



Long Range Transportation Plan

2020 • 2045



Final Plan

August 2020



OKLAHOMA
Transportation

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OKLAHOMA Transportation

CHAPTER 1: INTRODUCTION



1.1. INTRODUCTION

The Oklahoma Department of Transportation (ODOT) in collaboration with statewide modal stakeholders, developed the 2045 Long Range Transportation Plan (LRTP). The 2045 LRTP is a policy document that will guide ODOT in the development, management, and operation of a safe and efficient transportation system for the next 25 years.

A vibrant multimodal transportation system is vital to Oklahoma's future economic viability and competitiveness. To meet this challenge, it is imperative to have a vision for Oklahoma's 21st century transportation system that will support user needs for improved safety, infrastructure conditions, and system reliability to drive statewide economic investments.

ODOT's mission is to provide a safe, economical, and effective transportation network for the people, commerce, and communities of Oklahoma. Such a system is required to deliver on the 2045 LRTP vision, which is to:

2045 Vision

Provide a connected, multimodal transportation system that supports a thriving economy and improved quality of life for Oklahomans by providing for safe and efficient movement of people and goods.

Provide a connected, multimodal transportation system that supports a thriving economy and improved quality of life for Oklahomans by providing for safe and efficient movement of people and goods.

The primary purpose of the 2045 LRTP is to provide strategic direction for the development of the Oklahoma multimodal transportation system. The 2040 LRTP was adopted by the Oklahoma Transportation Commission in 2015, and the following were addressed in the developing of the 2045 LRTP:

- Updated vision, goals and objectives;
- Aligned federal performance measures to the updated goals;
- Described the existing multimodal transportation system;
- Examined demographic, socioeconomic, and emerging technology trends;
- Identified 25-year multimodal transportation system needs;
- Projected 25-year federal, state, and local revenues; and
- Updated the multimodal policies and strategies.

1.1.1. HIGHLIGHTS SINCE THE 2040 LRTP

Since the adoption of the 2040 LRTP in 2015, ODOT and its partners have made progress in several areas. The following provides highlights from 2016 to 2019.

In 2016:

- Due to the \$1.3 billion budget shortfall facing the State of Oklahoma, ODOT stepped forward to be part of the solution to help balance the fiscal year 2017 state budget. In the final budget agreement, \$367 million in cuts were made to state transportation, with the legislature authorizing ODOT to sell \$200 million in bonds to partially offset some of the reductions.
- Completed an intensive, year-long study of how best to respond to earthquakes and began implementing a new inspection policy.
- The U.S. Department of Transportation announced a \$62 million Advancements in Shipping and Transportation for the Long-Term Achievements of National Efficiencies (FASTLANE) grant to help fund an ODOT project to upgrade four miles of US-69/75 from Calera to Durant in Bryan County.
- Continued major progress on addressing the state's structurally deficient highway bridges. Thanks to increased state funding in the last decade, the number of structurally deficient highway bridges was reduced from an all-time high of 1,168 bridges in 2004 down to 321 at the beginning of 2016.
- Began planting pollinator gardens and updated mowing practices in anticipation of the Memorandum of Agreement to designate I-35 as the Monarch Highway in partnership with the Federal Highway Administration and the Iowa, Kansas, Minnesota, Missouri, and Texas departments of transportation (DOT).

In 2017:

- Began installing centerline rumble strips on Oklahoma highways to cut down on crossover crashes.
- Implemented ShakeCast, a program created by the U.S. Geological Survey, to identify specific bridges for immediate inspection by comparing state bridge data with the severity of an earthquake's ground motions nearly in real time
- 40 construction projects totaling more than \$204 million were removed from the updated Eight-Year Construction Work Plan (CWP), and about 42 percent of all programmed projects were delayed at least one year due to the state budget crisis.
- Oklahoma led the nation in eliminating structurally deficient bridges. Oklahoma has addressed 2,458 structurally deficient highway and local bridges in the last decade.

In 2018:

- A major bipartisan effort to reverse decades of underfunding for transportation in Oklahoma reached a critical milestone in 2018. The allocation of state income tax revenue to the Rebuilding Oklahoma Access and Driver Safety (ROADS) fund benefiting highway and bridge construction climbed to \$575 million for state fiscal year 2019, reaching the annual cap on the fund set in state law.
- Progress continued in 2018 on the Oklahoma Department of Transportation's No. 1 performance measure as the number of structurally deficient bridges on the state highway system was further reduced to 155.
- Awarded a \$45 million federal Infrastructure For Rebuilding America (INFRA) grant toward improvements on I-44 west of the Arkansas River in Tulsa.
- Began installing half-mile markers along Oklahoma interstates as part of a safety initiative to help first responders.
- Identified performance measure targets for safety, infrastructure condition, and system reliability.
- The Federal Transit Administration (FTA) announced that three Oklahoma grants were included in the 139 projects receiving grant funding from the Buses and Bus Facilities Infrastructure Investment Program.
- The Oklahoma City Streetcar officially opened to passengers. It is operated by the City of Oklahoma City, is the state's first modern streetcar, and is funded through local sales taxes.
- ODOT developed the Oklahoma Freight Transportation Plan (OFTP) in order to provide a safe, reliable, and productive freight transportation system that will support the growing economy and population in the state.
- ODOT developed the Oklahoma State Rail Plan for the purpose of guiding the state's rail freight and passenger transportation planning activities and project development plans over the next 20 years.
- As the direct recipient of transit funding from the Federal Transit Administration (FTA), ODOT Transit Programs Division developed a Transit Asset Management Group Plan to document the statewide approach to transit asset management. This plan will improve the practices of Oklahoma's small transit providers as they operate and maintain their capital assets to ensure reliable and safe service delivery for transit riders across the state.

In 2019:

- Progress continued in 2019 on the Oklahoma Department of Transportation's No. 1 performance measure as the number of structurally deficient bridges on the state's highway system was further reduced to 86.
- At the height of the flooding in 2019, a total of 150 separate highway closures due to high water or storm damage occurred in 38 counties, impacting all eight ODOT field districts. As many as 60 highways were closed at the same time, and damage estimates to highways and county roads topped \$20 million. Major routes like US-69, US-62, and US-64 were closed for weeks.
- Waterways traffic also came to a halt during the flooding, as the McClellan-Kerr Arkansas River Navigation System (MKARNS) water levels rose as much as 24 feet above normal in some areas.
- Governor Stitt signed House Bill 1365, which created the new Office of Mobility and Public Transit at ODOT to replace the old Transit Programs Division and transferred a federal program for transit services for the elderly and disabled from the Oklahoma Department of Human Services to ODOT.
- A new technique employed in 2019, Wet Night Reflective Grooved Striping, embeds striping into the pavement, better protecting it from the daily wear and tear of traffic, while also helping prevent the reflective beads from being scraped away by snowplows.
- ODOT developed its first Transportation Asset Management Plan (TAMP). The ODOT TAMP outlines a 10-year strategy for managing the state's pavements and bridges. The strategy includes setting goals and objectives, reporting the current conditions of assets, and projecting conditions 10 years into the future. The TAMP also details life cycle planning, presents a financial plan, and discusses how to manage risk. Taken together, these elements give Oklahoma a path towards transparent and efficient use of taxpayer dollars.
- ODOT updated its Strategic Highway Safety Plan (SHSP). The SHSP is a culmination of the joint efforts of many agencies involved in traffic safety in the state and sets the direction for safety efforts in Oklahoma.

1.1.2. ODOT'S RESPONSIBILITIES AND PARTNER AGENCIES

ODOT is responsible for the planning, design, construction, and maintenance of the state highway system and associated assets (rest areas, intelligent transportation systems, etc.) along the state highway system. The state-owned highway system is comprised of state numbered highway routes, US numbered highway routes, and the interstate highway system. It includes 12,254 centerline miles of state highway and over

6,700 bridges. Additionally, ODOT oversees other state and federal programs directed to the county and city transportation systems.

Oklahoma's geographic and demographic diversity means regions in the state are confronted with different transportation challenges and travel demands. The needs of metropolitan areas, such as Oklahoma City and Tulsa, to expand urban roadways or manage congested intersection operations may differ from rural Oklahoma's need to reduce roadway departure crashes or access rural transit. To address these regional transportation challenges, Oklahoma has eight transportation field districts, each managed by a district engineer who focuses on addressing their unique transportation needs and challenges.

While ODOT is primarily responsible for Oklahoma's (Interstate, US, and State) highway systems and assists with a variety of other modal programs, ODOT does not act alone in statewide transportation planning. Governmental entities – including federal and state agencies, metropolitan and regional transportation planning organizations (MPO and RTPPO), transit agencies, tribal governments, and local jurisdictions – partner with ODOT in the planning process. Additionally, advocacy groups and industry organizations contribute to the planning process.

ODOT also serves various roles related to railroads. ODOT administers the Federal Highway Administration's (FHWA) Grade Crossing Safety Program, manages Oklahoma's Heartland Flyer passenger rail service, serves as a liaison between ODOT and rail companies for ODOT projects involving rail property, and reviews federal funding opportunities to improve Oklahoma's rail systems.

ODOT is the Governor's designee for the administration of state and federal public transportation financial assistance programs for areas with a population under 50,000. ODOT is also responsible for administering the Transportation Alternatives Program funding.

1.1.2.1. METROPOLITAN PLANNING ORGANIZATION COORDINATION

Oklahoma's MPOs and RTPPOs also develop long range transportation plans on a regular cycle. MPOs were established by the Federal-Aid Highway Act of 1973, and their boundaries are defined by U.S. Census Bureau urbanized areas. RTPPOs were created following the 1991 passage of the Intermodal Surface Transportation Efficiency Act (ISTEA), which required states to establish a transportation planning process to serve areas beyond urbanized boundaries. In Oklahoma, RTPPOs were established in 2011 and 2012. Preparation of the 2045 LRTP was coordinated with Oklahoma's four MPOs and two RTPPOs through representation on the LRTP Advisory Committee. ODOT worked closely with the MPOs and RTPPOs during the development of the 2045 LRTP and recognizes that each partner agency has unique regional transportation issues and challenges to address.

1.1.3. FEDERAL REQUIREMENTS

The 2045 LRTP addresses the statewide planning requirements under the federal surface transportation acts – Moving Ahead for Progress in the 21st Century Act (MAP-21) and the Fixing America’s Surface Transportation (FAST) Act. MAP-21 created a streamlined, performance-based, and multimodal program to address the many challenges facing the multimodal transportation system. These challenges include improving safety, maintaining infrastructure in a state of good repair, reducing traffic congestion, improving efficiency of the system and freight movement, protecting the environment, and reducing delays in project delivery. The FAST Act maintains a focus on safety, largely keeps the existing highway-related program structure, continues efforts to streamline project delivery, and creates a new dedicated source of federal dollars for freight projects. A key component of MAP-21 and The FAST Act is the requirement that states and MPOs establish performance measures within the national goal areas. The FAST Act requirements were reviewed to ensure that 2045 LRTP strategic elements are consistent with any updates to the national goals and performance measures.

Statewide transportation planning occurs within a framework of federal funding and requirements that states must meet to be eligible for funds. The most important of these requirements have been encapsulated in the Code of Federal Regulation’s (CFR) section on “Statewide and Nonmetropolitan Transportation Planning and Programming” (23 CFR §§ 450.200 – 450.226). The Code of Federal Regulations encapsulates the rules promulgated by federal agencies to implement the authority of laws, including transportation-related laws passed by the U.S. Congress.

1.1.4. 2045 LONG RANGE TRANSPORTATION PLAN PROCESS

The 2045 LRTP planning process began in March 2019, and the plan will be completed in August 2020. The planning framework was designed to conform with the requirements set forth in the federal surface transportation law, as adopted under MAP-21 in 2012 and the FAST Act in 2015. Federal law requires that states create a plan that looks at least 20 years into the future. The plan must also be multimodal and prepared using input from stakeholders such as transportation providers, regional and local governments, non-government agencies, and the general public. **Figure 1-1** illustrates the planning process used to develop the 2045 LRTP.

The first step in the planning process was to update the 2040 LRTP vision, which is intended to guide ODOT’s decisions as it conducts the transportation planning, construction, and delivery process in the state. Next, the goals and objectives were updated based on input received from ODOT leadership, staff, and Advisory Committee members. Further, broader public feedback on priorities and values was gathered through an interactive online survey and public comment forums. The federal

performance measures were then aligned with the goals and objectives to ensure a performance-based plan was developed.

During the technical analysis phase of the 2045 LRTP, future needs were identified for Oklahoma’s multimodal transportation system based on analysis of data and trends. Federal, state, and local revenues were also projected to illustrate the amount of funding forecasted in comparison to the future transportation needs.

Based on the comprehensive LRTP planning process, the policies and implementation strategies were updated to address the 2045 LRTP vision, goals, and objectives as well as the emerging technology trends that will impact the multimodal transportation system.

Figure 1-1. The Long Range Transportation Planning Process



1.1.5. COORDINATION WITH SHORT TERM TRANSPORTATION PROGRAMS AND PLANS

1.1.5.1. FAMILY OF PLANS

During the 2045 LRTP planning process, the Family of Plans was developed. The Family of Plans includes documents such as the Eight-Year CWP, the State Rail Plan, the State Transportation Improvement Program (STIP), TAMP, and regional long range transportation plans. Each of these plans is connected in some way to the 2045 LRTP. These plans were used to define existing and desired system performance, identify goals

and objectives, identify future modal needs, and recommend policies and strategies to include in the 2045 LRTP.

Each of the plans share several common themes. Numerous plans focus on safety, the economy, multimodal connectivity, needs of the aging population, and system preservation. Many of the plans, from the State Freight Plan to MPO plans to tribal plans include lists of specific projects. Many of the plans also include discussion of new technology and its role in Oklahoma's transportation system.

1.1.5.2. EIGHT-YEAR CONSTRUCTION WORK PLAN (CWP)

The Eight-Year CWP contains capital improvement projects proposed for the state highway system, including bridge replacement or rehabilitation and highway improvements. ODOT's eight field district engineers lead the effort in developing this fiscally balanced work plan, in consultation with local officials and the communities they represent. The CWP is updated each fall. The Oklahoma Transportation Commission approves the final plan. The document's projects are consistent with the policies identified in the 2045 LRTP.

1.1.5.3. STATE TRANSPORTATION IMPROVEMENT PROGRAM (STIP)

The Statewide Transportation Improvement Program (STIP) identifies transportation projects expected to receive full funding and to take place over the four years following the STIP's release. The program identifies highway and transit projects planned for various areas of the state and it is updated every two years.

The STIP includes projects listed in the first four years of the CWP, as well as anticipated Transportation Improvement Projects (TIP) selected by MPOs in their respective regions. These regions include the Oklahoma City, Tulsa, Lawton, and Fort Smith metropolitan transportation planning areas.

This STIP includes projects funded through the Indian Reservation Roads Program and other Federal Lands Highway Programs. The STIP details the process for the County Improvements for Roads and Bridges (CIRB) Program, federal lands, and public involvement. The projects listed in the STIP are consistent with the policies of the 2045 LRTP, the MPO long range plans, and the tribal long range plans.



OKLAHOMA Transportation

CHAPTER 2: STRATEGIC DIRECTION



2.1. STRATEGIC DIRECTION

The foundation for ODOT's comprehensive direction, policy, and decision-making processes for the next 25 years lies in the 2045 LRTP vision, goals, and objectives. The 2045 LRTP vision, goals, and objectives were influenced by several factors including national goals, federal transportation performance measures and planning factors, ODOT's mission statement, 2040 LRTP, MPOs, tribal plans, other states LRTPs, input from public surveys and comments, ODOT leadership and staff, and Advisory Committee recommendations. Collectively these sources contributed to developing the 2045 LRTP strategic direction defined by the 2045 LRTP vision, goals, and objectives.

The following define the essential strategic direction elements:

- The **Vision Statement** provides a vivid aspirational image of the future that an organization is aiming to achieve.
- **Goals** are broad statements, usually qualitative and descriptive.
- **Objectives** are specific measurable statements that supports achievement of the broader goals

Objectives and performance measures are the foundation for tying the conceptual elements of a long range plan, the vision and goals, to program and project implementation. The 2045 LRTP objectives define the outcomes that ODOT and its partners intend to achieve related to each goal.

2.1.1. FAMILY OF PLANS

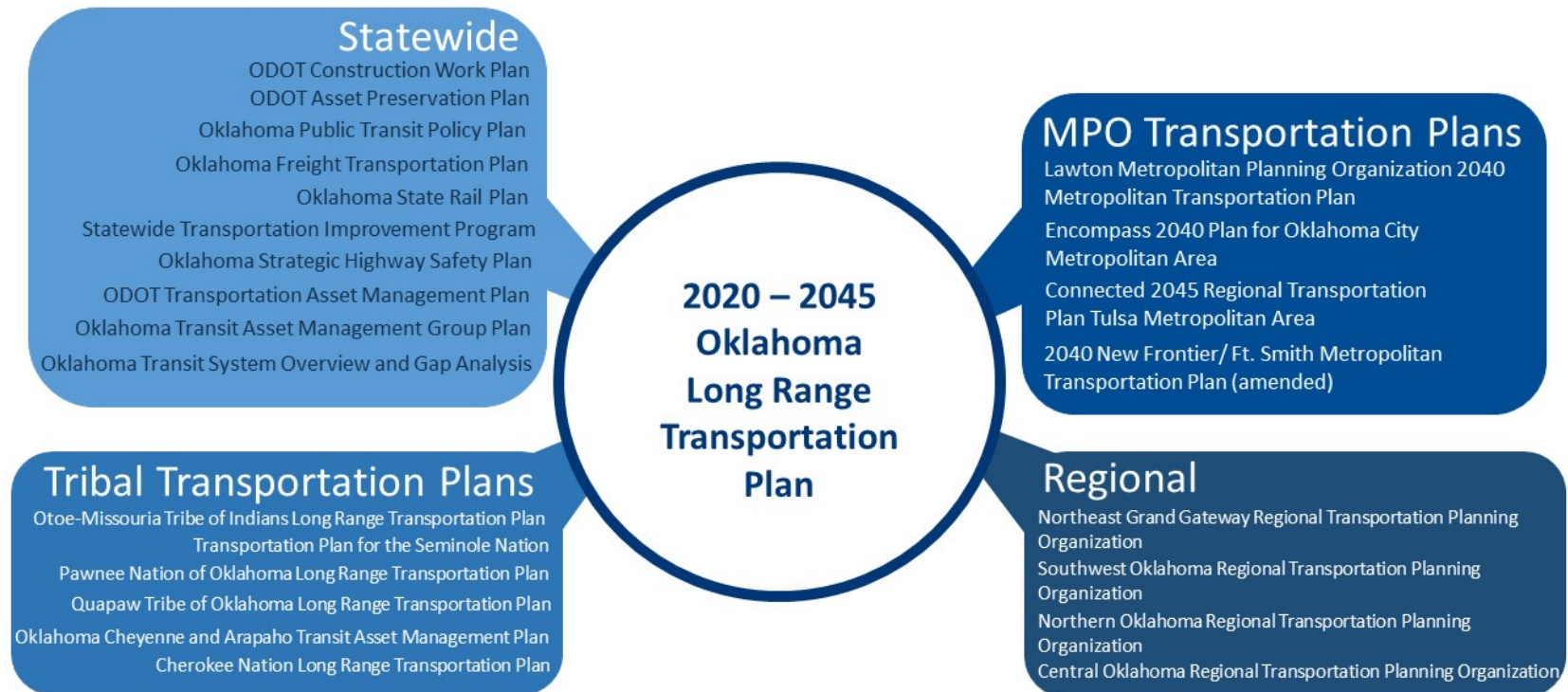
A family of plans was reviewed to ensure that any revisions to the 2045 LRTP vision, goals, and objectives align with the strategic direction of other state efforts and partner agency plans whenever possible. The family of plans include documents such as the Eight Year CWP, the State Rail Plan, the STIP, and regional long range transportation plans. Each of these plans whether representing statewide interests, tribal systems, MPO areas, or RTPO districts, are connected in some way to the 2045 LRTP.

Numerous plans focus on safety, the economy, multimodal connectivity, needs of the aging population, and system preservation. All were used to inform the 2045 LRTP in defining existing and desired system performance, identifying goals and priorities, identifying future modal needs, and recommending policies and strategies.

In particular, plans such as the TAMP, the SHSP the Transit Asset Management Group Plan, the Oklahoma State Rail Plan, the OFTP, and regional, tribal, and MPO transportation plans were key to informing the 2045 LRTP vision, goals, and objectives.

Figure 2-1 displays the full list of plans reflected in the 2045 LRTP.

Figure 2-1. Transportation Plan "Families" Reviewed in the Long Range Planning Process



**Statewide, Regional, Tribal, and MPO Plans Are Reflected in
The Long Range Transportation Plan**

2.1.2. VISION

The 2045 LRTP vision builds on the 2040 LRTP vision and was developed through consideration of the family of plans, ODOT's overall strategic direction, public input, MAP-21, and FAST Act requirements. The 2045 LRTP vision is as follows:

To provide a connected, multimodal transportation system that supports a thriving economy and improved quality of life for Oklahomans by providing for safe and efficient movement of people and goods.

2.1.3. GOALS

The 2045 LRTP goals reflect the vision and provide more specific desired outcomes. Using input from the 2045 LRTP planning process, the goals were formed around the six 2040 LRTP goals. An additional goal addressing fiscal responsibility was added in response to national project delivery delay measures.

The full set of 2045 LRTP goals was developed using public, stakeholder, and ODOT input and refined through several rounds of feedback from ODOT leadership and staff. The 2045 LRTP goals address and support all national performance goals identified in MAP-21 and the FAST Act. They are as follows:

- **Safety and Security** – Ensure a safe and secure transportation system for all users.
- **Infrastructure Preservation** – Preserve and maintain the condition of Oklahoma's multimodal transportation system in a state of good repair through risk-based, data-driven decision-making processes.
- **Mobility and Accessibility** – Facilitate the movement of people and goods, improve connectivity between regions and activity centers, and increase travel mode choices.
- **Economic Vitality** – Provide a reliable multimodal transportation system for people and goods that coordinates with land development patterns, strengthens communities, and supports a healthy and competitive Oklahoma economy.
- **Environmental Responsibility** – Minimize and mitigate transportation-related impacts to the natural and human environments.
- **Efficient Intermodal System Management and Operation** – Maximize system performance and operations.
- **Fiscal Responsibility** – Sustainably fund and efficiently deliver quality transportation projects while continuing to leverage additional resources in coordination with ODOT's partners.

2.1.4. OBJECTIVES

The 2045 LRTP objectives convey the steps needed to achieve each goal and build on the 2040 LRTP objectives, which were enhanced using input from the public, stakeholders, and ODOT leadership and staff. **Table 2-1** presents the 2045 LRTP objectives for each goal.

Table 2-1. 2045 LRTP Objectives by Goal Area

Goal Area 1: Safety and Security
Ensure a safe and secure transportation system for all users.
Reduce traffic-related fatalities and serious injuries sustained on Oklahoma’s multimodal transportation system.
Improve design, construction, and maintenance of transportation infrastructure to reduce the number and severity of crashes.
Increase seat belt usage.
Improve transportation security and emergency preparedness, response, and recovery.
Goal Area 2: Infrastructure Preservation
Preserve and maintain the condition of Oklahoma’s multimodal transportation system in a state of good repair through risk-based, data-driven decision-making processes.
Improve and maintain pavement condition levels on the state highway system.
Improve and maintain bridge condition levels on the state highway system.
Improve and maintain the condition of public transit vehicles, equipment, and facilities.
Maintain the state-owned freight rail system.
Improve ride quality on the state highway system, including National Highway System facilities.
Make more effective use of asset condition data to systematically approach asset management.
Protect existing and design new transportation infrastructure to meet travel needs in response to extreme weather events and other environmental conditions.

