.3	135.20	445.5	133.0

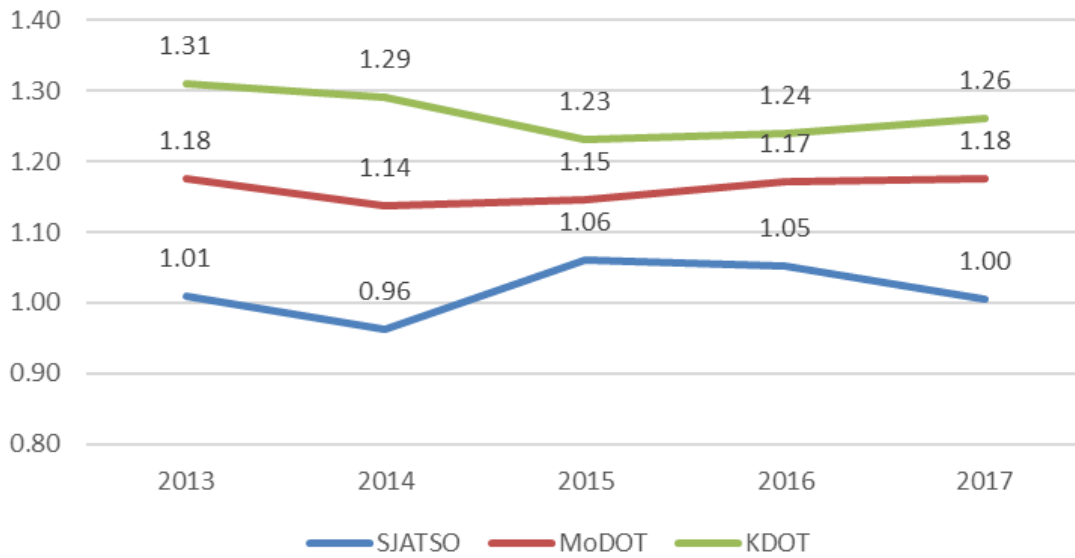
SOURCE: MoDOT; KDOT.

**Figure 1. Number of Fatalities**



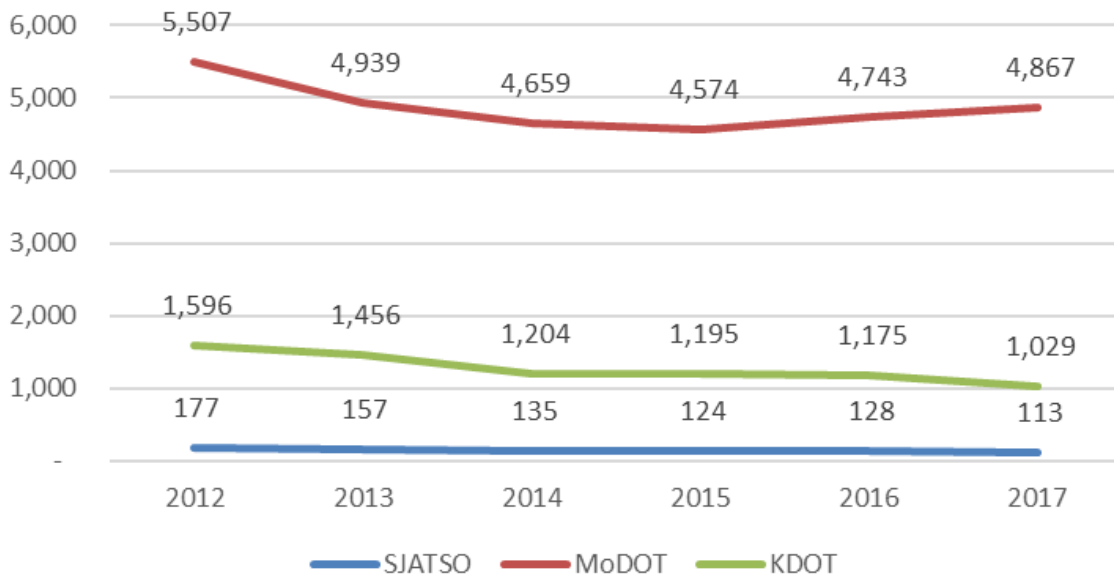
SOURCE: MoDOT; KDOT.