Goal Area 3: Mobility and Accessibility
Facilitate the movement of people and goods, improve connectivity between regions and activity centers, and increase travel mode choices.
Improve access to the statewide multimodal transportation system.
Facilitate better multimodal connectivity for people and goods within and beyond Oklahoma's borders.
Enhance access to jobs and services by expanding transportation choices for people in both urban and rural regions.
Goal Area 4: Economic Vitality
Provide a reliable multimodal transportation system for people and goods that coordinates with land development patterns, strengthens communities, and supports a healthy and competitive Oklahoma economy.
Coordinate with MPOs, local governments, and non-governmental organizations on land use, regional, and multimodal planning to support Oklahoma's existing and future transportation system.
Improve transportation connectivity to Oklahoma's economic and regional centers.
Improve travel time reliability for the movement of people and goods.
Goal Area 5: Environmental Responsibility
Minimize and mitigate transportation-related impacts to the natural and human environment.
Minimize and mitigate transportation-related impacts to cultural and historic resources.
Minimize and mitigate transportation-related impacts to wetlands, vulnerable ecosystems, and threatened and endangered species.
Minimize and mitigate harmful effects of storm water runoff related to surface transportation.
Promote use of clean fuels.
Support initiatives that maintain air quality and prevent non-attainment.

Goal Area 6: Efficient Intermodal System Management and Operation	
Maximize system performance and operations.	
Strategically design and adapt transportation infrastructure and technology for new or changing conditions.	
Improve freight-related highway infrastructure capacity.	
Advance the efficient movement of people and goods by improving access to intermodal facilities.	
Goal Area 7: Fiscal Responsibility	
Sustainably fund and efficiently deliver quality transportation projects while continuing to leverage additional resources in coordination with ODOT's partners.	
Increase the percentage of projects delivered on time and on budget.	
Maintain and improve partnerships and coordination with bordering states.	
Increase project funding opportunities through strategic partnerships.	

2.2. PERFORMANCE MEASURES

Federal law requires states and MPOs to establish performance measures that support the national goal areas. The measures and targets are intended to track progress in meeting performance goals, improve project decision-making, and help transportation agencies make the best use of public funds. The federal performance measures are aligned with objectives within the Safety and Security, Infrastructure Preservation, and Economic Vitality goal areas. The System Performance Report (Chapter 3) shows progress in meeting the safety, infrastructure condition, and system reliability targets.



OKLAHOMA Transportation

CHAPTER 3: SYSTEM PERFORMANCE REPORT



3.1. INTRODUCTION

The 2045 LRTP is a performance-based plan that considers the national transportation goals and federal performance measures in development of goals and strategies for the future of ODOT. ODOT is responsible for establishing performance targets for safety, infrastructure condition, and system performance as specified under 23 United States Code (USC) 490 – National Performance Management Measures. ODOT also acts as a sponsor in development of a Transit Asset Management Group Plan for the Tier 2 transit agencies in Oklahoma as per the FTA requirement for every transit agency receiving federal financial assistance.

The sections of this system performance report for the 2045 LRTP reflect the most recently available targets through various reporting requirements. The 2045 LRTP is a performance-based plan developed to align with national transportation goals, the TAMP, and the STIP. Implementation of the strategies and policies identified in the 2045 LRTP will help ODOT to work toward meeting the targets outlined in the following sections of this system performance report. The state's transportation planning efforts, including target setting, are coordinated with Oklahoma's MPOs in consultation with tribal governments and non-metropolitan area local officials responsible for transportation in the state.

3.2. PM 1 SAFETY

As established by 23 CFR 490, FHWA has defined performance measures for safety.

ODOT, in collaboration with the Oklahoma Highway Safety Office (OHSO) and MPOs, develops safety performance targets for full extent of the public roadway system for each of the five federal safety performance measures (PM 1) established by 23CFR 490, including:

- Total fatalities,
- Total serious injuries,
- Rate of fatalities per hundred million vehicle miles traveled (HMVMT),
- Rate of serious injuries per HMVMT, and
- Total non-motorized fatalities and serious injuries.

These annual targets are reported through the Highway Safety Improvement Program (HSIP) report and submitted to FHWA annually. ODOT uses a trend line projection to guide target development for the targets which are based on a five-year rolling average. The performance measures of total fatalities, total serious injuries, and total non-motorized fatalities and serious injuries are coordinated through the Highway Safety Office. The targets for the three measures coordinated through the Highway Safety

Office are developed using an autoregressive integrated moving average (ARIMA) model. The ARIMA model predicts a limit to an increasing trend for non-motorized fatalities and serious injuries. The ARIMA model predicts that the recent decrease in both fatalities and serious injuries can be sustained.

The HSIP requires a data-driven, strategic approach to improve highway safety through performance. Projects chosen for the HSIP are based on crash history, roadway characteristics, and the existence of infrastructure countermeasures that can address the types of crashes present. ODOT is committed to working toward the targets by programming projects in the HSIP that will align with the SHSP along with enforcement and education to improve safety on all public roads.

Table 3-1 illustrates the safety performance targets identified in the 2019 Oklahoma HSIP.

Table 3-1. Oklahoma Safety Performance Targets 2020

Performance Measure	Calendar Year 2020 Target
Number of Fatalities	662.0
Number of Serious Injuries	2,465.0
Fatality Rate	1.320
Serious Injury Rate	5.140
Total Non-motorized Fatalities and Serious Injuries	281.0

Source: 2019 HSIP

3.3. PM 2 PAVEMENT AND BRIDGE CONDITION

As established by 23 CFR 490, FHWA has defined performance measures for bridge and pavement condition (PM 2).

The pavement condition performance measures are:

- Percent of interstate pavement in good condition,
- Percent of interstate pavement in poor condition,
- Percent of non-interstate National Highway System (NHS) pavement in good condition, and
- Percent of non-interstate NHS in poor condition.

Pavement condition metrics including international roughness index (IRI), rutting, faulting, and cracking are used to determine the overall condition of the pavement for the federal performance measure.

The bridge condition performance measures are:

- Percent of NHS bridges by deck area in good condition and
- Percent of NHS bridges by deck area in poor condition.

Bridge condition is based on the National Bridge Inventory (NBI) rating of bridge components (i.e., deck, superstructure, substructure, and culvert) and is evaluated by the percent of the bridge deck area in Oklahoma.

ODOT is responsible for reporting pavement and bridge condition targets on the NHS, regardless of ownership. In coordination with MPOs, ODOT developed 2020 and 2022 targets for the pavement and bridge condition, which were reported to FHWA in October 2018. ODOT is currently evaluating the progress toward the targets, which will be reported to FHWA in the mid-period report of October 2020.

ODOT has adopted an asset management strategy of system preservation, with the objective of maintaining the state's transportation network at the highest possible level, given finite funding. In order to accomplish this task, ODOT relies on recommendations from its asset management systems for both bridge and pavement to determine STIP project selections based on the targets identified in the TAMP. The STIP and the 2045 LRTP support accomplishment of these performance targets, and ODOT intends to achieve positive outcomes as a result of these data-driven initiatives. Preservation projects are selected from a prioritization list that optimizes condition to meet performance targets established by ODOT.

ODOT established pavement condition targets through ODOT's pavement management system, which can forecast pavement performance. Targets were established using historical trends based on data collected in 2016 and forecasting for a ten-year timeframe. Overall, based on this analysis, good condition is projected to be maintained, and poor condition is expected to worsen.

Table 3-2 illustrates the pavement condition targets for 2020 and 2022.

Table 3-2. Oklahoma Pavement Performance Targets 2020 and 2022

Performance Measure	2020 Target	2022 Target
Percent interstate NHS pavement in good condition	50%	50%
Percent interstate NHS pavement in poor condition	3%	3%
Percent non-interstate NHS pavement in good condition	45%	45%
Percent non-interstate NHS pavement in poor condition	5%	7%

Source: ODOT Performance Measures & Target Setting 2018

ODOT established bridge performance targets through review of 2016 bridge condition data against existing funded and planned projects. Overall, bridge condition is expected to improve over a ten-year timeframe. **Table 3-3** illustrates bridge condition targets for 2020 and 2022.

Table 3-3. Oklahoma Bridge Performance Targets 2020 and 2022

Performance Measure	2020 Target	2022 Target
Percent of NHS bridges by deck area in good condition	55%	60%
Percent of NHS bridges by deck area in poor condition	5%	7%

Source: ODOT Performance Measures & Target Setting 2018

3.4. PM 3 SYSTEM RELIABILITY

As established by 23 CFR 490, FHWA has identified performance measures to evaluate system reliability for passenger vehicles and freight as well as air quality conditions. Oklahoma does not include any nonattainment or maintenance areas, and as a result it is not required to report air quality targets. The three system reliability performance measures ODOT is required to establish targets include:

- percent of reliable person-miles traveled on the interstate,
- percent of reliable person-miles traveled on the non-interstate NHS,
- and truck travel time reliability index (TTTR) on the interstate.

As per federal rules, percent of reliable person-miles traveled on the interstate and TTTR are calculated using the National Performance Management Research Data Set

(NPMRDS). Level of travel time reliability (LOTTR) is calculated as a ratio of the longer (80th percentile) travel time to a “normal” travel time (50th percentile) over an entire year. The TTTR index is a ratio of the 95th percentile travel time by the 50th percentile travel time.

ODOT is monitoring reliability, and it is programming projects to address identified travel time issues. In addition, ODOT conducts corridor studies and interchange studies to help address travel time reliability concerns and meet established targets. ODOT is implementing a multi-objective decision analysis (MODA) tool to aid in the selection of capacity expansion and operational improvement projects. The tool will include weighted criteria related to reliability improvements. ODOT is also making a concerted effort to address the freight bottlenecks identified in the OFTP over time.

ODOT established targets through coordination with MPOs using historical data, dating back to 2014. A trend analysis projected estimated reliability targets for 2020 and 2022. FHWA did not require targets to be set and reported for non-interstate reliability in the October 2018 report. **Table 3-4** illustrates the 2020 and 2022 system performance targets.

Table 3-4. Oklahoma System Reliability Performance Targets 2020 and 2022

Performance Measure	2020 Target	2022 Target
Percent of reliable person-miles on the interstate	90%	90%
Percent of reliable person-miles traveled on the non-interstate NHS	Not required	80%
TTTR index on the interstate	1.33	1.33

Source: ODOT Performance Measures & Target Setting 2018

3.5. TRANSIT ASSET MANAGEMENT

Transit asset management (TAM) is a federal requirement for all federal fund recipients that own, operate, or manage capital assets used in providing public transportation services.¹ TAM uses transit asset condition to guide how to manage capital assets and prioritize funding to improve or maintain a state of good repair.

ODOT’s Office of Mobility and Public Transit serves as a sponsor for the Transit Asset Management Group Plan. The Transit Asset Management Group Plan documents the statewide approach to TAM to improve the practices of Oklahoma’s small transit

¹ Federal Transit Administration (2020). *Transit Asset Management: Top 12 Frequently Asked Questions*. Retrieved from <https://www.transit.dot.gov/TAM/gettingstarted/htmlFAQs>

providers as they operate and maintain their capital assets to ensure reliable and safe service delivery for transit riders across the state.

Twenty rural transit agencies and one small urban operator participated in the Transit Asset Management Group Plan. Performance targets were selected based on performance baselines established for existing assets and projections of available funding. For all the transit organizations participating in the Transit Asset Management Group Plan, TAM activity is coordinated by the ODOT Office of Mobility and Public Transit. Representatives from transit agencies are brought together as needed for discussions and workshops. The Transit Asset Management Group Plan funding analysis found available funding insufficient to address the group's average capital investment needs and the backlog of maintenance needs. With limited capital funding, ODOT's Office of Mobility and Public Transit typically awards capital investment projects once significant funds have been accumulated over time.

The City of Edmond, a small urban transit provider did not participate in the first Transit Asset Management Group Plan but anticipates joining in future updates.

Oklahoma's remaining small urban, large urban, and tribal transit agencies set agency transit asset management targets through individual TAM plans. The Central Oklahoma Transportation and Parking Authority (doing business as EMBARK) uses TAM as a platform to combine and enhance efforts established through the organization's strategic business, capital improvements, and maintenance plans. Attempting to better equip decision makers for optimal allocations of resources to maintenance of facilities, infrastructure, and rolling stock. The EMBARK TAM plan identifies appropriate review points and a series of decision support tools to advance TAM metrics.

The Lawton Area Transit System (LATS) TAM plan identifies an annual investment prioritization analysis in order to:

- (1) Determine what capital investments are needed to what degree and when in order to maintain a state of good repair, and
- (2) Rate and rank state of good repair programs and projects in order of implementation priority.

However, LATS also identifies a lack of funding as an impediment to achieving more ambitious targets. The LATS TAM plans state that vehicles will continue to run well past their useful life without additional federal or local funding sources.

The Metropolitan Tulsa Transit Authority (MTTA) seeks to meet its target benchmarks using cost-effective mechanisms such as a strong preventive maintenance plan to extend vehicle life. The agency also implements fleet rotation practices to equalize miles and vehicle wear and is implementing a mid-life rehabilitation program based on the transit State of Good Repair Vehicle Replacement Model, which was developed in the Transit Cooperative Research Program (TCRP) Project E-09.

The 2019 performance targets from the Transit Asset Management Group Plan, and TAM plans for EMBARK, LATS, and MTTA are listed in **Table 3-5**. The most recent and complete targets were gathered from the FTA's National Transit Database (NTD) and TAM plans. The transit agencies will update targets annually and provide the data to the NTD. Performance targets represent the percent of asset inventory that has met or exceeded its useful life benchmark (ULB).

Table 3-5. Transit Performance Targets (FY19)
Percent met or exceeded useful life benchmark (ULB)

Asset Category	Asset Type	ODOT Tier II Group*	EMBARK	LATS	MTTA**
Revenue Vehicle	Automobile	57.14%	n/a	n/a	n/a
	Over-the-road Bus	45.45%	n/a	n/a	n/a
	Bus	28.13%	0%	0%	10%
	Cutaway	35%	0%	50%	10%
	Minivan	22.67%	n/a	n/a	n/a
	School Bus	0%	n/a	n/a	n/a
	Sports Utility Vehicle	0%	n/a	n/a	n/a
	Van	67.53%	n/a	33.33%	n/a
	Ferryboat	n/a	0%	n/a	n/a
	Streetcar	n/a	n/a	n/a	n/a
Equipment	Automobiles	54.17%	50%	66.67%	20%
	Trucks and other Rubber Tire Vehicles	33.33%	20%	66.67%	n/a
Facilities	Administrative / Maintenance Facilities	4.35%	n/a	0%	1%
	Passenger / Parking Facilities	0%	n/a	0%	1%
	Bus Shelters	n/a	n/a	n/a	9%

Source: NDT 2019

* Source: Transit Asset Management Group Plan

**Source: MTTA TAM Plan 2018

Note: The City of Edmond has previously reported as part of the OKDHS Group Plan and does not report on the federal targets; therefore, is not included in the chart.

Twelve tribal transit agencies also operate in Oklahoma and maintain transit revenue vehicles, equipment, and/or facilities. The tribal transit agencies are held to the same federal TAM requirements. The twelve tribal transit agencies reported their targets through the NTD or to ODOT directly and are show in **Table 3-6**.

Table 3-6. Tribal Transit Performance Targets (FY19)
Percent met or exceeded useful life benchmark (ULB)

Asset Category	Asset Type	Cherokee Nation*	Cheyenne & Arapaho Tribes	Chickasaw Nation	Choctaw Nation of Oklahoma	Citizen Potawatomi Nation	Comanche Nation	Kiowa Tribe	Muscogee (Creek) Nation	Northeast Tribal Transit Consortium*	Ponca Tribe of Oklahoma	Seminole Nation Public Transit	United Keetoowah Band of Cherokee Indians in Oklahoma
Revenue Vehicle	Automobile		20%						50%				100%
	Bus								0%				
	Cutaway	0%	29%	50%	42.86%	0%			0%	0%		0%	
	Minivan		50%	0%	44.44%	50%	100%	0%	30%		100%	0%	50%
	Sports Utility Vehicle			0%									
	Van	0%	0%	100%	20%	25%	30%	100%		43%	0%		0%
Equipment	Automobiles		20%										
	Trucks and other Rubber Tire Vehicles						0%						0%
Facilities	Administrative / Maintenance Facilities		20%				0%		0%		0%	0%	0%
	Parking Structures		20%										

Source: NDT 2019

*Source: Tribal agency staff

Note: Blank cells indicate that the agency does not own or maintain that type of vehicle, equipment, or facility.

Note: Comanche Nation and Kiowa Tribes are now reporting to NTD together as Comanche and Kiowa.



OKLAHOMA Transportation

CHAPTER 4: PUBLIC STAKEHOLDER ENGAGEMENT



4.1. INTRODUCTION

ODOT recognizes the importance of understanding public beliefs, attitudes, and behaviors as they relate to Oklahoma’s future multimodal transportation system. Thus, a vital part of the 2045 LRTP was public involvement and stakeholder outreach. Throughout the development of the 2045 LRTP, there were several opportunities for stakeholders to provide feedback on milestones. ODOT recognizes that public and stakeholder input is critical in order to understand the transportation priorities and needs of Oklahoma and to develop policy and strategies to guide future investment decisions.

Input was collected in several ways including three online surveys, and a series of four Advisory Committee meetings.

4.2. PUBLIC INVOLVEMENT PLAN

The purpose of the 2045 LRTP Public Involvement Plan (PIP) was to outline methods and tactics for encouraging a diverse group of interested parties to participate in the development of the 2045 LRTP. The PIP was created at the beginning of the 2045 LRTP process and is consistent with ODOT’s Public Participation Plan (PPP), which meets the federal requirements for statewide planning as outlined in MAP-21 and the FAST Act.

MAP-21 requires formal documentation of the public involvement process used for statewide planning, and the FAST Act requires continuous involvement opportunities and new considerations for coordinating with additional stakeholders. The PIP is the formal documentation required by federal law, and it provides procedures that are inclusive, timely, and complete.

“Oklahomans are paying attention to transportation.

We appreciate the time that people took to provide us with more input than we have ever received during the development of a Long Range Transportation Plan.

We believe that this input will help us better tailor the plan to address what is important to Oklahomans.”

Dawn Sullivan, ODOT Deputy Director

4.3. COMMUNICATION METHODS AND TOOLS

4.3.1. STAKEHOLDER DATABASE

The initial public engagement activity was to identify and compile a diverse list of stakeholders that included names, mailing, and email addresses of the following:

- Advisory Committee members
- MPO staff
- RTPOs
- Urban and rural transit providers
- Tribal representatives
- Transportation mode representatives (e.g., rail, bicycle/pedestrian, waterway)
- Chamber of commerce staff
- Federal, state, and local elected officials
- City and county clerks
- Librarians
- Interested members of the general public
- ODOT staff

The database was routinely updated. As of June 2020, 2,582 contacts were included in the database.

4.3.2. PLANNING PARTNERS

The following statewide, regional, and metropolitan planning organizations were consulted with and participated in the development of the 2045 LRTP.

- Association of Central Oklahoma Governments (ACOG)
- Association of South Central Oklahoma Governments (ASCOG)
- Central Oklahoma Economic Development District (COEDD)
- Eastern Oklahoma Development District (EODD)
- Grand Gateway Economic Development Association (GGEDA)
- Indian Nations Council of Governments (INCOG)
- Kiamichi Economic Development District of Oklahoma (KEDDO)
- Northern Oklahoma Development Authority (NODA)
- Oklahoma Economic Development Association (OEDA)
- Southern Oklahoma Development Association (SODA)
- Southwestern Oklahoma Development Authority (SWODA)
- Lawton Metropolitan Planning Organization (LMPO)
- Frontier Metropolitan Planning Organization (FRONTIER)

4.3.3. MEDIA RELEASES AND EMAIL BLASTS

ODOT issued media releases, posted on social media, attended stakeholder meetings, and used 'email blasts' to encourage diverse participation in the development of the 2045 LRTP.

4.3.4. ADVISORY COMMITTEE MEETINGS

ODOT hosted four Advisory Committee meetings. Detailed notes from each meeting are available at <https://www.oklongrangeplan.org/resources>. Committee members included stakeholders from across Oklahoma that represented different modes of transportation, planning partners, tribal interests' partners, businesses, highway patrol, and ODOT staff. **Table 4-1** shows a list of the member organizations of the Advisory Committee.

Table 4-1. 2045 LRTP Advisory Committee Member Entities

Advisory Committee Members	
Company/Organization	
Alt Fuels - Electric/CNG/INCOG	OKC Chamber of Commerce
Amazon	Oklahoma Department of Commerce
Amer Auto Association	Oklahoma Department of Environmental Quality (ODEQ)
Amtrak	Oklahoma Highway Patrol
Association of Central Oklahoma Governments	Oklahoma Historical Preservation Office
Bike Oklahoma	Oklahoma Railroad Association
Cherokee Nation Planner	Oklahoma Trucking Association
Cherokee Nation Transportation Director	OU Technology Professor
Chesapeake Energy	Port of Muskogee
Devon Energy	Rural TPO - Northern Oklahoma Development Authority - Enid
EMBARK - OKC Transit	Rural Transit Provider / Oklahoma Transit Association
Equity Marketing Alliance	Seminole Nation Planner
Farmrail	Southwestern Oklahoma Development Authority - Elk City
Fed Ex	Tinker Air Force Base
Federal Highway Administration	Tulsa Airport
Federal Motor Carriers Safety Administration	Tulsa Chamber of Commerce
Greyhound Bus Lines	Tulsa Transit
Heartland Flyer/Passenger Rail	Uber
Indian Nations Council of Governments	UPS
Lawton Ft. Sill	Walmart
New View Oklahoma	Webco Industries
ODOT Capital Programs	

4.3.4.1. MEETING #1

The first Advisory Committee meeting was held on June 25, 2019. The purpose of the meeting was to inform stakeholders about the purpose of the 2045 LRTP, explain the Advisory Committee's role in developing the 2045 LRTP, collect input about transportation priorities that should be addressed in the 2045 LRTP, review the 2040 LRTP goals, and discuss new 2045 LRTP goal areas.

ODOT Deputy Director Dawn Sullivan shared that the 2045 LRTP was a tool that ODOT will use to work toward achieving Governor Stitt's vision of Oklahoma becoming a top 10 state for transportation.

Figure 4-1. Advisory Committee Meeting



Input from the Advisory Committee

What do you want from a future state transportation system?

Some responses included:

- Safety improvements
- Maintenance of the current transportation system
- More transportation options, especially for rural areas
- Better connections for communities and businesses
- Increased use of electric vehicles (EVs) and connected and autonomous vehicle (CAV) technologies

What do you believe are the most important issues facing Oklahoma today & in the next 10 years?

Some responses for the two questions included:

- Consistent and reliable transportation funding

- Enhancing economic growth by improving infrastructure and access to jobs

What was the greatest transportation need perceived today or in the future based on the organization they were representing or based on personal reflection/experience?

Some responses included:

- Offer more modal options
- Increase safety
- Improve or reconstruct existing roadways and bridges
- Improve traffic flow and ease congestion
- Advance use of technological within transportation (i.e., EVs and CAVs)

Updating Plan Goals

The committee members generally agreed that the following goals areas used in the 2040 LRTP should be kept and modified:

- Safe and secure travel
- Infrastructure preservation
- Economic vitality

Some members suggested that the following should be removed, revised, and/or combined with the goals listed above:

- Mobility choice, connectivity, and accessibility
- Environmental responsibility
- Efficient multimodal system management and operation

4.3.4.2. MEETING #2

The second Advisory Committee meeting was held on October 30, 2019. The purpose of this meeting was to review public input on transportation goals and priorities, introduce the 2045 LRTP goals, and discuss preliminary multimodal transportation needs.

The following 2045 goal areas were finalized based on input from the public, Advisory Committee, and ODOT leadership and staff:

2045 LRTP goals

- Safety and security
- Infrastructure condition
- Mobility choice, connectivity, and accessibility
- Economic vitality
- Environmental responsibility
- Efficient intermodal system management and operation
- Fiscal responsibility

The input received from the Advisory Committee contributed to the development of the 2045 LRTP goals and objectives discussed in Chapter 2.

4.3.4.3. MEETING #3

The third Advisory Committee meeting took place on January 29, 2020. The purpose of this meeting was to present the final 25-year multimodal transportation needs and 25-year federal, state, and local revenue forecasts. A breakout session was conducted to discuss how the following emerging trends impact the development of the 2045 LRTP policies and strategies:

- Connected and autonomous vehicles (CAV)
- Cybersecurity
- Electric vehicles (EV)
- Severe weather impacts
- Mobility as a Service (MaaS)
- Alternative freight movement and demand

Input from the Advisory Committee included:

- Increase CAV education and address the perception of some Oklahomans that driverless vehicles were not safe and/or feasible on rural roads.
- Enhance partnerships to share and gather data with other state agencies, ride share companies, and/or other transportation service companies/providers.

Figure 4-2. Advisory Committee Breakout Groups



- Consider possible legislation about data collection and sharing as well as determining if the data belongs to the driver.
- Explore road use charges and implement registration surcharges for EVs.
- Construct facilities that could accommodate future needs such as sidewalks, ramps, and scooter and bike parking.
- Incorporate the use of truck platooning and dedicated truck lanes, use public private partnerships to increase truck parking, create tax incentives for gas stations to build larger truck parking areas, and improve the ability for drivers to log trips electronically.

The input received during the breakout session contributed to the update and development of new policies and strategies discussed in Chapter 9.

4.3.4.4. MEETING #4

The fourth Advisory Committee meeting took place on June 3, 2020. Due to the COVID-19 pandemic, the meeting was conducted virtually by using Go To Meeting. The purpose of this meeting was to present the draft 2045 LRTP to the Advisory Committee to get their input prior to the public comment period.

4.3.5. TRIBAL COORDINATION

ODOT staff met with tribal leaders at ODOT's Tribal Advisory Board Meeting on May 7, 2019. The purpose of the meeting was to provide an update on the 2045 LRTP and get input on the goals and objectives, and their transportation needs. The Tribal Advisory Board includes members from Chickasaw Nation, Choctaw Tribal Transit, Ponca Tribe, Osage Nation, Chickasaw Tribe, Cherokee Tribe, Citizen Potawatomi Nation, Comanche Nation, Cherokee Nation, Iowa Tribe, and Sac & Fox Nation.

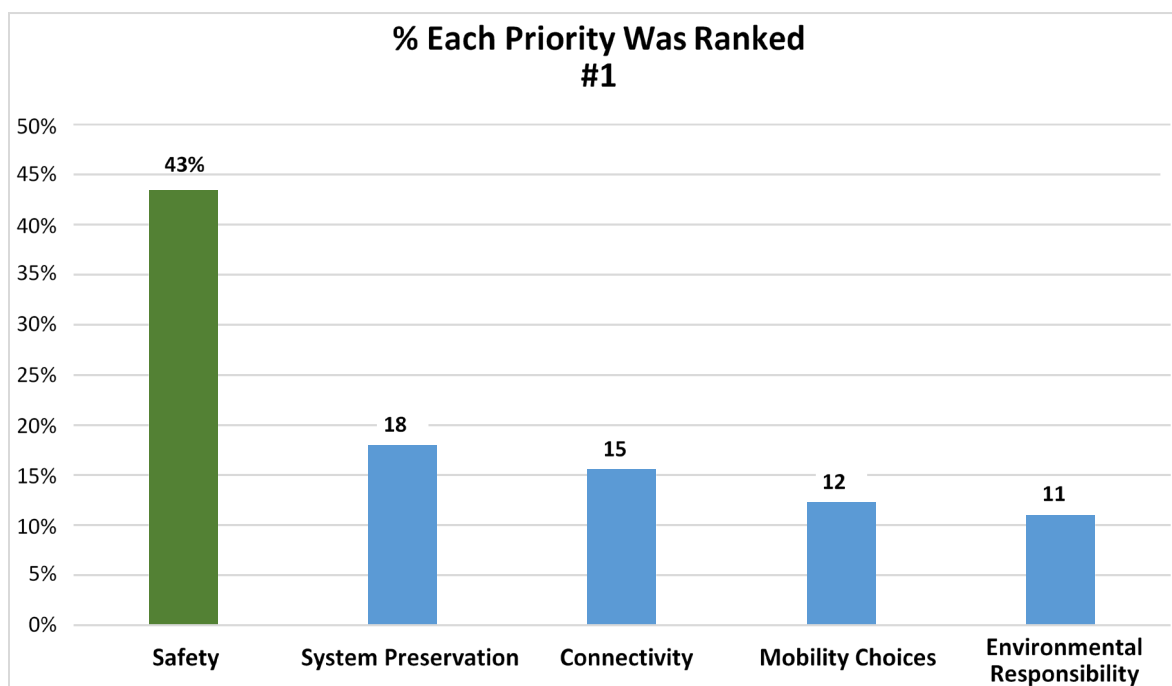
4.3.6. INPUT OPPORTUNITY #1 – SUMMER 2019

ODOT began the 2045 LRTP public outreach campaign in June 2019 using online tools to reach a diverse statewide audience. Marketing tools such as email blasts, news releases, and social media posts were used to direct audiences to an online engagement survey.

The online public survey was the primary tool utilized to engage the general public. It was developed and deployed to raise public awareness of the 2045 LRTP and, at the same time, solicit public opinions and information related to their transportation needs and priorities. The online engagement survey was available to all Oklahomans from June 12 to August 12, 2019 in English and Spanish, and with an option for the hearing impaired. More than 3,800 people from 75 of Oklahoma's 77 counties provided input on their transportation needs and priorities.

As shown in **Figure 4-3**, by an overwhelming margin, 43 percent of respondents ranked safety as the highest priority followed system preservation (18%), connectivity (15%), mobility choice (12%), and environmental responsibility (11%).

Figure 4-3. Transportation Priorities



Additional input gathered from the public included the following:

77%

Strongly disagreed or disagreed on keeping transportation costs the same, even if that meant the condition of the system declines over time and no new facilities are built.

83%

Strongly agreed or agreed that improving traffic operations through additional investments in technology and innovations will maximize the efficiency of the system.

84%

Strongly agreed or agreed that it was important to improve existing highway pavement and bridge conditions even if they had to pay more.

56%

Strongly agreed or agreed that expanding or reconstructing the transportation system was important, even if it means paying more.

4.3.7. INPUT OPPORTUNITIES #2 & #3 – SUMMER 2020

ODOT provided two opportunities for the public and stakeholders to provide input on the 2045 LRTP. Marketing tools such as email blasts, news releases, and social media posts were used to direct audiences to an online survey. In June 2020, ODOT received more than 1,058 electronic survey responses providing input on the recommendations and focus areas included in the 2045 LRTP executive summary. The public comment period to review the 2045 LRTP was conducted in July. All surveys were available in English and Spanish, as well as an option for the hearing impaired.

Public input confirmed that Oklahomans agreed with 2045 LRTP recommendations and that the 2045 LRTP addressed select focus areas. The following are highlights from the public input received in June 2020.

RECOMMENDATIONS

94%

Strongly agreed or agreed ODOT should continue to invest in bridge preservation to achieve and maintain a share of state-system structurally deficient bridges no greater than 1 percent.

87%

Strongly agreed or agreed that ODOT should utilize operational strategies to reduce the impact of congestion-causing incidents on transportation systems.

51%

Strongly agreed or agreed ODOT should explore various alternatives for funding the State's surface transportation program.

57%

Strongly agreed or agreed ODOT should explore what is required to develop a fully integrated Connected Automated Vehicle (CAV) system.

FOCUS AREAS

83%

Strongly agreed or agreed the LRTP:

- addresses transportation needs in urban and rural areas
- focuses on safety improvements as a top priority
- anticipates future transportation needs and funding opportunities

67%

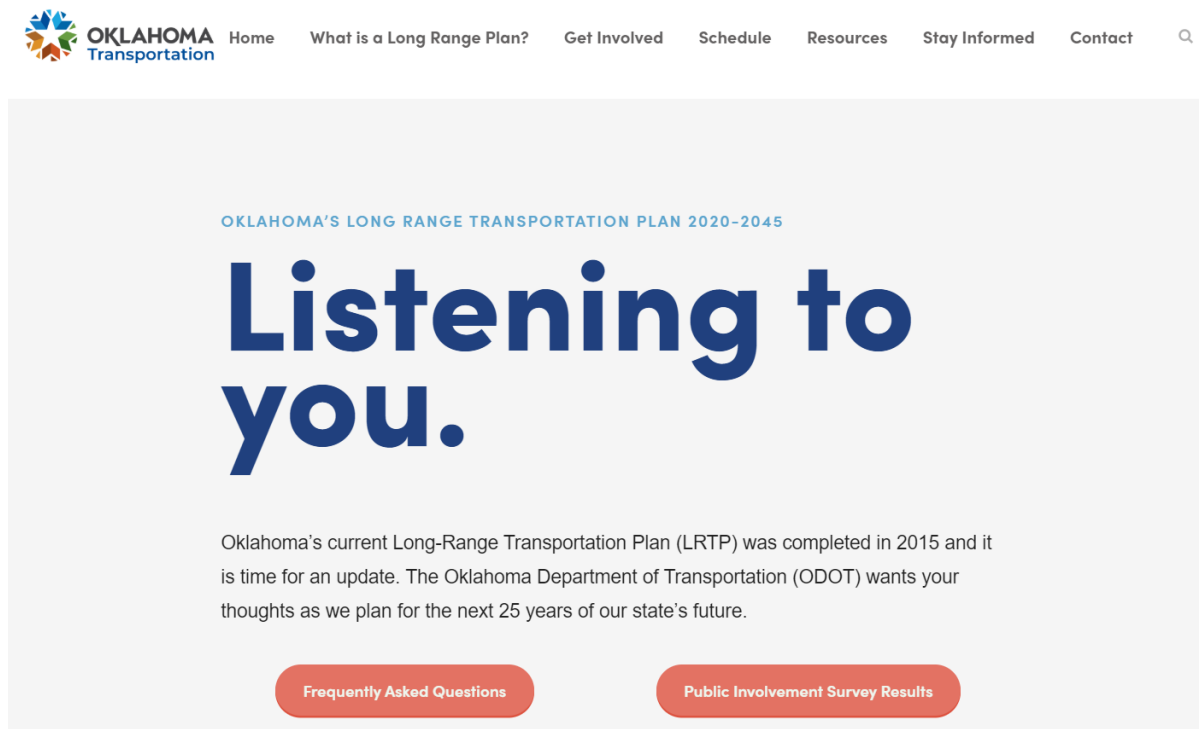
Strongly agreed or agreed the LRTP aligns with Oklahoma values and national transportation goals.

23%
**Likely to
buy an
Electric
car in
the next
5 years**

4.3.8. PROJECT WEBSITE

The 2045 LRTP website, www.oklongrangeplan.org, was developed as a resource where interested citizens and stakeholders could learn what a long range plan is, review the previous 2040 plan, sign up for updates, review Advisory Committee meeting notes, and review milestone documents. **Figure 4-4** is a screen shot of the 2045 LRTP website homepage.

Figure 4-4. Plan Website - Homepage





OKLAHOMA Transportation

CHAPTER 5: EXISTING AND EMERGING TRENDS



5.1. INTRODUCTION

An assessment of existing and future trends in topics such as demographics, socioeconomics, the natural and built environments, and technology are important in building the foundation for the 2045 LRTP. Understanding the users of the transportation system and their mobility needs help inform the development of the goals, objectives, policies, strategies, and funding decisions related to the delivery of transportation projects and services across the state.

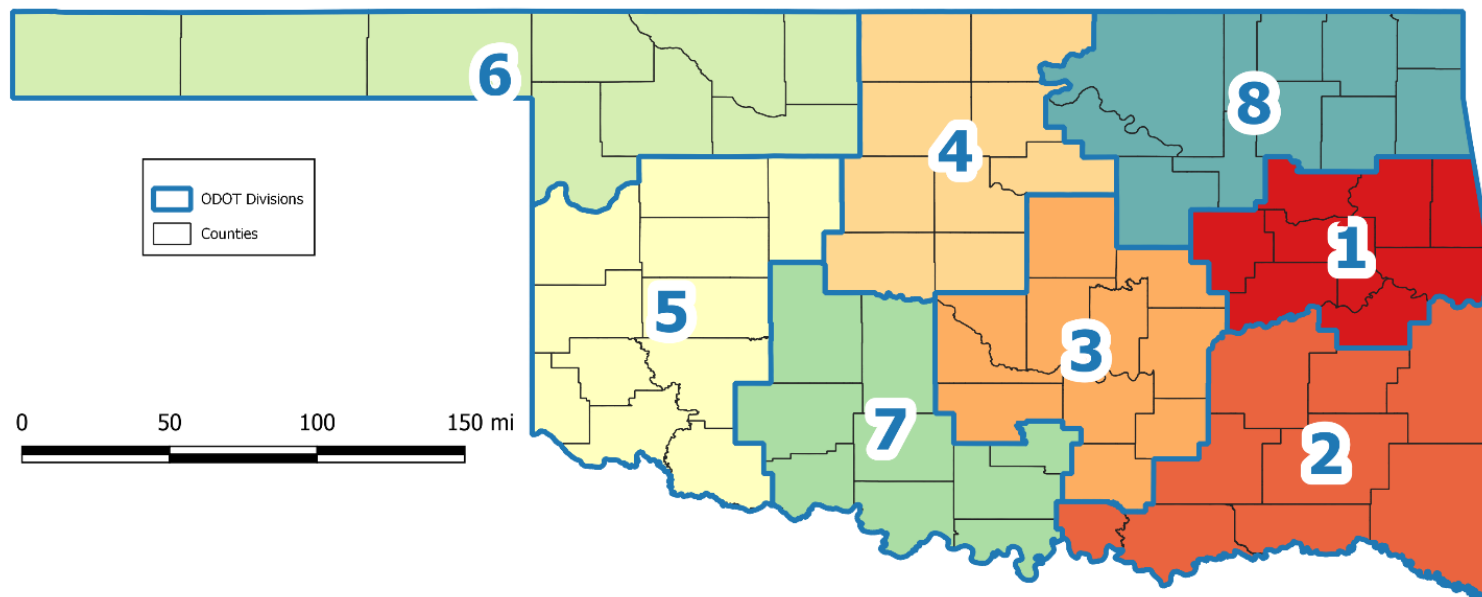
Oklahoma's transportation system should reflect the dynamic and evolving communities that it serves. This chapter identifies and examines the existing and emerging factors that will shape the future of Oklahoma's transportation system.

Oklahoma is organized into 77 counties and eight ODOT field districts (**Table 5-1** and **Figure 5-1**). Demographic and socioeconomic characteristics, trends and analysis discussed throughout this section are organized into these geographic units.

Table 5-1. Oklahoma Counties by ODOT Districts

District	Counties
District 1	Adair, Cherokee, Haskell, McIntosh, Muskogee, Okmulgee, Sequoyah, Wagoner
District 2	Atoka, Bryan, Choctaw, Latimer, Le Flore, McCurtain, Marshall, Pittsburgh, Pushmataha
District 3	Cleveland, Coal, Garvin, Hughes, Johnston, Lincoln, McClain, Okfuskee, Pontotoc, Pottawatomie, Seminole
District 4	Canadian, Garfield, Grant, Kay, Kingfisher, Logan, Noble, Oklahoma, Payne
District 5	Beckham, Blaine, Custer, Dewey, Greer, Harmon, Jackson, Kiowa, Roger Mills, Tillman, Washita
District 6	Alfalfa, Beaver, Cimarron, Ellis, Harper, Major, Texas, Woods, Woodward
District 7	Caddo, Carter, Comanche, Cotton, Grady, Jefferson, Love, Murray, Stephens
District 8	Craig, Creek, Delaware, Mayes, Nowata, Osage, Ottawa, Pawnee, Rogers, Tulsa, Washington

Figure 5-1. ODOT Districts



5.2. DEMOGRAPHICS

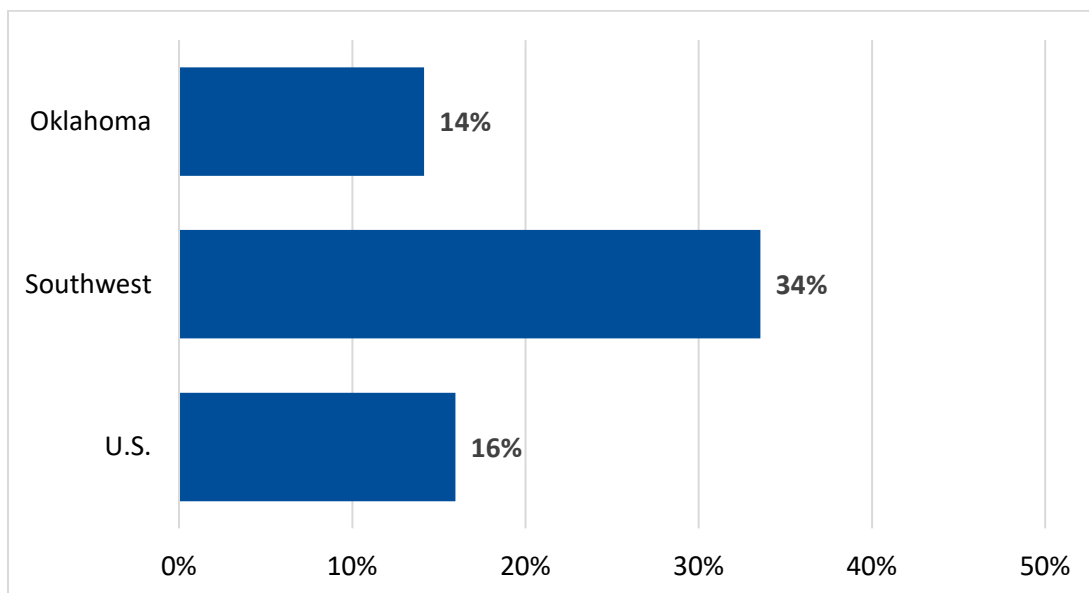
This section summarizes trends in Oklahoma’s population and specific demographic trends that directly affect the demands on the statewide transportation system.

5.2.1. POPULATION TRENDS

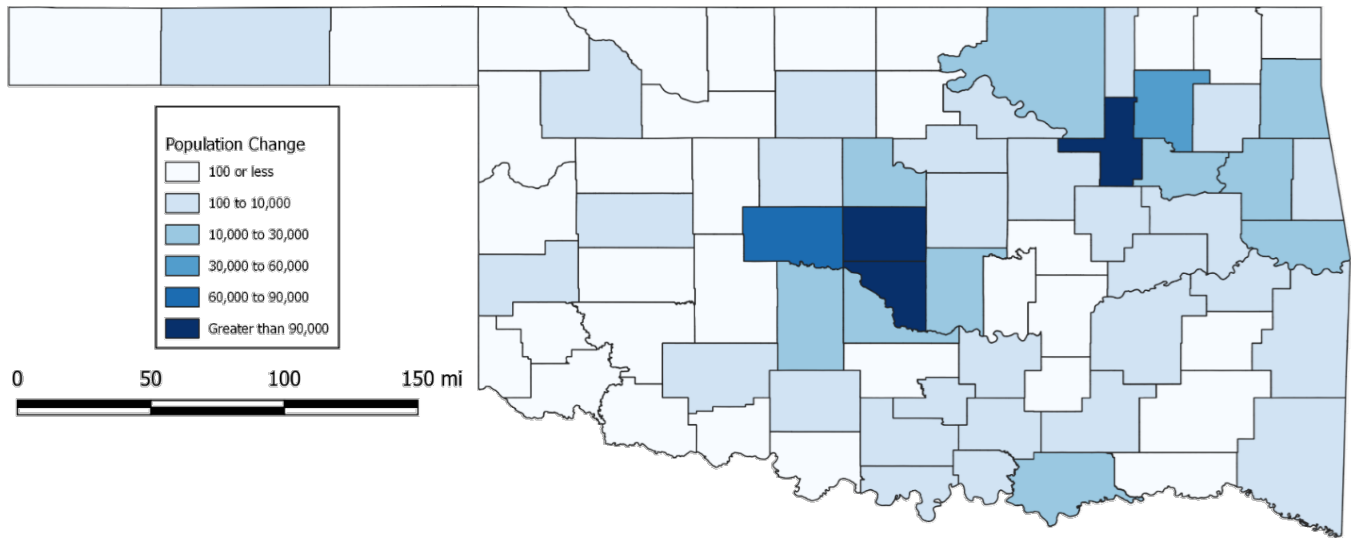
According to the 2000 Census, Oklahoma had just over 3.45 million residents, a number that is estimated to have increased to just over 3.94 million in 2018. **Figure 5-2** shows this 14 percent growth rate for population, a rate which is slightly less than for the U.S. as a whole and less than half of the overall growth rate for the Southwest region, which includes Arizona, New Mexico, Oklahoma, and Texas. The Federal Reserve Bank of Kansas City found that the primary factor for the state’s lag in population growth has been a combination of decreased domestic migration to the State and a downturn in the economy following a 2014-2015 drop in oil prices. Oklahoma maintains its ranking as the 28th most populous state in the nation, which it has maintained since the 1990 decennial census.

By 2045, the population in Oklahoma is projected to increase by 20 percent, remaining behind regional and national population growth averages. However, there is much variability between projected population growth by Oklahoma counties as shown in **Figure 5-3**. The majority of future population growth is expected to occur in the urban areas of Oklahoma City and Tulsa (ODOT Districts 4 and 8). Counties surrounding and containing these urban areas, including Canadian, Oklahoma, Cleveland, Tulsa, and Rogers Counties are projected to experience population changes of greater than 30,000 people.

Figure 5-2. Overall Population Growth, 2000-2018



Source: U.S. Census Bureau

Figure 5-3. Projected Population Change by County, 2018-2045


Source: Woods & Poole Economics, Inc. Washington, D.C. Copyright 2018.