**Figure 2. Fatality Rate** (per 100 Million VMT; 5-Year Rolling Average)



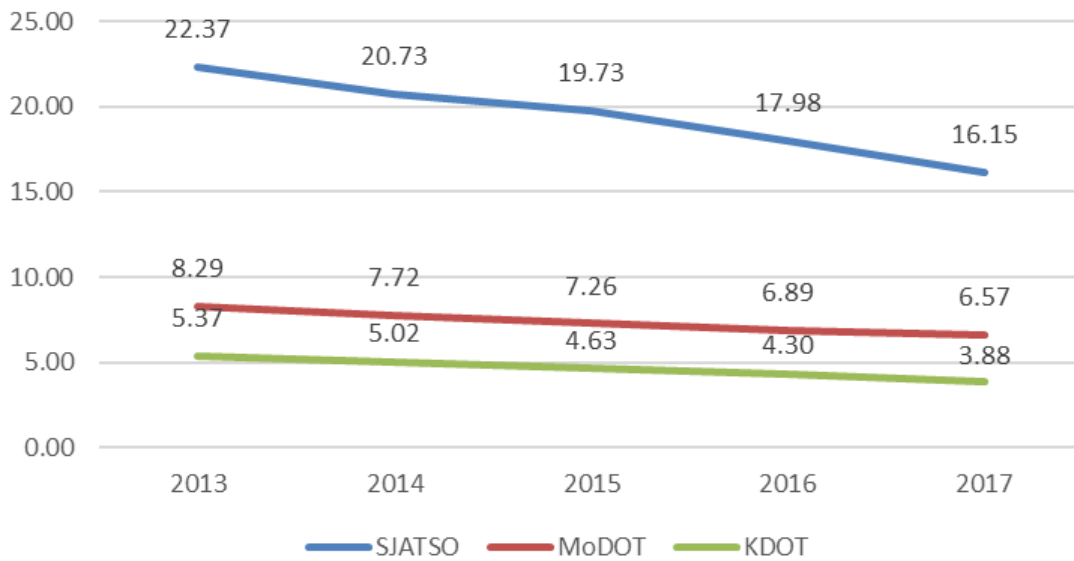
SOURCE: MoDOT; KDOT.

**Figure 3. Number of Serious Injuries**



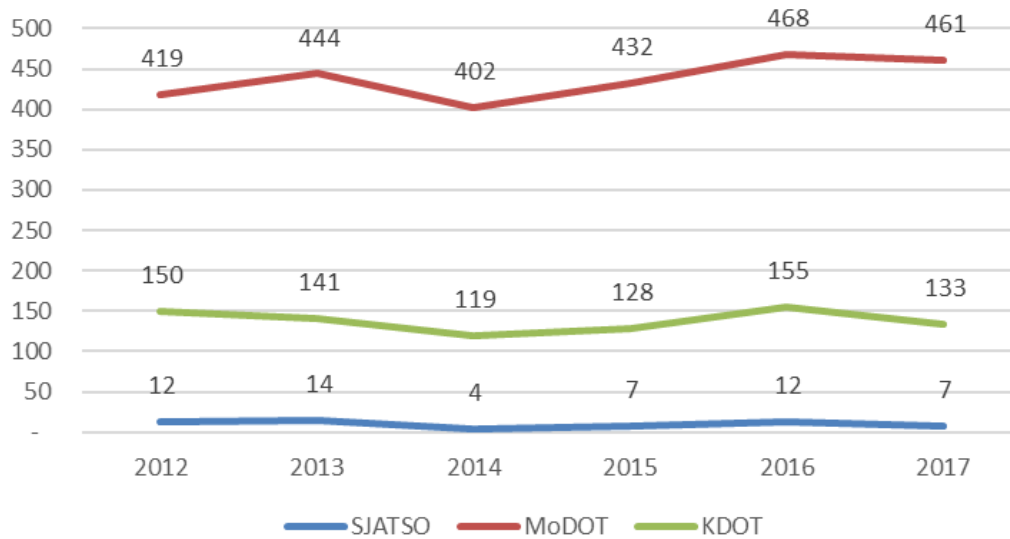
SOURCE: MoDOT; KDOT.

**Figure 4. Serious Injury Rate** (per 100 Million VMT; 5-Year Rolling Average)



SOURCE: MoDOT; KDOT.