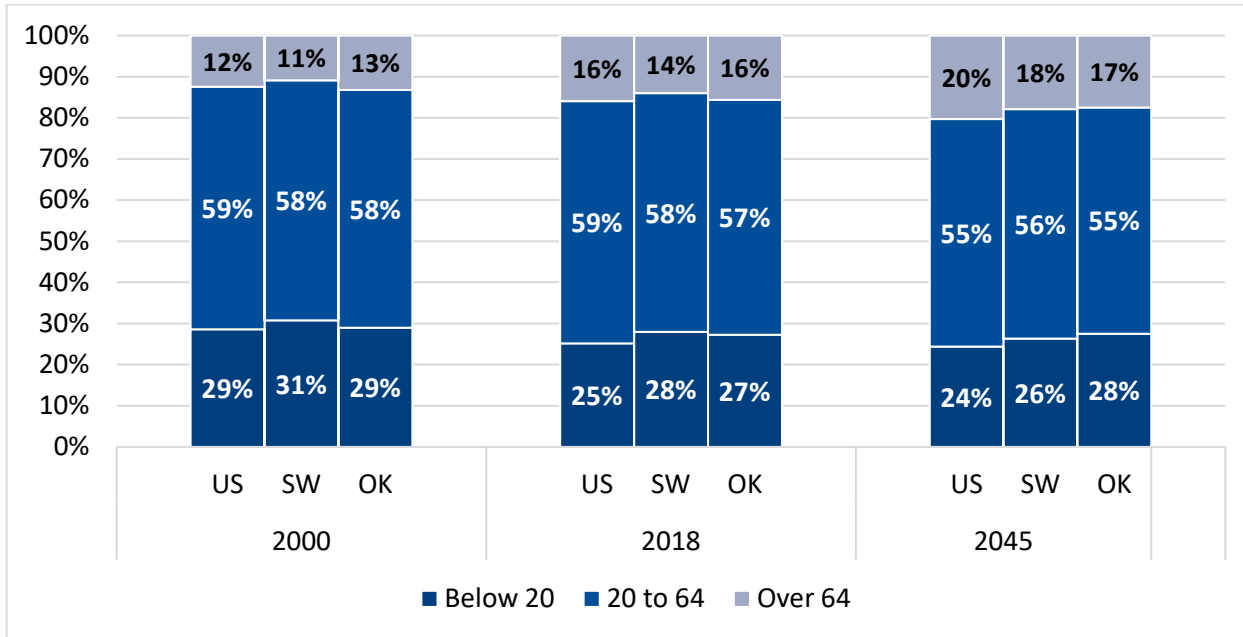
5.2.1.1. AGE DISTRIBUTION

Oklahoma's population is gradually aging—a trend shared with the U.S. and the Southwest region (**Figure 5-4**). While this upward trend is expected to increase, Oklahoma is projected in 2045 to have a lower percentage than the Southwest region or the U.S. as a whole of those 64 years and older. This demographic change has significant implications for the delivery of state transportation services, as the overall travel and commuting patterns of senior populations (those aged 65+) is often different than those of younger populations.

The state's senior population is expected to grow variably across Oklahoma's counties, from 16 percent in 2018 to approximately 17 percent in 2045. Those aged 65 years and older represent less than 15 percent of the population in Oklahoma's most urbanized areas, but account for over 24 percent in other more rural parts of the state (**Figure 5-5**).

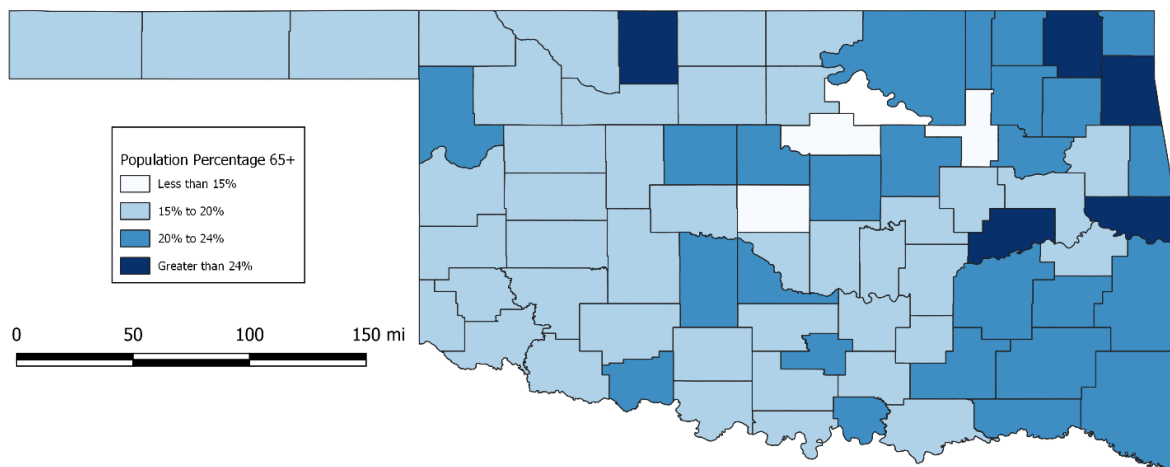


Figure 5-4. Population by Age Group



Source: U.S. Census Bureau and Woods & Poole Economics, Inc. Washington, D.C. Copyright 2018.

Figure 5-5. Oklahoma Projected Population Percentage Aged 65+ by County, 2045

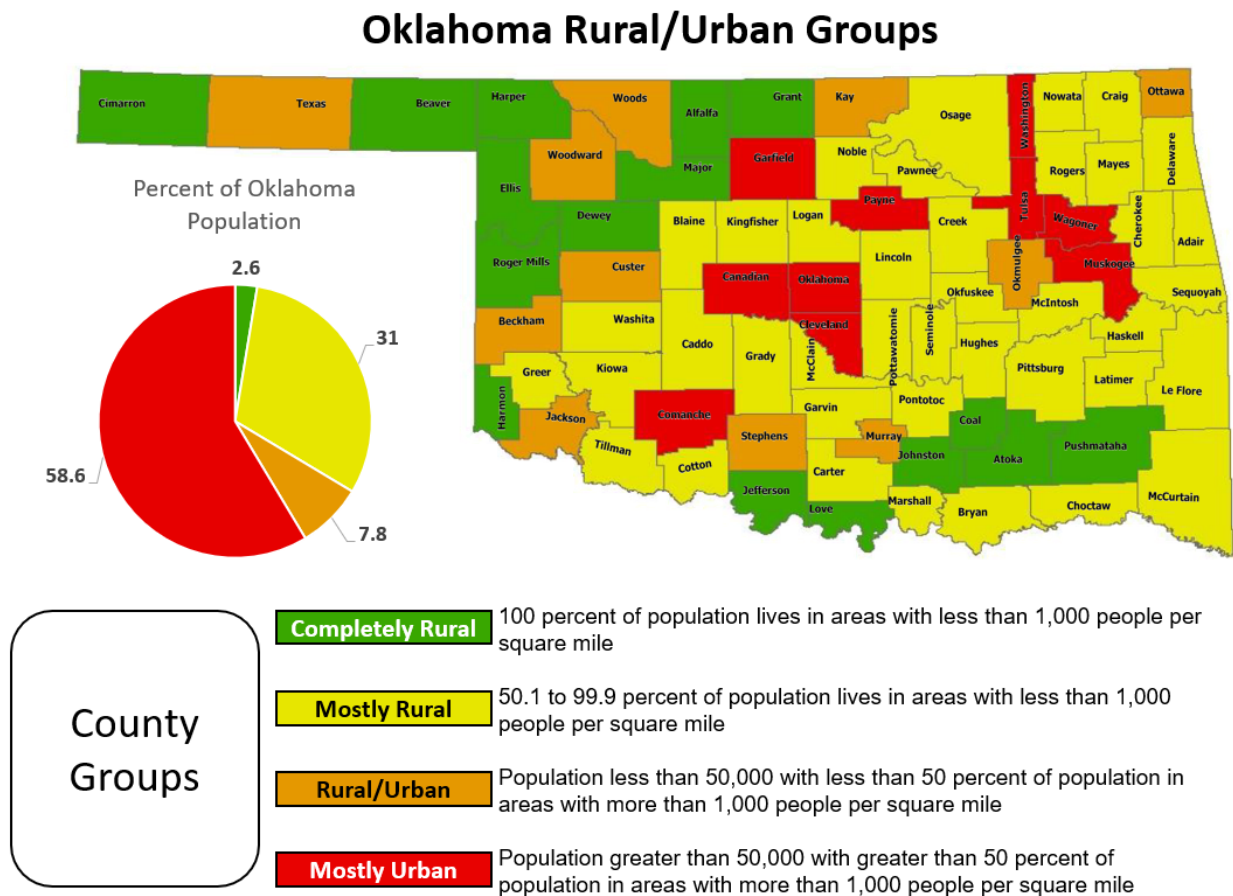


Source: Woods & Poole Economics, Inc. Washington, D.C. Copyright 2018.

5.2.1.2. URBAN VS. RURAL POPULATIONS

Examining the differences in projected population trends between urban and rural areas is important in sustaining a cohesive transportation system. **Figure 5-4** and **Figure 5-5** illustrate population growth centered around Oklahoma’s urban areas and a greater percentage of older adults residing in rural areas. This urban/rural population is not a new phenomenon and is acutely apparent when looking at population density throughout the state. **Figure 5-6** shows that almost 60 percent of Oklahoma residents live in counties whose total land area accounts for less than 11 percent of the state’s geographic area.

Figure 5-6. Rural and Urban Populations in Oklahoma, 2010



Source: U.S. Census for Oklahoma Rural Development Conference and Workshop (2017)

5.3. SOCIOECONOMIC FACTORS

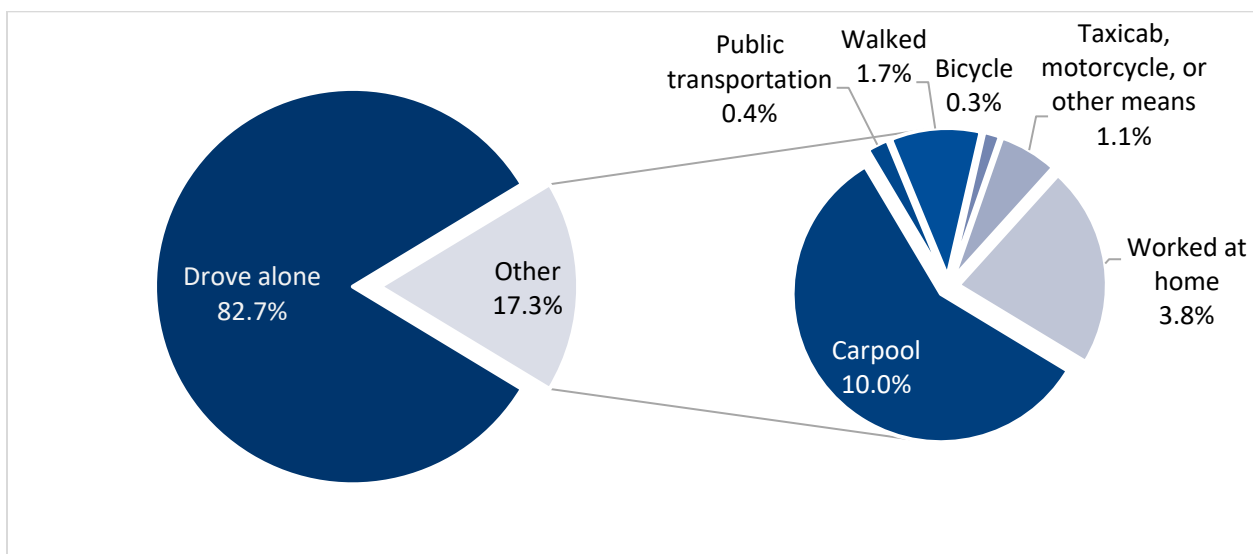
The following section provides an overview of the economic and social factors than can influence future demands on the transportation system.

5.3.1. COMMUTING PATTERNS

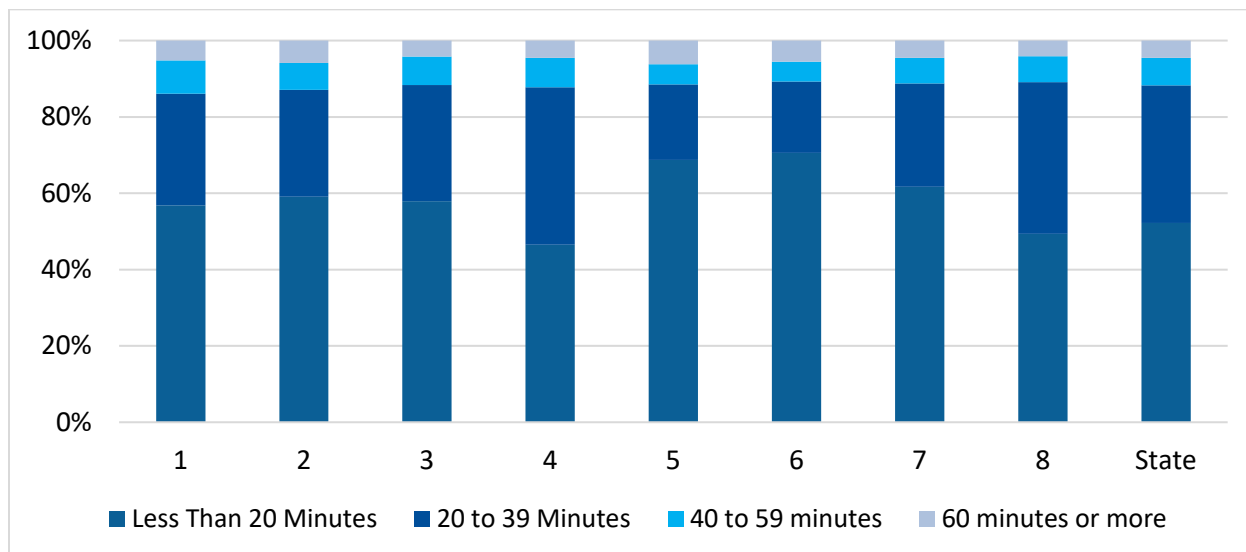
Nearly 83 percent of the state’s population that commutes to work drives alone. Illustrated in **Figure 5-7**, carpooling was the second most common mode of transportation. Collectively, these two modes equate to over 92 percent of workers’ commutes in Oklahoma.

Over 17 percent of commuters used an alternative mode of transportation to get to work including carpooling, public transit, walking, biking, telecommuting or other means. The average travel time to work for Oklahoma workers is 21 minutes (**Figure 5-8**). Except for the metropolitan areas of Oklahoma City and Tulsa, more than half of Oklahoma’s total working population have travel times of less than 20 minutes.

Figure 5-7. Oklahoma Commute by Mode, 2017



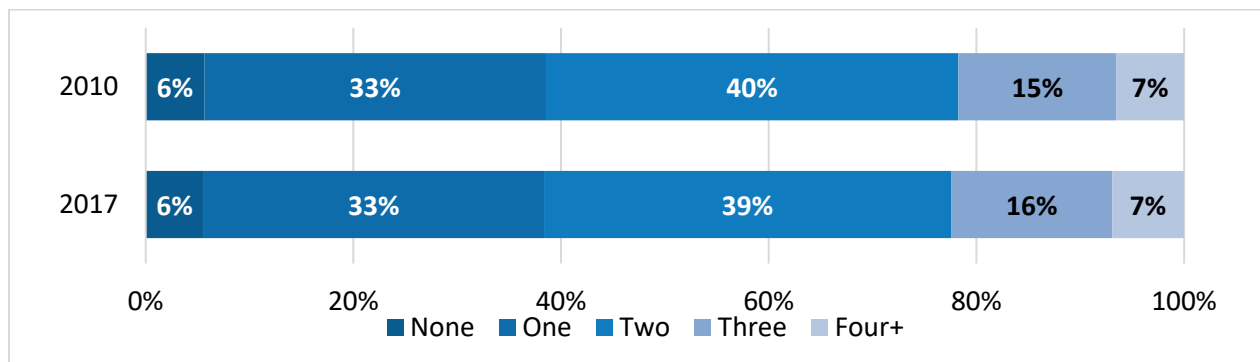
Source: U.S. Census Bureau, 2013-2017 ACS 5-Year Estimates

Figure 5-8. Travel Times to Work by Oklahoma DOT District, 2017


Source: U.S. Census Bureau, 2013-2017 ACS 5-Year Estimates

5.3.2. VEHICLE AVAILABILITY

Between 2010 and 2017, vehicle availability per household has remained relatively unchanged, though a slightly higher percentage of households now have three vehicles available as opposed to two (**Figure 5-9**). In 2018, Oklahoma registered approximately 3.1 million vehicles (Oklahoma Tax Commission Motor Vehicle Division, 2018), or approximately 2.13 vehicles per household.²

Figure 5-9. Percentage of Oklahoma Households by Vehicles Available


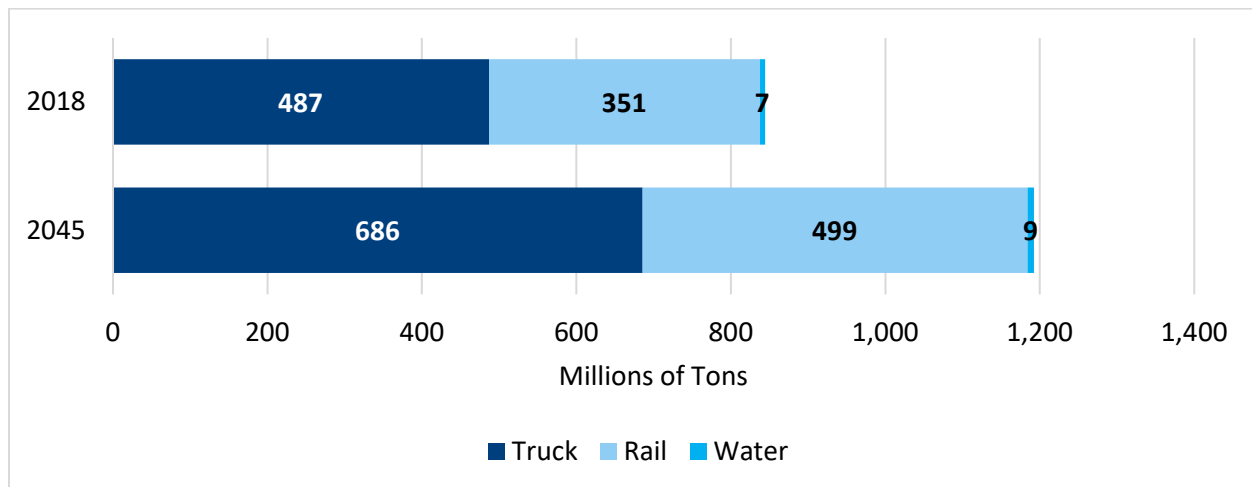
Source: U.S. Census Bureau, 2006-2010 ACS and 2013-2017 ACS 5-Year Estimates

² Based on U.S. Census Bureau's American Community Survey (ACS) 5-Year estimate of 1,468,971 households in Oklahoma.

5.3.3. FREIGHT

Oklahoma's multimodal freight transportation system consists of freight rail, highways, ports and waterways, and airports. The most dominant modes of freight transportation in Oklahoma are truck (58 percent), followed by rail (41 percent) and water (1 percent). Between 2018 and 2045, truck and rail freight tonnage are projected to grow by over 40 percent (**Figure 5-10**). Water freight tonnage is expected to experience a similar amount of growth at just over 30 percent.

Figure 5-10. Projected Oklahoma Freight Tonnage by Mode



Source: Oklahoma Freight Transportation Plan 2018-2022 (2017)

5.3.4. E-COMMERCE

Electronic commerce, or 'e-commerce,' is a modern approach to business that addresses the needs of business organizations, vendors, and customers to reduce cost, improve the quality of goods and services, and increase the speed of delivery. Oklahoma continues to see a surge in e-commerce retail sales, which is aligned with national trends. The number of distribution centers across the state is projected to rise as companies seek to place their goods closer to cities, or the points of greatest consumption.

5.4. EMERGING TRENDS

This section focuses on trends that are still evolving, particularly related to technology, that are highly likely to have significant impacts in the future of transportation. The topics discussed in this section include electric vehicles (EV), compressed natural gas (CNG) vehicles, Oklahoma's alternative fuel corridors, connected and autonomous vehicles (CAVs), truck platooning, and mobility as a service (MaaS).

5.4.1. ELECTRIC VEHICLES (EV)

EV adoption varies significantly across the country and the world. While international adoption does not directly affect Oklahoma's local transportation systems, increasing global investments are improving the technology and reducing its price. In 2018, EVs accounted for 0.35 percent of the 2,683 vehicles sold in Oklahoma. Since the first year of EV sales, a total of less than 5,000 EVs have been sold in Oklahoma, placing the state 28th in the country for total EV sales. **Table 5-2** lists the sales of EVs in 2018 in number of units, as well as percentage of light-duty vehicles sold.

EVs are an emerging technology that is highly dependent on state and federal policies, disruptions in supply chains, as well as changes in social behavior. Between 2017 and 2018, Oklahoma experienced the largest percent increase in sales of EVs of any state in the country, with sales increasing by 250 percent. However, EV sales were still less than half a percent of all vehicle sales in the state. Reductions in emissions are a key selling point for EVs. In terms of emissions produced, driving an EV in Oklahoma is equivalent to driving a 49 mpg gasoline-run vehicle.

There are currently a variety of incentives and programs available from both state and federal sources regarding EVs and EV infrastructure. The following is a list of some of the more prominent programs:

- Federal EV tax credit³
- Oklahoma tax credit for alternative fueling infrastructure⁴
- Oklahoma owned/operated alternative fueling infrastructure⁵
- CLEAN AIR Grants for public fleets
- ChargeOK Electric Vehicle Supply Equipment Grants

³ Reference Public Law 112-240, Section 403; and 26 US Code 30D

⁴ Oklahoma Statutes 68-2537.22

⁵ Oklahoma Statutes 74-78 and 74-130.2

In addition to these incentives, Oklahoma offers a simplified EV charging business model, allowing companies to sell electricity for EV charging without regulations from the framework that governs utilities.

As EV sales continue to surge in Oklahoma, there will be a growing need for EV infrastructure. The current lack of available charging stations is considered a significant hindrance to the future adoption of EVs. Oklahoma currently has 236 publicly available charging stations. The charging stations are primarily concentrated in Oklahoma City, Tulsa and along I-40 and I-44, however the network has been expanded to serve nearly all regions of the state including the panhandle (**Figure 5-11**). These stations feature primarily level 2 chargers, or standard fast-charging, with a small number of level 3, or DC fast-chargers, along the interstates. Oklahoma Gas and Electric (OG&E) has partnered with OnCue to develop a pilot installation of a level 3 charging station at their Yukon location.

To offset a potential reduction in gas tax revenue, the state is considering the two following EV funding methods: (1) adopting a flat vehicle registration fee for EVs, and (2) a road use charge (RUC). These methods are common techniques to help alleviate concern that EVs will reduce revenues dependent on the gas tax. A RUC, also known as a mileage-based user fee (MBUF), determines taxes owed based on miles driven. A growing number of states have enacted EV fees, including Oklahoma. However, Oklahoma's fee was ultimately ruled unconstitutional by the Oklahoma State Supreme Court.

Table 5-2. Electric Vehicle Sales 2018

Location Vehicle Type	Oklahoma		United States		Global	
	Sales	Percent of Sales	Sales	Percent of Sales	Sales (mil)	Percent of Sales
Battery Electric Vehicle	2,402	0.31%	203,625	1.21%	1.45	1.5%
Plug-in Hybrid Electric Vehicle	281	0.04%	124,493	0.74%	0.65	0.7%
Total	2,683	0.35%	328,118	1.95%	2.1	2.2%

Sources: Auto Alliance 2019, EV-volumes.com 2019

Figure 5-11. Public EV Charging Stations in Oklahoma

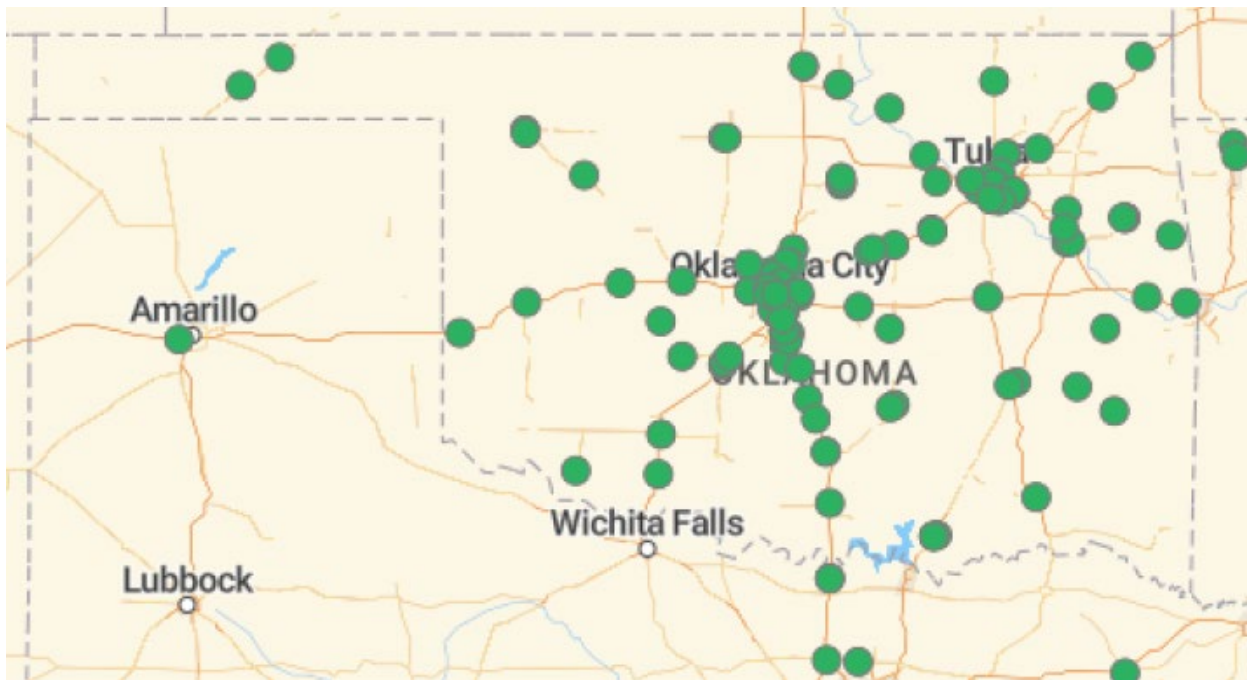


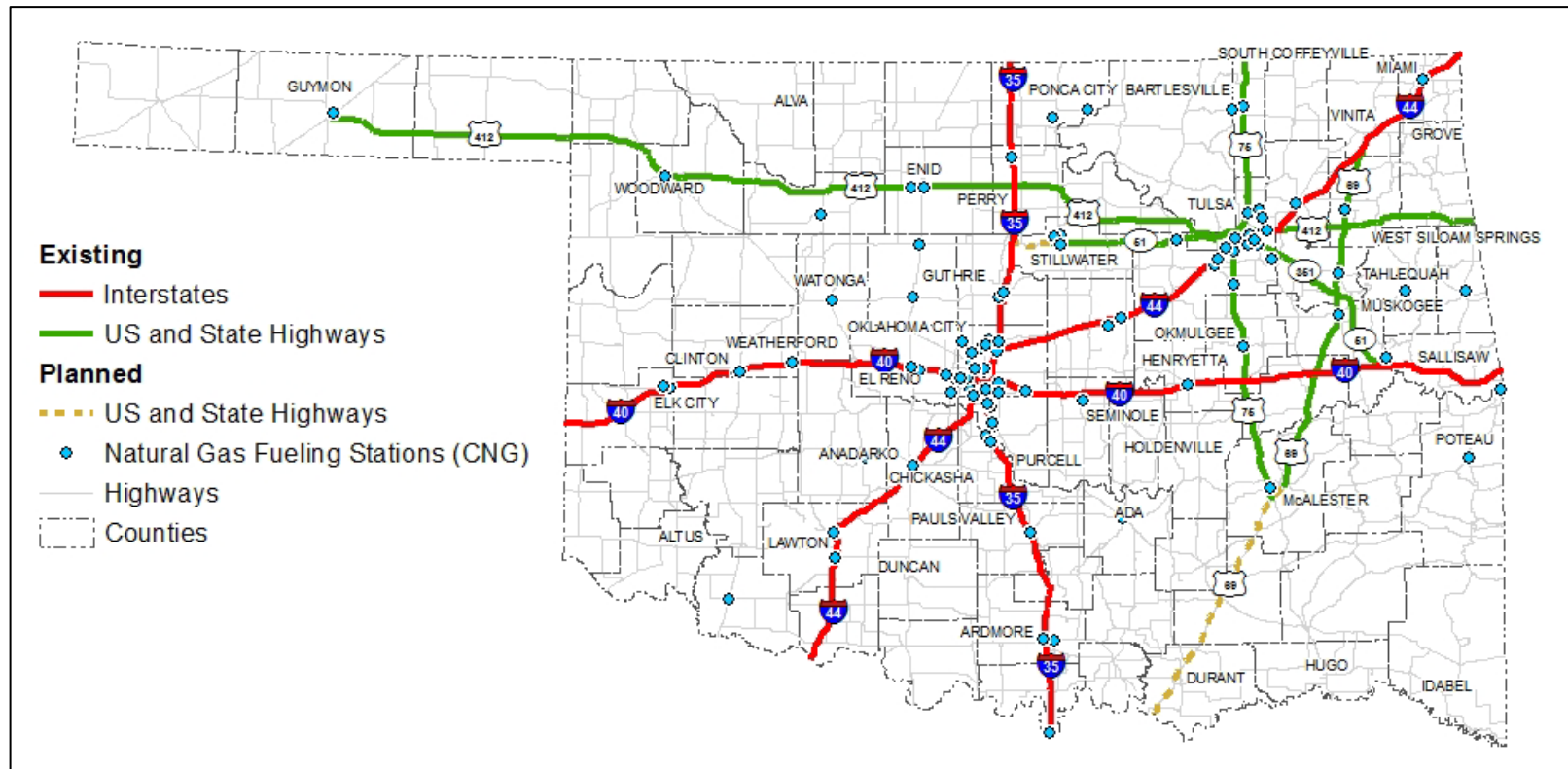
Image Source: Alternative Fuels Data Center (2020)

5.4.2. COMPRESSED NATURAL GAS (CNG) VEHICLES

Oklahoma ranks third nationally in natural gas production and second for the number of CNG stations. Considered a low-carbon and cleaner-burning fuel than petroleum, natural gas has the potential to reduce greenhouse (GHG) emissions. As such, the state may adopt an increasing number of CNG fleet vehicles as an alternative to gasoline or diesel-powered vehicles. Limited market attention on CNG vehicles has made it difficult to project future adoption by private individuals. However, the 2019 adoption of House Bill 2095 provides a tax credit to private individuals who convert their current vehicles to run on CNG or purchase vehicles that already run on this alternative fuel. These tax credits will be available from 2020 to 2027. **Figure 5-12** illustrates current CNG corridors in Oklahoma.

Increased availability and use of CNG vehicles are largely reliant on the availability of CNG fueling stations, which have a high upfront cost and a continued need for public demand to offset these costs. **Figure 5-13** shows the location of the CNG fueling stations and the CNG alternative fuel corridors, which includes I-35, I-40, I-44, SR-51, SR-351, US-69, US-75, US-412.

Figure 5-12. CNG Corridors in Oklahoma



Source: FHWA Alternative Fuels Corridors, 2016-2018

Figure 5-13. CNG Fueling Stations in Oklahoma

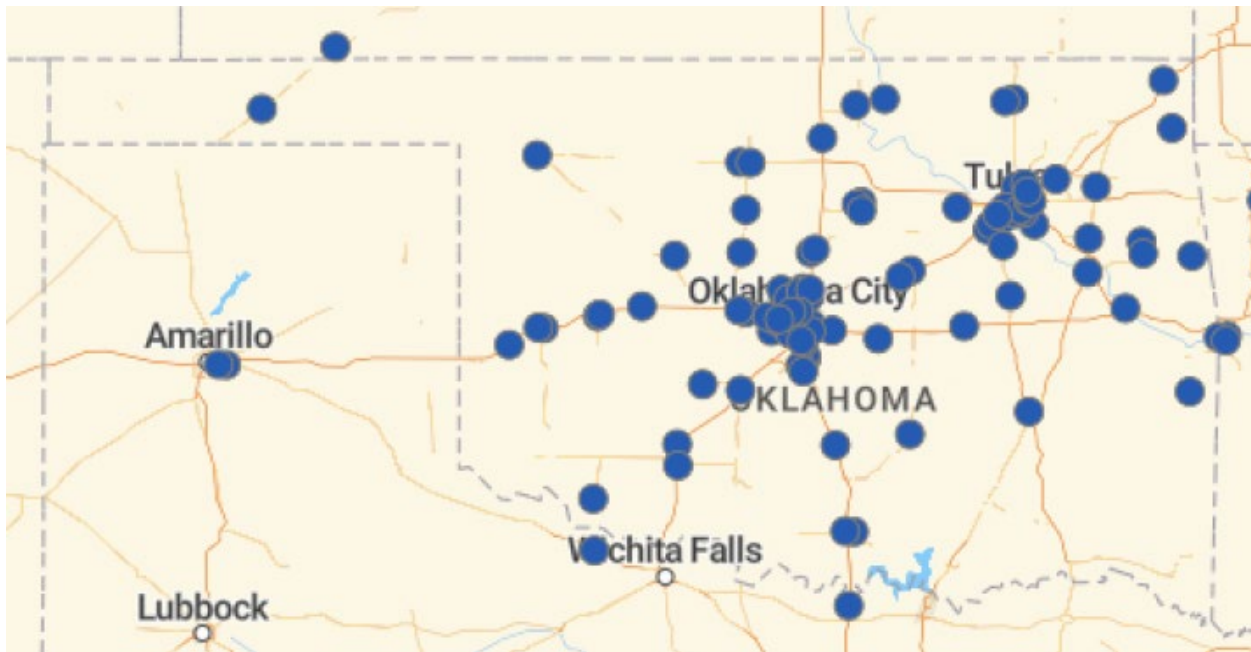


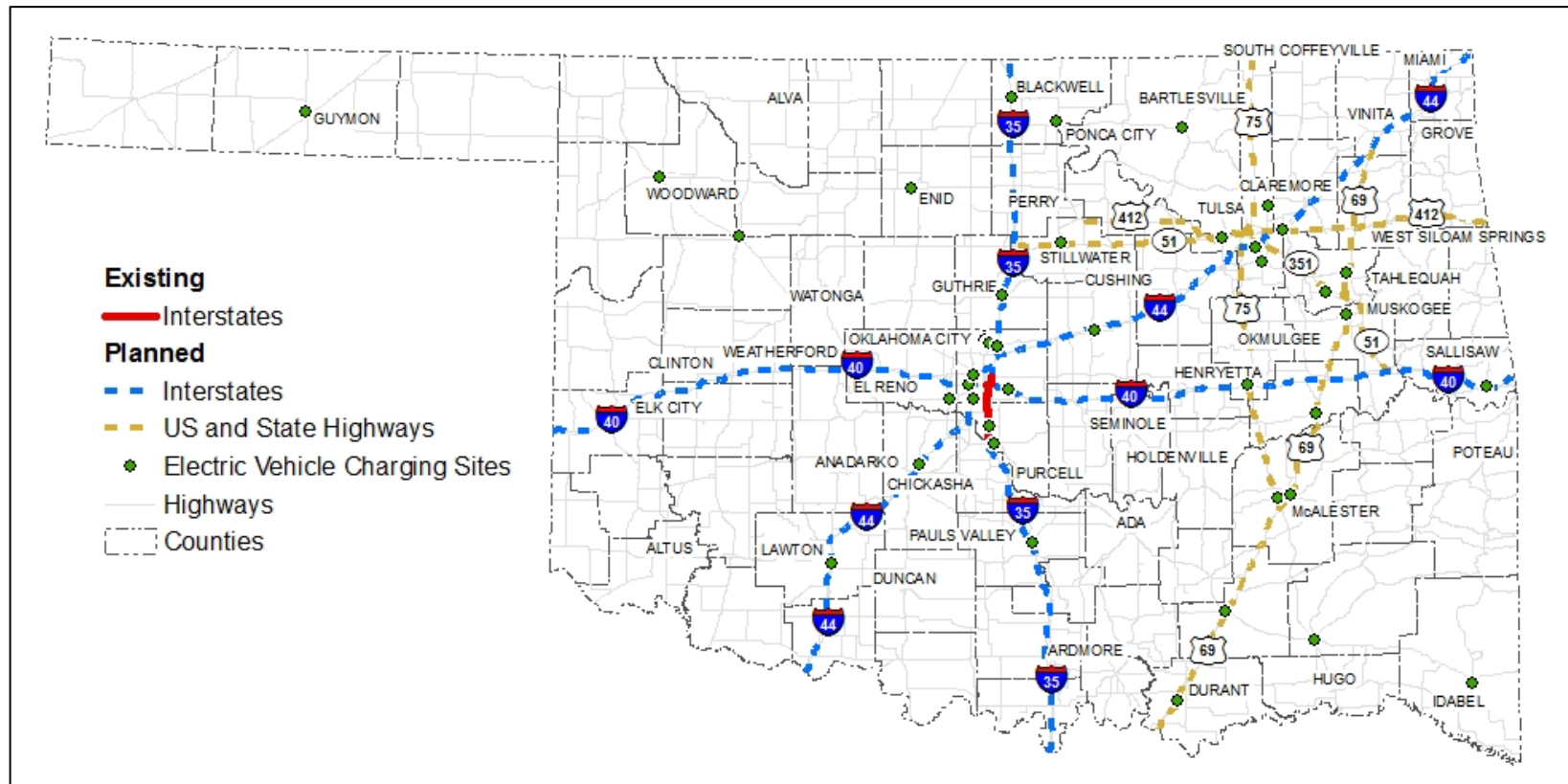
Image Source: Alternative Fuels Data Center (2020)

5.4.3. ALTERNATIVE FUEL CORRIDORS

The U.S. Department of Transportation (DOT) has designated national plug-in electric vehicle charging and hydrogen, propane, and natural gas fueling corridors to improve alternative fuel vehicle mobility. The U.S. DOT solicited nominations from state and local officials and worked with industry stakeholders to designate corridors. Within five years of the establishment of the alternative fuel corridors, and every five years thereafter, U.S. DOT will update and redesignate the corridors.

With an extensive network of EV and CNG fueling stations, Oklahoma is working to designate multiple roadways as alternative fuel corridors. According to the U.S. Department of Transportation, alternative fuel corridor designations currently cover over 135,000 miles of the National Highway System (NHS) network. **Figure 5-14** illustrates Oklahoma's current EV network, which includes I-35, I-40, I-44, SR-51, SR-351, US-69, US-75, US-412.

Figure 5-14. Alternative Fuel Corridors in Oklahoma



5.4.4. CONNECTED AND AUTOMATED VEHICLES (CAV)

Vehicle connection and vehicle automation each have individual benefits and challenges but elicit the most benefit when combined. While the technologies that will allow for broad adoption of CAVs are still being developed, the pace of adoption in Oklahoma will depend largely on the speed of technological advancement within the state and across the country. Cities across the state and the U.S. are taking the lead on implementing CAV technologies. The City of Tulsa has created an Urban Mobility Innovation Team to advise business and government leaders on policy and technical issues related to adoption of CAVs. The team will inform the city's Strategic Mobility Plan.

Autonomous vehicles (AVs) are currently being deployed in various pilot programs across the country. **Figure 5-15** illustrates the Society of Automotive Engineers' (SAE) five levels of autonomy. Level 1 and 2 driver-assist features are becoming standard options on many new vehicles and include adaptive cruise control, lane keep assist, and parking assist systems. Levels 3 through 5 include fully autonomous vehicles that can drive on their own. These levels differ in the duration for which they can fully drive the vehicle, referred to as their 'operational domain.'

Compared to AVs, connected vehicle (CV) technology is a much broader set of technologies. Route navigation, as well as cellular or satellite connection, all fall into this category. Vehicle-to-everything (V2X) technology is commonly considered when discussing CVs. V2X includes communication between vehicles and any entity that may affect the vehicle, such as other vehicles, pedestrians, and infrastructure. This technology can provide vehicles with the information needed to make automated tactical driving decisions such as lane changing, accelerating, braking, and turning.

Many states have begun establishing legislation in anticipation of the arrival of CAVs, including Oklahoma. Oklahoma's current legislation sets requirements for AV testing and removes following distance requirements to allow for truck platooning.

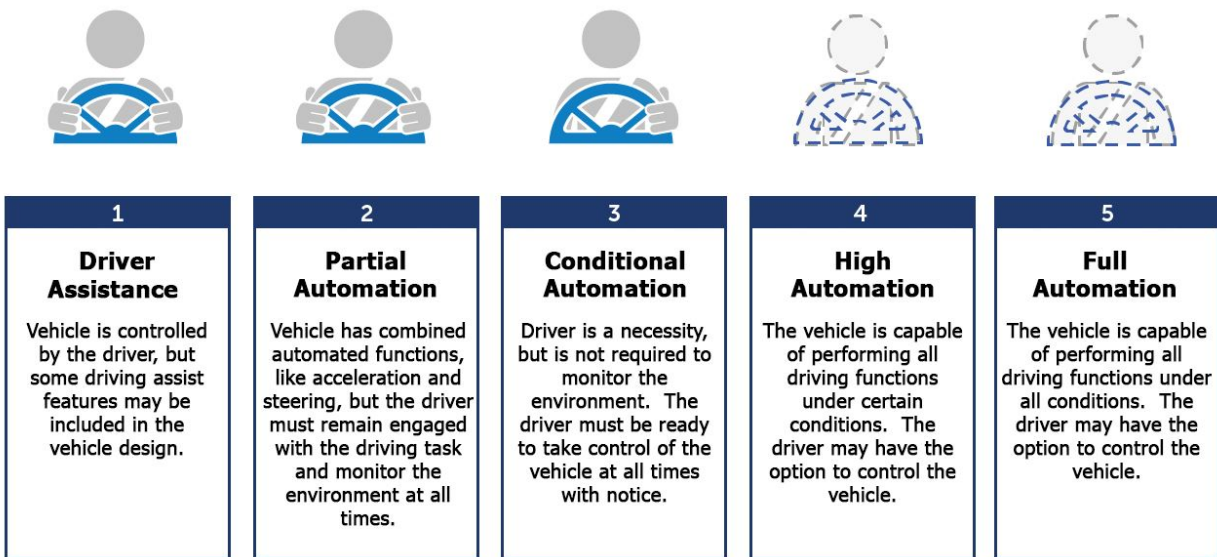
Figure 5-15. SAE Levels of Driving Automation


Image Source: SAE International, National Highway Traffic Safety Administration

5.4.5. MOBILITY AS A SERVICE

The use of MaaS is not a new concept. Transit and ride-sharing services have been a staple in transportation offerings but can become limited by location or specific use. MaaS looks to achieve a comprehensive transportation offering across a variety of technology platforms, including mobile applications that allow users to plan and pay for transportation services, Global Positioning System (GPS) to track both users and vehicles, and ultimately CAVs to offer travel through vehicles without having to pay for the cost of drivers. The framework to deliver MaaS is illustrated in **Figure 5-16**. Adoption of MaaS in Oklahoma and across the country could have significant implications on future transportation offerings, including rural mobility options and dedicated areas for MaaS users.

Figure 5-16. MaaS Framework

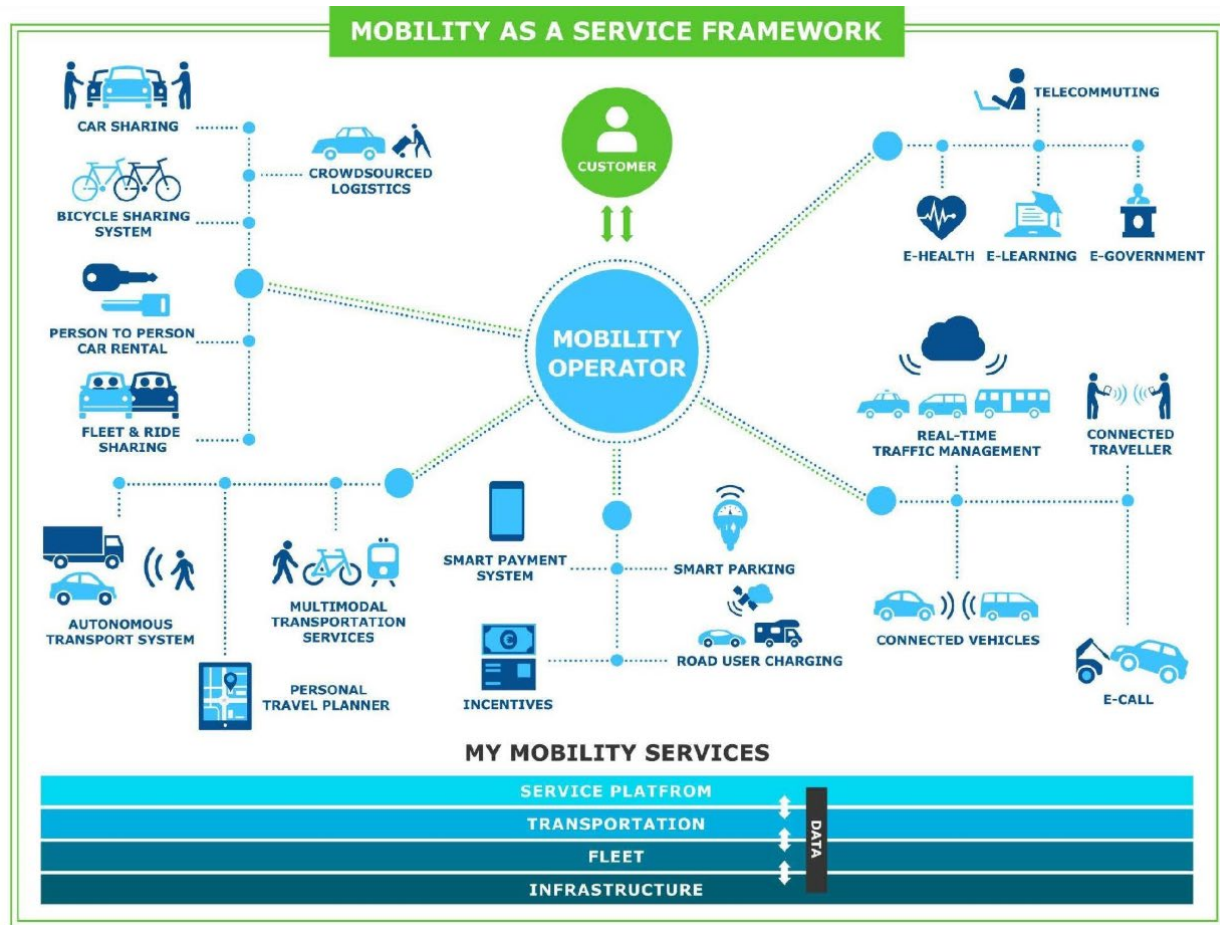


Image Source: TelematicsWire.Net



OKLAHOMA Transportation

CHAPTER 6: SAFETY, SECURITY, RISK, AND RESILIENCY



6.1. INTRODUCTION

Safety is a primary concern in long range transportation planning, with historical trends informing both progress from and potential for transportation strategies. ODOT's analysis of safety performance measures to be included in the 2019 Oklahoma HSIP serves as a primary reference for this section. This section also addresses the security of the transportation system, particularly as it relates to the introduction of new technology and the resulting risks. Understanding the risks associated with these hazards is key in planning for resilient systems.