**Figure 5. Non-Motorized Serious Injuries and Fatalities**



SOURCE: MoDOT; KDOT.

**Figures 2 and 4** presented the safety data as a rate per 100 million VMT. As such, the SJATSO planning area can be compared to the Missouri and Kansas statewide rates to identify a general trend (improving or getting worse). Regarding the fatality rate, the SJATSO area has consistently been below both the Missouri and Kansas statewide rates (see **Figure 2**).

Regarding the serious injuries rate, the SJATSO area has been much higher compared to the statewide rates (see **Figure 4**). SJATSO staff has raised questions regarding this rate being so much higher and one possible explanation could be a difference in how serious injuries are categorized across different areas of the state. This is something that SJATSO staff is monitoring and will address with future performance measure updates. However, even with the high serious injuries rate for the SJATSO MPA, it is worth noting in **Figure 4** that the trend has consistently been decreasing at a faster pace compared to the statewide serious injury rates. This improving trend line is a very positive indicator that the St. Joseph area is addressing safety concerns within the region.

### Progress/Opportunities Toward Reaching Targets

As previously stated, SJATSO places a high priority on safety and works to program projects that will enhance safety for the traveling public—ultimately looking to reduce fatalities and serious injuries. SJATSO has analyzed the 2020-2023 TIP and identified nearly \$1.5 million in programmed projects that address safety. These projects are sponsored by the Northwest District of MoDOT and help the State move towards meeting statewide safety targets. Safety is MoDOT's number one priority, so much so that the Mission Statement was updated to include safety. A strategic planning framework—called FOCUS—was also created, based on Safety, Service and Stability. MoDOT supports *Missouri's Blueprint: A Partnership Toward Zero Deaths* a strategic highway safety plan designed to reduce the number and severity of traffic crashes using the four key disciplines of traffic safety: engineering, enforcement, education and emergency response. To reach the Blueprint goal of 700 or fewer fatalities by 2021, new reduction targets were established for 2019: reduce fatalities by 13 percent and serious injuries by 8 percent. Distracted driving is still a major concern that MoDOT is addressing with news releases, digital message boards, and the Buckle Up Phone Down campaign.

As part of the 2045 MTP development, safety was also identified as a top priority. An analysis of recent crash data shows that a high number of crashes within the St. Joseph MPA occur along or near the Belt Highway. Public outreach efforts consistently identify the Belt Highway as a safety concern when discussing regional transportation facilities. In identifying potential opportunities to improve safety for the traveling public, even a modest reduction in the number of crashes along the Belt Highway would go a long way toward advancing SJATSO efforts to meet established safety targets.

The MTP identifies several opportunities for safety improvements along the Belt Highway. First, SJATSO supports on-going efforts to monitor and improve traffic operations/geometrics that improve safety. One approach that would help toward achieving safety targets would be to analyze the top five crash locations along the Belt with the goal of identifying contributing factors and potential mitigation measures to reduce or eliminate potential issues. Secondly, from a multimodal perspective, the MTP identifies the Belt Highway as an

important future north-south transit corridor. As such, there is a need to establish safe bus stops/pull-out areas as well as continuous sidewalk connections to safely accommodate pedestrians as they complete their first- and last-mile portion of a trip. Finally, the MTP highlights an opportunity to improve a portion of Frederick Avenue, from east of I-29 to west of the Belt Highway, through enhanced gateway and streetscaping improvements. These improvements would focus on improving space for pedestrians and bicyclists, enhancing pedestrian crossings, and slowing travel speed to enhance safety for all transportation users.

## Pavement and Bridge Targets

Another performance measure that State DOTs carry out as part of the National Highway Performance Program (NHPP) is to assess the condition of pavements on the non-Interstate National Highway System (NHS); pavements on the Interstate System; and bridges carrying the NHS, including on- and off-ramps connected to the NHS.

This final rule includes the following six measures:

- percentage of pavements on the Interstate System in Good condition
- percentage of pavements on the Interstate System in Poor condition
- percentage of pavements on the NHS (excluding the Interstate System) in Good condition
- percentage of pavements on the NHS (excluding the Interstate System) in Poor condition
- percentage of NHS bridges in Good condition
- percentage of NHS bridges in Poor condition

Data was provided by MoDOT and KDOT for these categories. Historical performance of the NHS pavements is based on smoothness data known as International Roughness Index (IRI). In 2017 MoDOT began to capture and report on smoothness and rutting, cracking and faulting. For all four pavement targets, the goal is to maintain current conditions and the state of good repair.