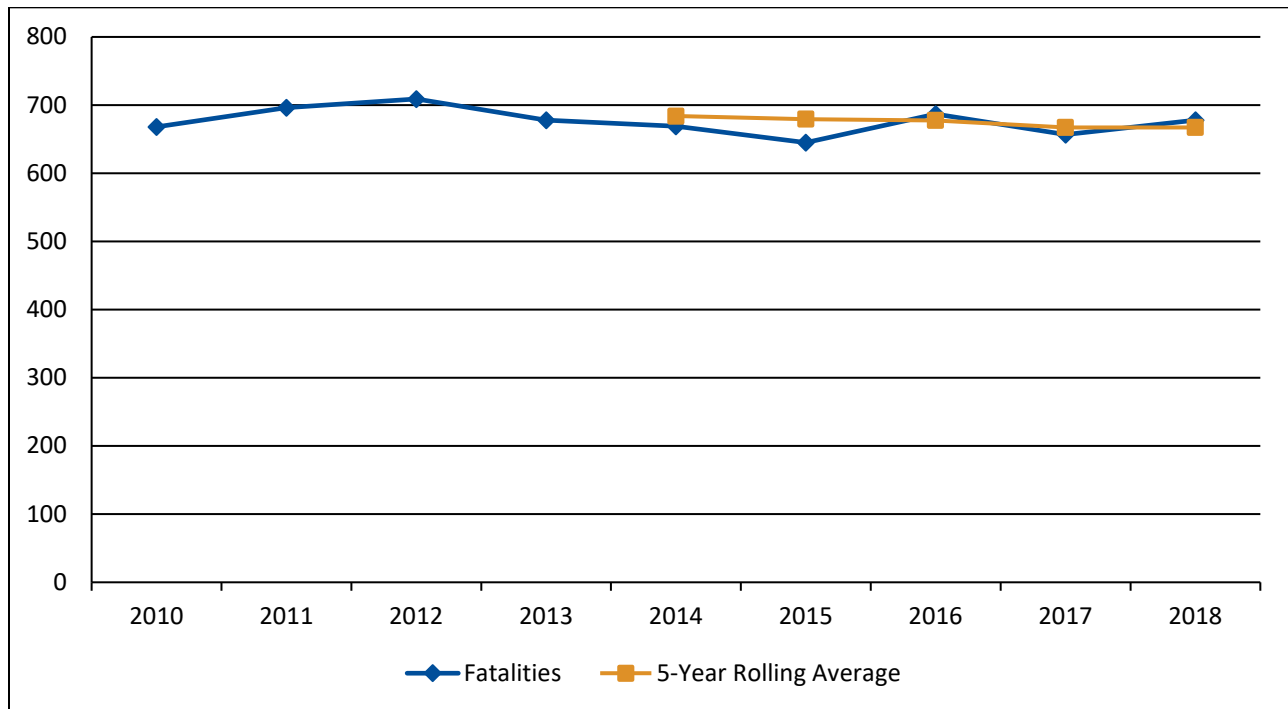
6.2. SAFETY

Improved transportation safety is a primary goal in Oklahoma and for the 2045 LRTP. ODOT values life and strives to minimize traffic fatalities and serious injury crashes. This section discusses ODOT's safety performance measures.

6.2.1. FATALITIES

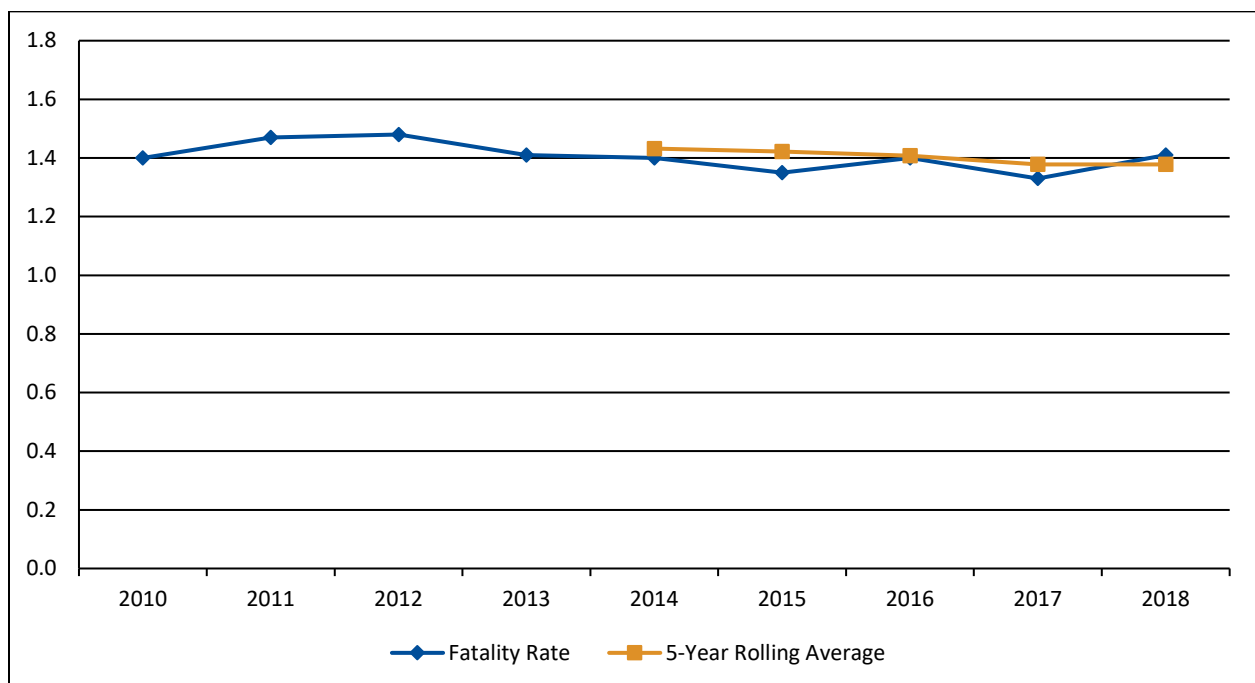
Oklahoma's fatality rate (number of fatalities per 100 million vehicle miles traveled (HVMVT) and the number of traffic related fatalities have generally trended down since 2014 after peaking in 2012 (**Figure 6-1** and **Figure 6-2**). However, when compared against larger goals identified in Oklahoma's Strategic Highway Safety Plan (SHSP), the five-year averages for fatalities in the areas of pedestrians and older drivers have increased during this period (**Figure 6-3**).

Figure 6-1. Fatalities on Oklahoma Public Roads

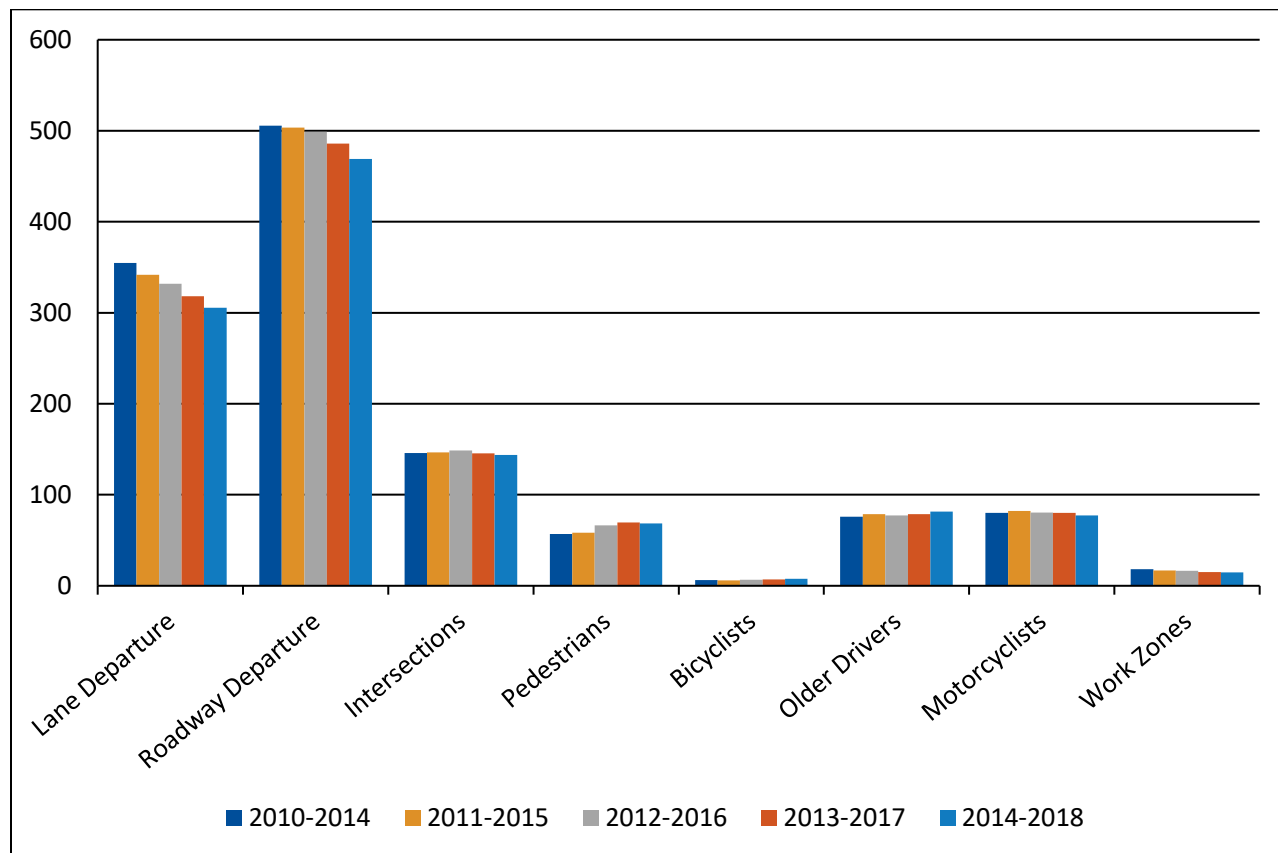


Source: ODOT Analysis, August 2019

Figure 6-2. Fatalities per HMVMT on Oklahoma Public Roads



Source: ODOT Analysis, August 2019

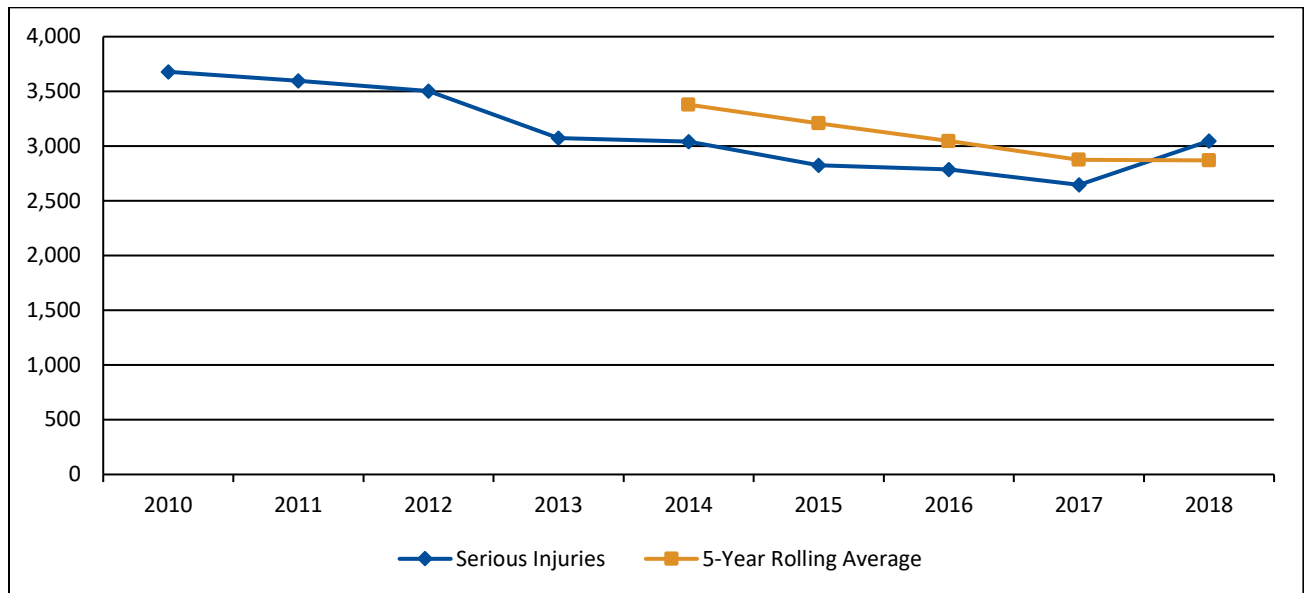
Figure 6-3. 5-Year Average for Fatalities by SHSP Emphasis Area


Source: ODOT Analysis, August 2019

6.2.2. SERIOUS INJURIES

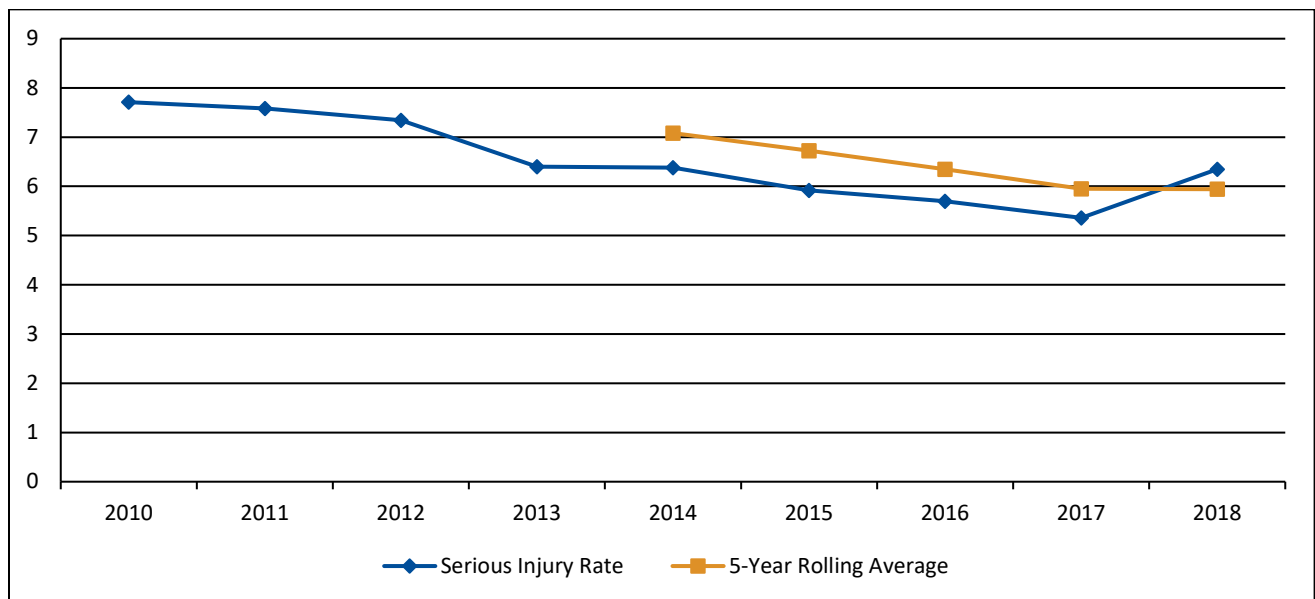
Similar to fatalities, the five-year rolling averages for serious injuries, both total and per HMVMT, have decreased since 2014, despite increases in both measures in 2018 (**Figure 6-4** and **Figure 6-5**). The 2018 five-year averages for serious injuries have decreased in all SHSP emphasis areas compared to 2014 (**Figure 6-6**).

Figure 6-4. Serious Injuries on Oklahoma Public Roads

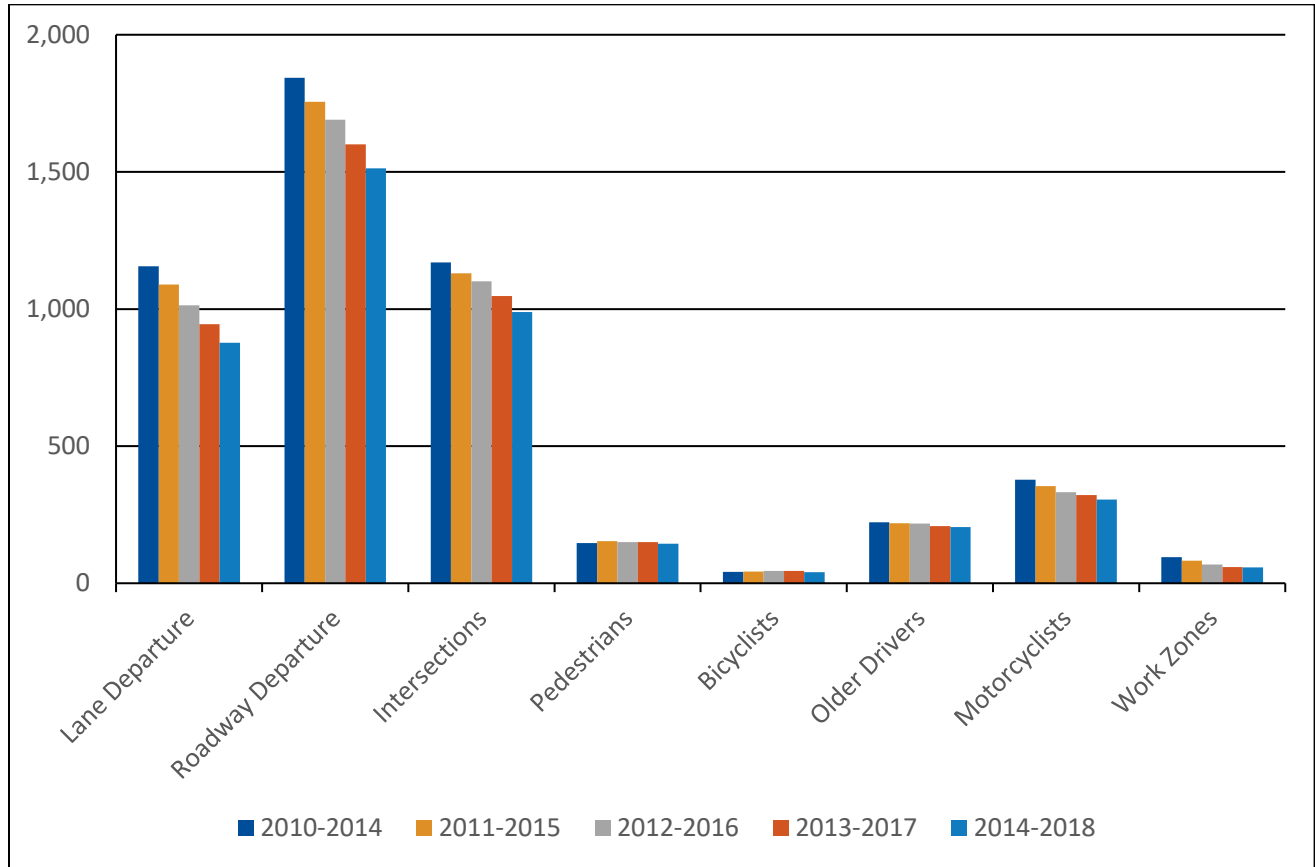


Source: ODOT Analysis, August 2019

Figure 6-5. Serious Injuries per HMVMT on Oklahoma Public Roads



Source: ODOT Analysis, August 2019

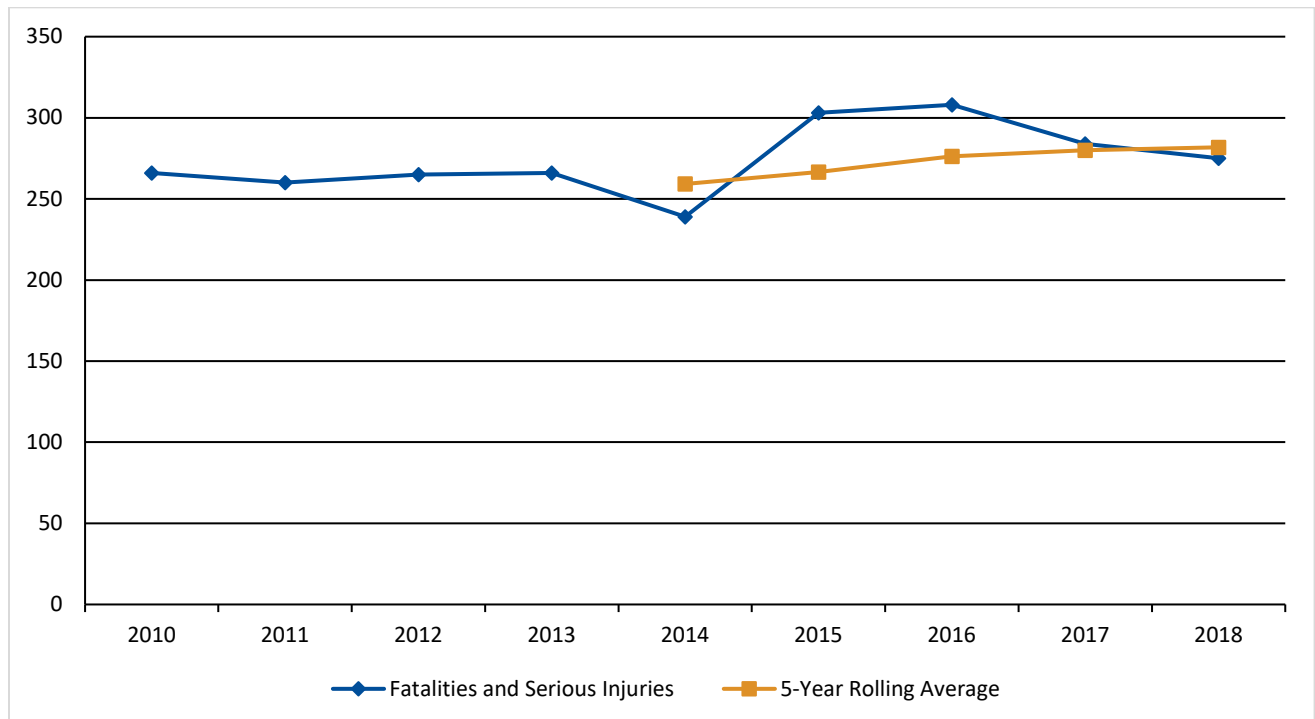
Figure 6-6. 5-Year Average for Serious Injuries by SHSP Emphasis Area


Source: ODOT Analysis, August 2019

6.2.3. PEDESTRIAN AND BICYCLE SAFETY

In reporting safety data, incidents involving both pedestrian and bicyclists are covered under non-motorized fatalities and non-motorized serious injuries as defined by the Fatality Analysis Reporting System (FARS)⁶ and the American National Standard Institute (ANSI). **Figure 6-7** shows that the five-year average for non-motorized fatalities and non-motorized serious injuries has increased slightly from 2014, though total incidents have decreased from a peak in 2016.