MoDOT's future bridge targets for percent poor deck area on the NHS were set at the current percent poor to maintain current conditions and the state of good repair. The bridge targets for percent good deck area on the NHS were established based on five years of historical data. The future targets are based on the declining trend in the short-term and remain flat for future years to maintain the state of good repair.



**Table 1** summarizes the statewide pavement targets established by MoDOT in 2018. **Table 2** summarizes the statewide bridge targets established by MoDOT in 2018.

**Table 1: MoDOT Pavement Performance Targets**

Performance Measure	2017 Baseline	2019 Target	2021 Target
Percentage of Interstate Pavements in Good Condition	77.5%	--	77.5%
Percentage of Interstate Pavements in Poor Condition	0.0%	--	0.0%
Percentage of non-Interstate NHS Pavements in Good Condition	61.1%	61.1%	61.1%
Percentage of non-Interstate NHS Pavements in Poor Condition	1.0%	1.0%	1.0%

**Table 2: MoDOT Bridge Performance Targets**

Performance Measure	2017 Baseline	2019 Target	2021 Target
Percentage of NHS Bridges in Good Condition	34.0%	30.9%	30.9%
Percentage of NHS Bridges in Poor Condition	7.1%	7.1%	7.1%

KDOT roads and bridges are assessed annually using the data-driven Pavement Management System and Pontis Bridge Management System. The goal of ratings was to maintain roadways in good condition so that they only require routine or light preventative maintenance. For state-owned bridges, a bridge health index (BHI) was used, and was based upon a bridge count basis. Each bridge was counted and weighted equally regardless of bridge size. KDOT's goal was to maintain the state-owned bridge system at a high level.

**Table 3** summarizes the statewide pavement targets established by KDOT in 2018. **Table 4** summarizes the statewide bridge targets established by in 2018.

**Table 3: KDOT Pavement Performance Targets**

Performance Measure	2016 Baseline	2017 Baseline	2019 Target	2020 Target	2021 Target	2022 Target
Percentage of Interstate Pavements in Good Condition		66.7%		65.0%		65.0%
Percentage of Interstate Pavements in Poor Condition		0.3%		0.5%		0.5%
Percentage of non-Interstate NHS Pavements in Good Condition		62.7%		55.0%		55.0%
Percentage of non-Interstate NHS Pavements in Poor Condition		1.1%		1.5%		1.5%

**Table 4: KDOT Bridge Performance Targets**

Performance Measure	2016 Baseline	2017 Baseline	2019 Target	2020 Target	2021 Target	2022 Target
Percentage of NHS Bridges in Good Condition	76.5%			70.0%		70.0%
Percentage of NHS Bridges in Poor Condition	1.6%			3.0%		3.0%

### SJATSO Pavement and Bridge Targets

In establishing pavement and bridge targets for the region, SJATSO had the option to support the statewide goals or develop a unique methodology and performance measures for the MPA. SJATSO considered these options and, due to the limited amount of data available to develop a trend analysis, decided to adopt the established statewide targets (as set forth in **Tables 2 to 5**). In 2020, SJATSO intends to evaluate progress toward meeting the state targets, which could include reevaluating potential new targets when additional data for rutting, cracking and faulting becomes available.

### Progress/Opportunities Toward Reaching Targets

**Figure 6** displays poor pavement and bridge conditions within the SJATSO MPA. The figure also includes fair pavement conditions, as this category would be approaching poor condition.

Regarding area pavement conditions, a recent emergency TIP amendment in Spring 2019 allowed the repaving of Mitchell Avenue. Regarding interstate pavement conditions, MoDOT targets repaving interstate segments using an 8-year cycle. A portion of I-29 through the St. Joseph area was recently repaved and a portion south of Route O is scheduled to be repaved in 2020. The mainline portion of I-229 between 22nd Street north to I-29/US-71 interchange (not including the elevated structure) is scheduled to be repaved in 2021.