⁶ FARS is a nationwide census containing data on fatal injuries suffered in motor vehicle traffic crashes created by the National Highway Traffic Safety Administration (NHTSA).

Figure 6-7. Total Non-Motorized Fatalities and Non-Motorized Serious Injuries


Source: ODOT Analysis, August 2019

6.3. SECURITY

Providing safety and security on Oklahoma’s transportation system is critically important and requires collaboration between numerous federal, state, and local agencies. ODOT works with the Oklahoma Department of Emergency Management (OEM) to respond to emergencies and natural disasters during times of crisis and to maintain the functions of vital assets. Cybersecurity will also increase in importance as more emerging technologies become operational.

6.3.1. CYBERSECURITY

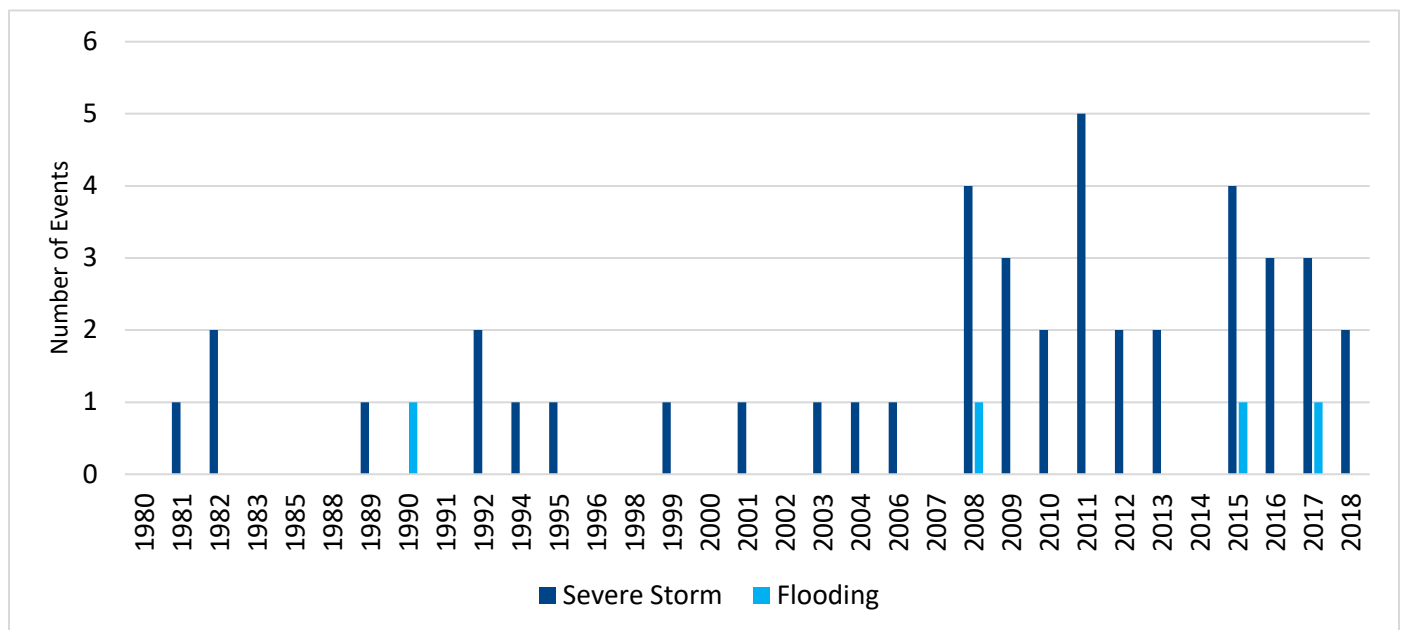
When introducing technology into the transportation infrastructure, cybersecurity concerns should be addressed. The advancement of intelligent transportation systems (ITS), which play a critical role in supporting safety and security during disasters, as well as the emergence of transportation trends identified in Chapter 5, are increasingly significant when discussing long term needs of Oklahoma’s transportation system.

6.3.2. SEVERE WEATHER EVENTS

Since 1980, the U.S. has experienced a growing number of billion-dollar disasters, mostly attributed to severe weather-related events. These severe weather events, including extreme heat, tornadoes, and high-intensity rain, impact Oklahoma's multimodal transportation system.

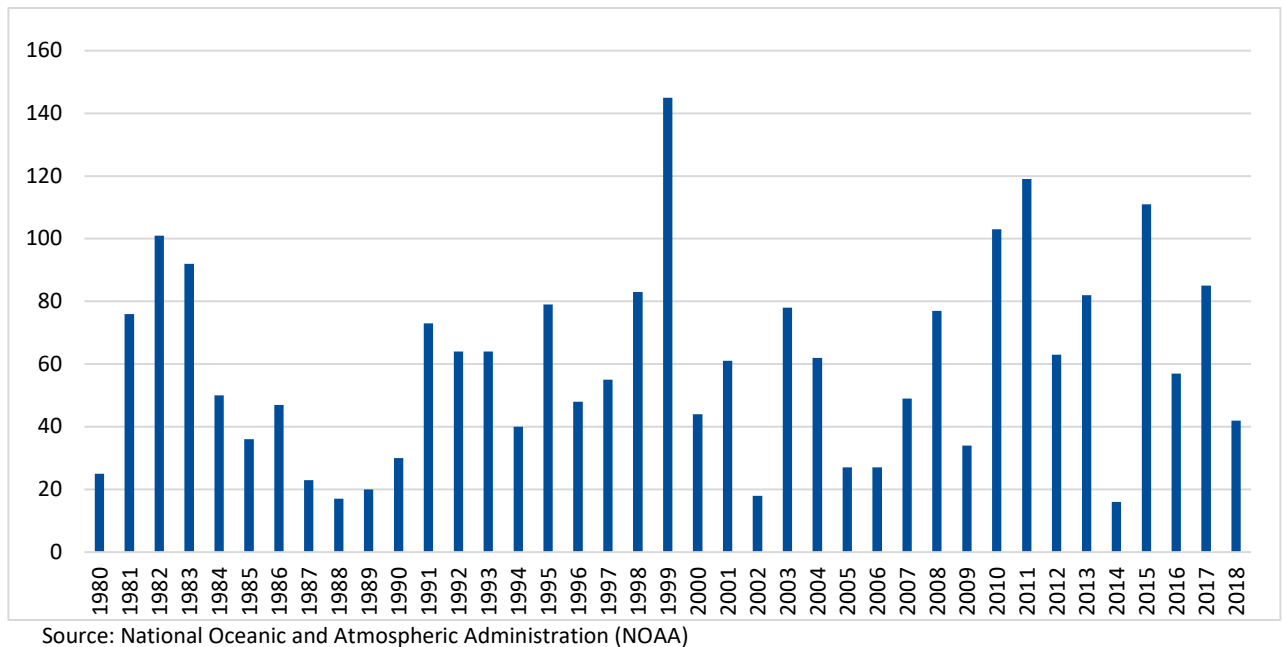
Between 2008 and 2018, Oklahoma saw a surge in billion-dollar disasters resulting from flooding and severe storms (**Figure 6-8**), as well 159 tornadic events of an EF2 or greater⁷. **Figure 6-9** demonstrates the frequency of tornadoes.

Figure 6-8. Billion-Dollar Disaster Events in Oklahoma from Flooding and Severe Storms, 1980 to April 9, 2019 (Inflation Adjusted)



Source: National Oceanic and Atmospheric Administration (NOAA)

⁷ The EF-Scale, or Enhanced Fujita Scale, is a rating of how strong a tornado was and is calculated by comparing the tornado's damage to similar objects at certain wind speeds.

Figure 6-9. Tornadoes in Oklahoma, 1980 to 2018


6.3.3. SEISMIC ACTIVITY

In addition to the weather-related events, Oklahoma also faces the risks of earthquakes. A significant increase in seismic activity has been observed in Oklahoma since 2009. The U.S. Geological Survey (USGS) and Oklahoma Geological Survey (OGS) recorded 887 magnitude three or higher (M3+) earthquakes in 2015, an almost 52 percent increase from 2014. However, the number of events has decreased since 2015, with 639 and 272 earthquakes M3+ recorded in 2016 and 2017, respectively. This decrease can be attributed to a reduction in wastewater injections following tightened regulations on fracking.

In 2017, ODOT began using the USGS's ShakeCast program to assist in its efforts to prioritize bridge inspections immediately following an earthquake. **Figure 6-10** shows areas in the state with potential seismic activity along with chances for damage caused by shaking.

Figure 6-10. Oklahoma Area Seismicity and Chance of Damaging Shaking

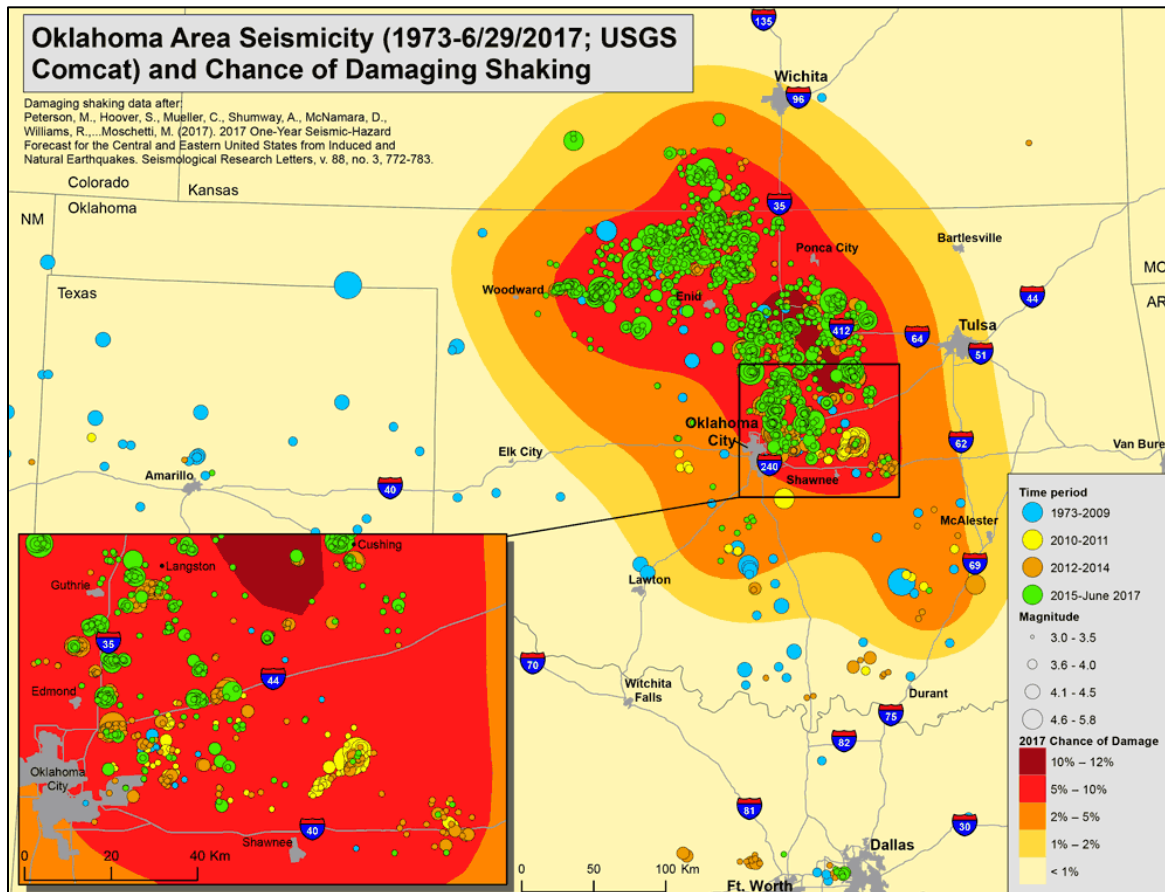


Image Source: U.S. Geological Survey (2017)

6.4. ENVIRONMENTAL MITIGATION

Environmental regulations require FHWA and other transportation agencies to consider potential environmental impacts to the social, cultural, and natural environment, while considering the public's need for safe and efficient transportation.

ODOT works with the FHWA to comply with the National Environmental Policy Act of 1969 (NEPA) and other environmental regulations and requirements. ODOT strives to constantly improve upon compliance with environmental rules and regulations, using a stewardship approach toward the environment. Environmental impacts are a consideration in delivering the Eight Year CWP as part of operating and maintaining an efficient statewide transportation system.

6.4.1. PROTECTION OF NATURAL, CULTURAL, AND HISTORIC RESOURCES

To meet the transportation needs of a growing population and to maintain and improve existing infrastructure, impacts to the natural and cultural environment are often

unavoidable. ODOT strives to continue advancement of proven innovations to reduce environmental impacts, improve the life of transportation assets, lower costs, save lives and improve efficiencies for Oklahoma's transportation system. As such, ODOT's transportation programs and operations continue to evolve to integrate environmental considerations and regulatory requirements. To streamline and minimize potential delays in the environmental process portion of project development efforts, ODOT has instituted a series of programmatic agreements with various entities and resource agencies to define the expectations and roles related to addressing transportation project-associated environmental impacts. Chief among the agreements is a Programmatic Agreement for Processing Categorical Exclusion Actions between FHWA and ODOT.

ODOT also strives to minimize impacts to endangered and threatened species using environmentally friendly construction methods to deliver projects that limit the impact of Oklahoma's transportation system on the natural and cultural environment. ODOT pursues and maintains partnerships with federal agencies such as the U.S. Fish and Wildlife Services and the U.S. Army Corps of Engineers, and routinely holds training and provides assistance for construction personnel to ensure compliance with environmental commitments during construction.

6.4.2. STORMWATER MANAGEMENT

Many transportation infrastructure projects affect wetlands and streams. ODOT has relied on an array of mitigation strategies as an effective way to preserve, enhance, and restore environmental resources. As a best practice, avoidance is the first alternative explored in developing transportation solutions. If impacts to these resources cannot be avoided, the next step is to develop mitigation strategies. These mitigation strategies typically include the acquisition of credits from commercially operated mitigation banks or in lieu fee programs, and consideration of partnership with other state or nonprofit agencies for offsite mitigation. The determination of need and the identification of appropriate mitigation—as early as possible in the transportation planning process—is critical to ensuring that the project can be completed on schedule.

ODOT uses best management practices to control and manage stormwater and maintain water quality. These include structural devices, maintenance procedures, and management practices that prevent or reduce the harmful effects of storm water runoff, such as pollution, erosion, and flooding.



OKLAHOMA Transportation

CHAPTER 7: EXISTING TRANSPORTATION SYSTEMS AND CONDITIONS



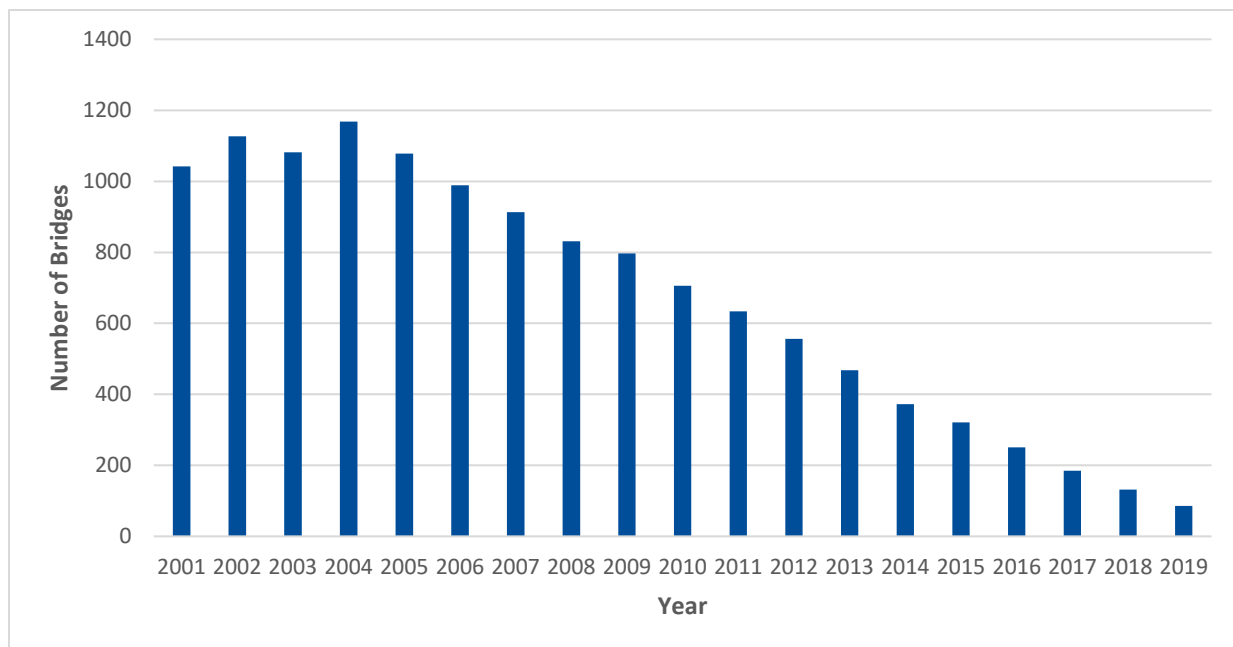
7.1. INTRODUCTION

This section provides an inventory of the multimodal transportation infrastructure of Oklahoma based on existing system data and attributes for the year 2019, unless otherwise noted for bridges, highways, freight rail, ports of entry, ports and waterways, and for public and active transportation facilities.

7.2. BRIDGES

Oklahoma's state highway system reached a peak of 1,168 structurally deficient bridges on the state highway system in 2004. Since the year 2000, when Oklahoma had a high share of structurally deficient bridges, ODOT has prioritized eliminating structurally deficient bridges. After decades of minimal investment in the state's 6,794 bridges, increased state funding has enabled ODOT to reach an improved low of 86 structurally deficient bridges at the end of 2019. This represents a 93 percent reduction in the number of structurally deficient bridges, placing Oklahoma just over 1 percent of structurally deficient bridges. **Figure 7-1** indicates the progress that ODOT has made in reducing the number of structurally deficient bridges.

Figure 7-1. Structurally Deficient Bridges on State Highway System

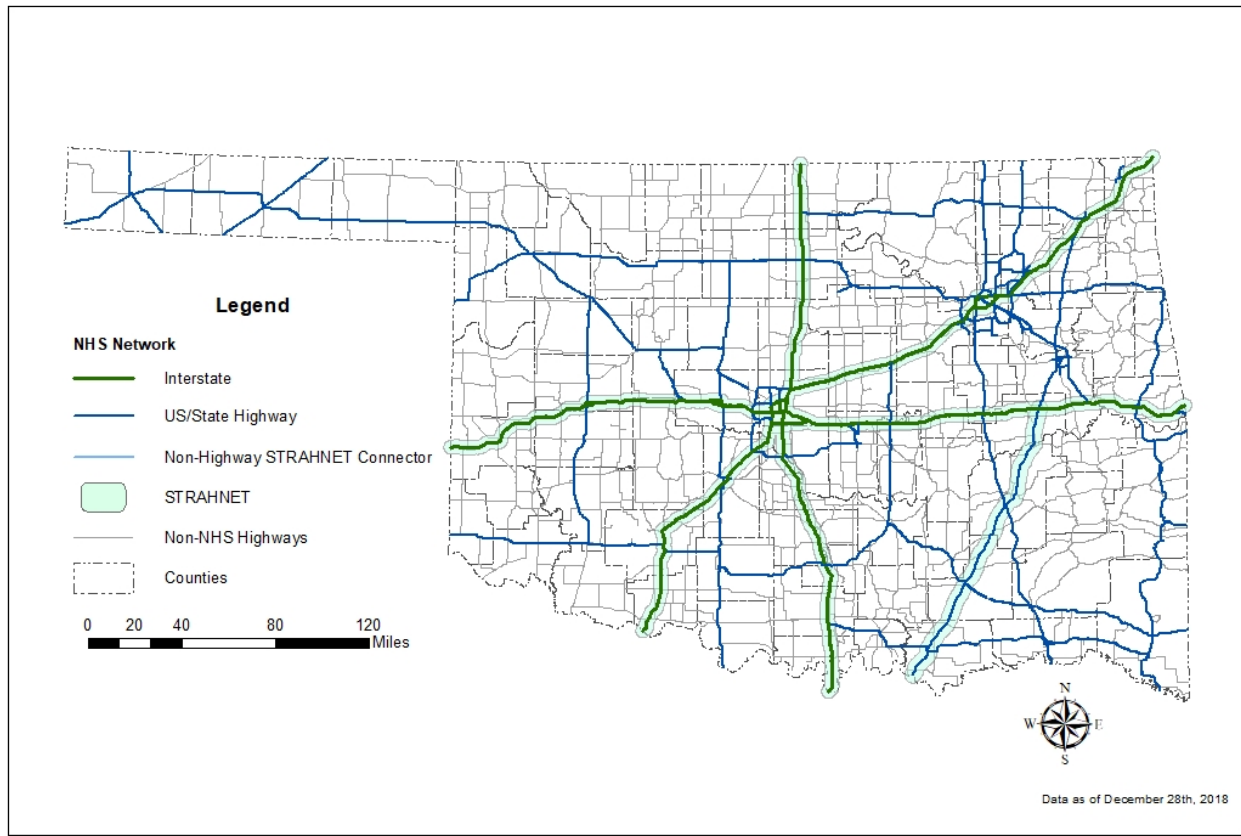


Source: ODOT <https://www.ok.gov/odot/Bridges.html>, (data based on year of the actual inspection)

7.3. HIGHWAYS

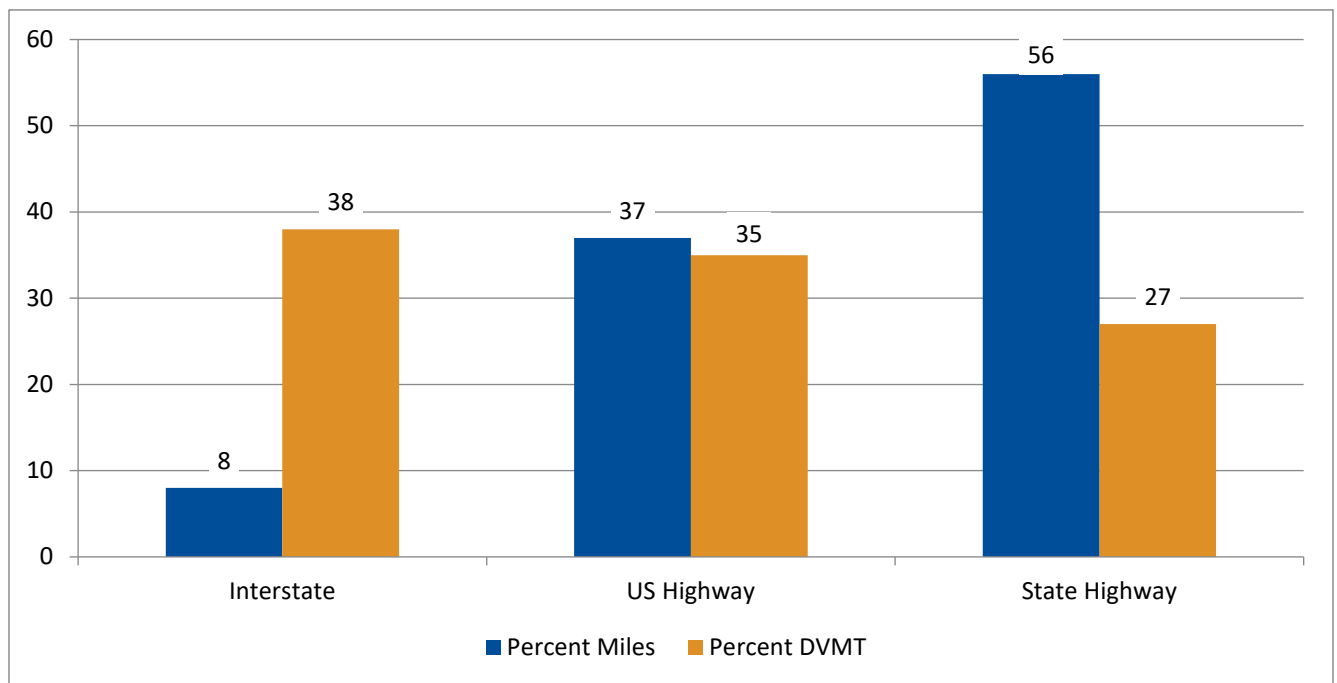
Oklahoma has an extensive highway network which positions the state's system as a link in the national transportation system. Many U.S. Highways and State Highways span Oklahoma, connecting communities and commercial centers. **Figure 7-2** indicates the extent and characteristics of major Oklahoma highways.