Generally speaking, bridges identified in poor condition are not located along the mainline facilities (they are overpasses). Two major bridges will likely be needed within the MTP planning horizon, including the I-229 elevated structure and the I-229/US-36/US-59 interchange. The City of St. Joseph has also identified several local bridges that will need to be repaired/replaced in the near future. Most of these bridges have conceptual design plans and are waiting to be programmed in the CIP.



## Travel Time Reliability and Freight Reliability Targets

State DOTs and MPOs will use travel time reliability and freight reliability measures to report on the following characteristics within their jurisdiction:

- the performance of the Interstate and non-Interstate NHS to carry out the NHPP;
- freight movement on the Interstate system; and
- traffic congestion and on-road mobile source emissions for the purpose of carrying out the Congestion Mitigation and Air Quality Improvement (CMAQ) Program.

This System Performance/Freight/CMAQ Performance Measures final rule includes six measures:

- Interstate Travel Time Reliability Measure: Percent of Person-Miles Traveled on the Interstate that are Reliable
- Non-Interstate Travel Time Reliability Measure: Percent of Person-Miles Traveled on the Non-Interstate NHS that are Reliable
- Freight Reliability Measure: Truck Travel Time Reliability Index
- Peak Hour Excessive Delay (PHED) Measure: Annual Hours of PHED Per Capita
- Non-Single Occupancy Vehicle (SOV) Travel: Percent of non-SOV Travel
- On-Road Mobile Emissions: Total Emissions Reduction

The CMAQ measures do not apply to the SJATSO region, so the PHED, Non-SOV and On-Road mobile emissions targets are not addressed. **Table 5** summarizes the system reliability targets established in 2018 by MoDOT and **Table 6** summarizes KDOT's targets. The MPO has the option to either support state goals or set their own.

**Table 5: MoDOT System Reliability Performance Targets**

Performance Measure	2017 Baseline	2019 Target	2021 Target
Interstate Travel Time Reliability Measure: Percent of Reliable Person-Miles Traveled on the Interstate	91.6%	88.9%	87.1%
Non-Interstate Travel Time Reliability Measure: Percent of Reliable Person-Miles Traveled on the Non-Interstate NHS	92.3%		87.8%
Freight Reliability Measure: Truck Travel Time Reliability Index	1.25	1.28	1.30

**Table 7: KDOT System Reliability Performance Targets**

Performance Measure	2017 Baseline	2019 Target	2021 Target
Interstate Travel Time Reliability Measure: Percent of Reliable Person-Miles Traveled on the Interstate	95.4%	95.0%	95.0%
Non-Interstate Travel Time Reliability Measure: Percent of Reliable Person-Miles Traveled on the Non-Interstate NHS	96.2%	95.0%	95.0%
Freight Reliability Measure: Truck Travel Time Reliability Index	1.14	1.16	1.16

### *SJATSO System Reliability Targets*

SJATSO has adopted the established statewide targets as set forth in **Table 5 and 7**. SJATSO will evaluate progress toward meeting the 2019 target when data is available in 2020.

## Transit Asset Management

Transit providers and subsequently MPOs set performance measures regarding transit asset management. Beyond federal requirements, TAM supports the implementation of the MTP goals such as accessibility, which specifically recognizes enhancing transit to provide more reliable service and an overall improved passenger experience. TAM is a method to quantify these improvements, helping staff as well as the community better gauge the larger impacts that programmed projects will have towards achieving these goals. For example, as the busses exceed their useful life there is an increased need for repairs ultimately impacting the delivery of service and—if left unaddressed—potentially affecting safety.

### SJATSO Transit Asset Management

SJATSO worked with the local transit agency, St. Joseph Transit, to establish realistic and measurable performance measures which were adopted by the Coordinating Committee on March 26, 2019. **Table 8** summarizes the established performance targets to be achieved by June 30, 2020. Additional detail can be found in the current version of the TAM (most current at the time of the MTP development was July 2018).

**Table 8: Transit Asset Management Performance Targets**

Asset Category	Asset Class	Targets				
		2019	2020	2021	2022	2023
<b>Equipment</b>						
Age: % of equipment within an asset class that have met or exceeded their Useful Life Benchmark (ULB) at the end of the fiscal year (FY)	Non-Revenue Service Automobiles	0%	0%	0%	0%	0%
	Trucks & Other Rubber Tire Vehicles	0%	0%	0%	0%	0%
	Maintenance Equipment	0%	0%	0%	0%	0%
	Software Systems	0%	0%	0%	0%	0%
	Security Systems	0%	0%	0%	0%	0%
<b>Revenue Vehicles</b>						
Age: % of revenue vehicles within an asset class that have met or exceeded their ULB at the end of the FY	Bus	45%	0%	0%	0%	0%
	Cutaway Bus	0%	0%	0%	0%	0%
<b>Facilities</b>						
Condition: % with a condition rating below 3.0 on the FTA TERM Scale at the end of the FY	Administration/Maintenance Facility	0%	0%	0%	0%	0%
	Passenger Facilities	0%	0%	0%	0%	0%

### Progress/Opportunities Toward Reaching Targets

The FTA has determined that, at a minimum, facilities should be rated 3.0 (“adequate condition”) on the TERM scale. An assessment was completed as part of the TAM Plan with no facilities rated at less than 3.0. Additionally, Rolling Stock is making progress with 14 coaches programmed to be replaced in FY20 using 5339(b) discretionary funds, totaling an investment of \$6,750,000. Equipment such as vans also improved with the replacement of one staff van in FY18, reducing the performance target to 0% exceeding Useful Life Benchmark; all other equipment has remained the same.

## Conclusion

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The PBPP process is still relatively new in terms of implementation and monitoring, and as such the 2045 MTP provides a high-level assessment on recent progress toward addressing the federally mandated FHWA and FTA transportation performance measures. SJATSO is committed to working with MoDOT and KDOT to create a more fully institutionalized process that is incorporated into on-going SJATSO transportation planning activities, including future MTP updates. Furthermore, the 2045 MTP goals are consistent in supporting the PBPP process and moving both the region and State DOTs toward meeting established goals/targets.

Finally, following the adoption of the 2045 MTP, SJATSO intends to begin developing an annual report card that provides updates on how effective the region has been in achieving the stated targets. It should be noted that it may not be possible to necessarily reach certain targets; however, SJATSO is committed to working on solutions that move the trend in the appropriate direction to help the region achieve its long-term vision.

## Definitions

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### **National Highway System**

The National Highway System (NHS) consists of roadways important to the nation's economy, defense, and mobility. The NHS includes Interstates, Other Freeway & Expressways, and Other Principal Arterials.

### **Non-Interstate NHS**

The Non-Interstate NHS consists of Other Freeways & Expressways, and Other Principal Arterials.

### **Bridge deck area**

Bridge deck area is the percent of deck area classified as good and poor, using National Bridge Inventory (NBI) condition ratings for Deck, Superstructure, Substructure, and Culvert. Condition is determined by the lowest rating of these items. If the lowest rating is greater than or equal to 7, the bridge is classified as good; if it is less than or equal to 4, the bridge is classified as poor. Deck area is computed using NBI Structure Length and Deck Width or Approach Roadway Width (for some culverts). Bridges rated below 7 but above 4 will be classified as fair.

### **Pavement Condition**

Pavement condition is evaluated by measuring International Roughness Index (IRI), Present Serviceability Index (PSR), Cracking Percent, Rutting, and Faulting (uneven slabs of concrete).

### **Level of Travel Time Reliability (LOTR)**

Level of Travel Time Reliability is defined as the ratio of the longer travel times (80th percentile) to a "normal" travel time (50th percentile) using the data from the FHWA's National Performance Management Research Data Set (NPMRDS). Data are collected in 15-minute segments during all time periods between 6 am and 8 pm. The measures are the percent of person-miles traveled on the relevant portion of the NHS that are reliable. Person-miles take into account the users of the NHS. Data to reflect the users can include bus, auto, and truck occupancy levels.

### **Truck Travel Time Reliability (TTTR) Index**

Truck Travel Time Reliability Index is used to assess freight movement. Reporting is divided into five periods: morning peak (6 - 10 am), midday (10 am - 4 pm) and afternoon peak (4 - 8 pm) Mondays through Fridays; weekends (6 am - 8 pm); and overnights for all days (8 pm - 6 am). The TTTR ratio is generated by dividing the 95th percentile time by the normal time (50th percentile) for each segment. The TTTR Index is generated 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 the interstate.