Figure 7-2. Major Highways in Oklahoma



Source: ODOT Strategic Asset and Performance Management Division, December 2018

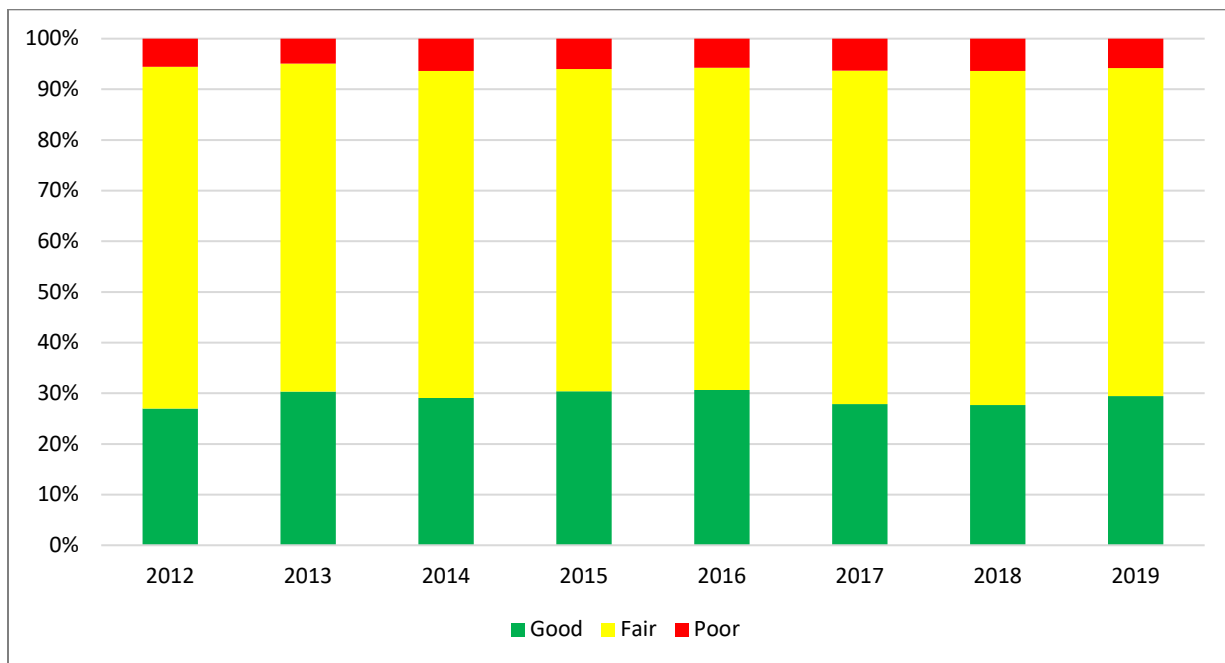
Oklahoma has approximately 116,000 miles of public roads, of which ODOT is responsible for the 12,254 centerline miles of the state highway system. Over 81.7 million miles of travel occur on the state highway system daily. **Figure 7-3** illustrates the type of roadway and displays the daily vehicle miles traveled (DVMT) for highway facilities.

Figure 7-3. Percent of Daily Vehicle Miles Traveled (DVMT) per Highway Type


Source: ODOT Strategic Asset and Performance Management Division, June 2019

The interstate system is a significant component of the state highway system. ODOT is responsible for 673 of the state's 933 interstate miles, with the remaining 260 miles under the responsibility of the OTA as toll facilities. OTA operates ten turnpikes on approximately 606 miles of roadway. As part of the Driving Forward program and an effort to modernize and improve safety, OTA is planning to construct three new turnpikes. This system of turnpikes complements and augments the ODOT-maintained state highway system by providing additional routes and connections to the state highway system through alternative funding solutions.

ODOT strives to combat pavement deterioration as a result of traffic and weather conditions. **Figure 7-4** illustrates the federal pavement condition rating for the entire state highway system. ODOT annually conducts an inspection of the state highway system to better track statewide conditions and trends, and to recommend appropriate pavement treatments. Analysis indicates that the percentage of pavement rated as poor is slightly increasing, and that the amount of pavement indicated as good is slightly decreasing over time. As prescribed in the Eight-Year CWP, ODOT will make improvements to over 1,800 miles of the state highway system.

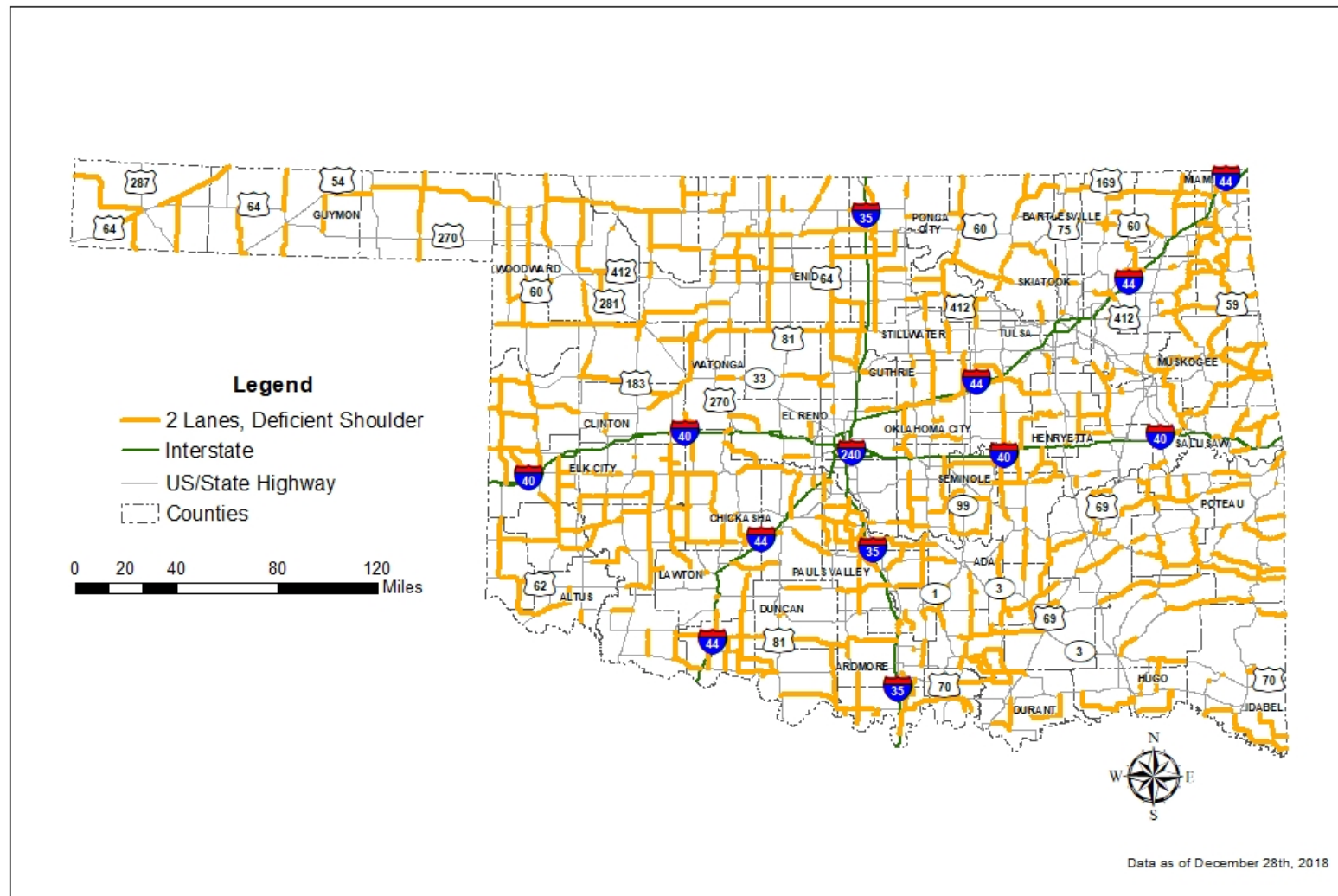
Figure 7-4. Statewide State Highway System Pavement Condition


Source: ODOT Strategic Asset and Performance Management Division, June 2019

7.3.1. RURAL TWO-LANE HIGHWAYS

Oklahoma rural highways have historically served the state's energy and agricultural-based economy. However, roads originally developed for farm-to-market purposes no longer meet the needs or expectations associated with a modern transportation network. Developing innovative transportation solutions such as CAVs, combined with the volumes and weights of modern traffic, place increasing demands for uniformity and consistent conditions on roads and highways. Of the over 9,500 miles of rural two-lane highways on the state highway system, approximately 5,399 miles of these are two-lane facilities without paved shoulders. **Figure 7-5** illustrates the extent of the state highway system that remains as two-lane roads with no shoulders.

Figure 7-5. State Highway System Roads with Two- Lanes, Deficient Shoulders



Source: ODOT Strategic Asset and Performance Management Division, December 2018

7.3.2. MAJOR STATE HIGHWAYS

Oklahoma relies upon multilane highways to provide access to the state’s most significant population centers. These facilities serve daily commerce and job access. Multilane highways and interstates carry over 76 percent of daily vehicle miles traveled on the entire state highway system.

7.3.3. INTERSTATE HIGHWAYS

Interstate highways are the highest class of highway and are designed to move significant numbers of people and goods safely and efficiently across the country. Three interstates, I-35, I-40, and I-44 pass through the state, connecting Oklahoma directly to Kansas, Texas, Arkansas, and Missouri, and indirectly to other parts of the country. This network is also designed to provide movement for national defense purposes. The interstate system accounts for approximately 38 percent of the daily vehicle miles traveled on the state highway system.

The condition of interstate highway pavement is evaluated annually to formulate and execute a comprehensive effort at managing pavement conditions. Since 2012, the percentage of pavements in “poor” condition remains small, with an increasing trend of pavements in “fair” condition. This increase is likely attributed to a decrease of pavements in “good” condition (**Figure 7-6**).

Figure 7-6. Federal Interstate Pavement Condition

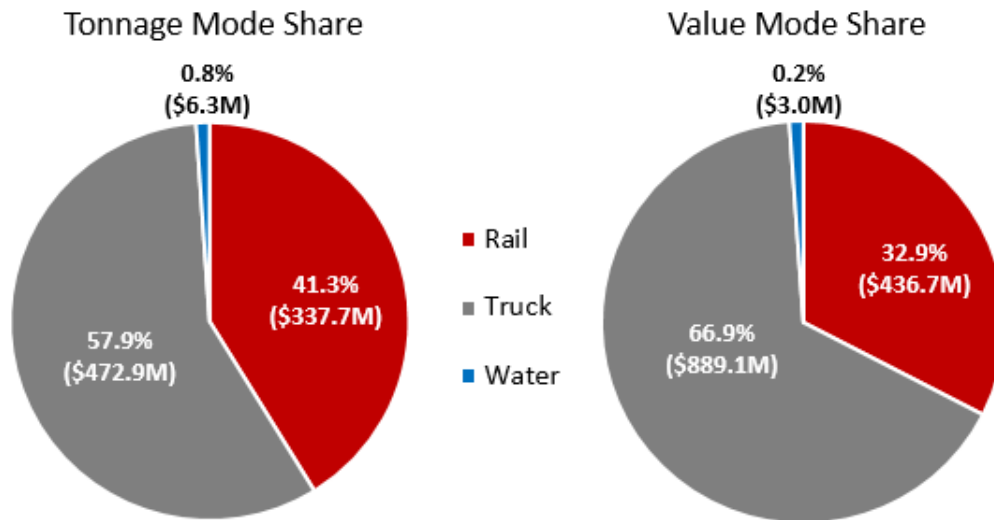


Source: ODOT Strategic Asset and Performance Management Division, June 2019

7.4. FREIGHT TRANSPORTATION

According to the 2018-2022 OFTP, the dominant modes of freight transportation in Oklahoma are truck, rail, and water. **Figure 7-7** from the Freight Plan depicts both the tonnage and value share of Oklahoma freight by mode.

Figure 7-7. Oklahoma Freight Mode Share by Tonnage and Value

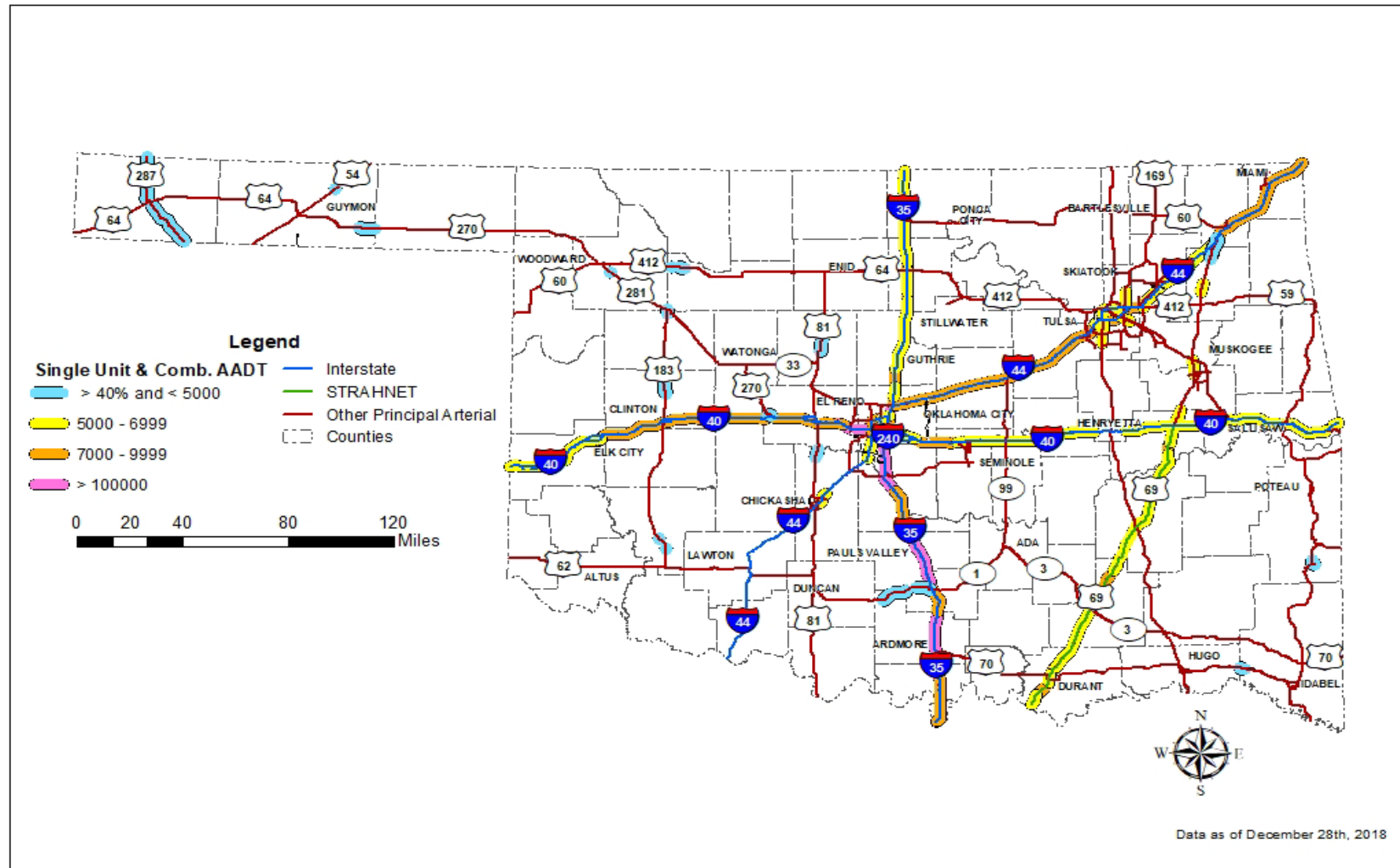


Source: Oklahoma Freight Transportation Plan, 2017

7.4.1. FREIGHT ON HIGHWAYS

ODOT analyzes truck volumes to identify important statewide freight corridors. **Figure 7-8** indicates the High-Volume Truck Corridors, which ODOT recognizes as crucial for the goods movement. Identifying these High-Volume Truck Corridors allows Oklahoma to focus investment, maintenance activities, and enforcement efforts. Overweight vehicles, poorly maintained equipment, and unsafe operations adversely influence the infrastructure and traffic on these roadways, as well as the safety of the traveling public. Overweight trucks cause accelerated deterioration of the roadways and bridges, reducing the estimated useful life of these facilities and increasing maintenance costs. As such, a comprehensive enforcement effort has been launched to protect the traveling public by ODOT, the OTA, and the Oklahoma Corporation Commission, in conjunction with the Oklahoma Department of Public Safety (DPS).

Figure 7-8. High Volume Truck Corridors



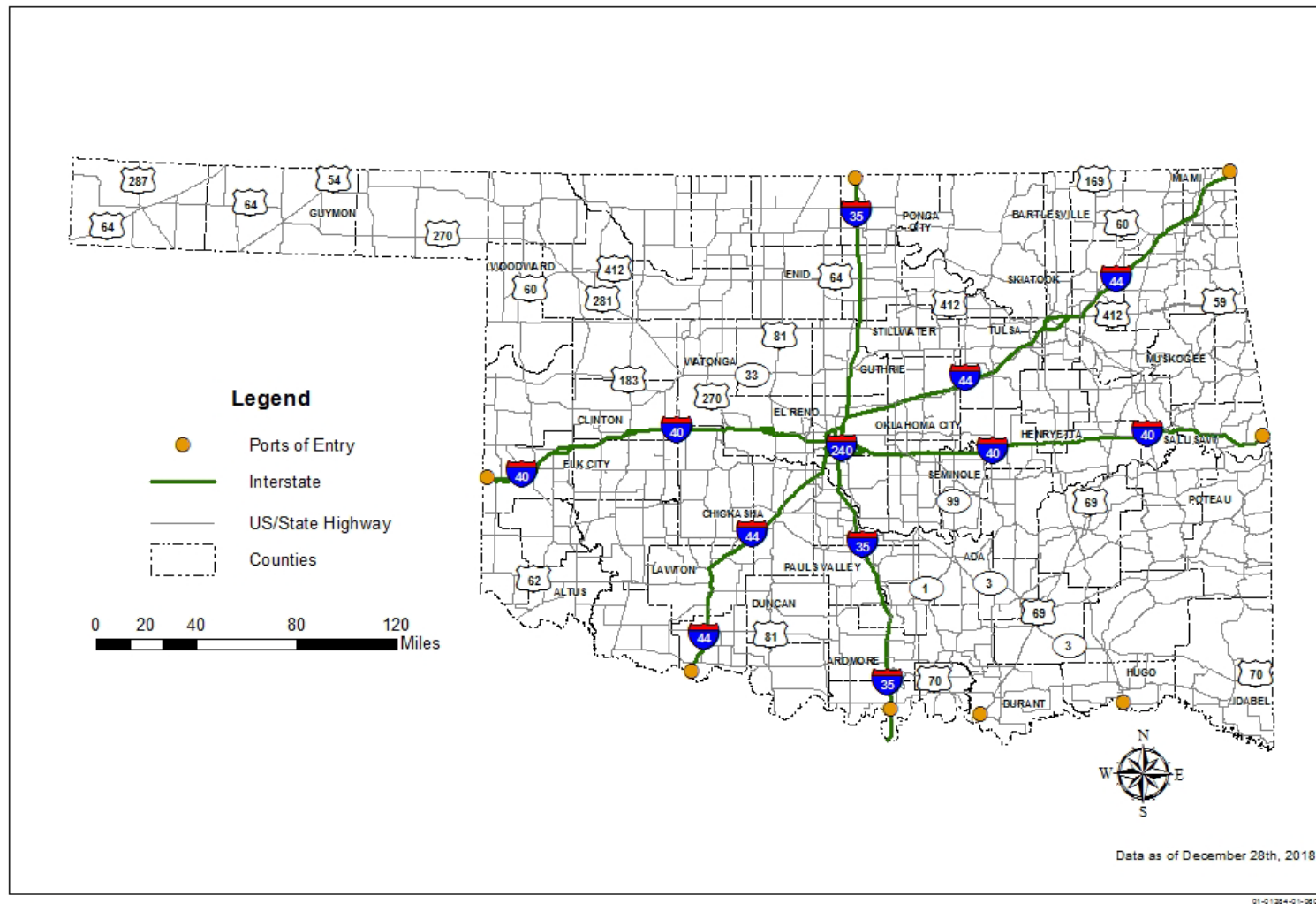
Source: ODOT Strategic Asset and Performance Management Division, December 2018

7.4.2. PORTS OF ENTRY

ODOT builds and maintains enhanced weigh stations, or ‘Ports of Entry,’ across the state, while the Oklahoma Corporation Commission and Oklahoma DPS staff the facilities and perform inspections. Safety inspections conducted by the Corporation Commission and DPS focus on truck and driver safety, including checking the truck’s braking system, enforcing weight standards, and verifying that the driver logbook entry forms are entered correctly.

Figure 7-9 illustrates the state’s eight primary ports of entry. A new port is planned for construction in Northeast Oklahoma.

Figure 7-9. Oklahoma Ports of Entry Locations

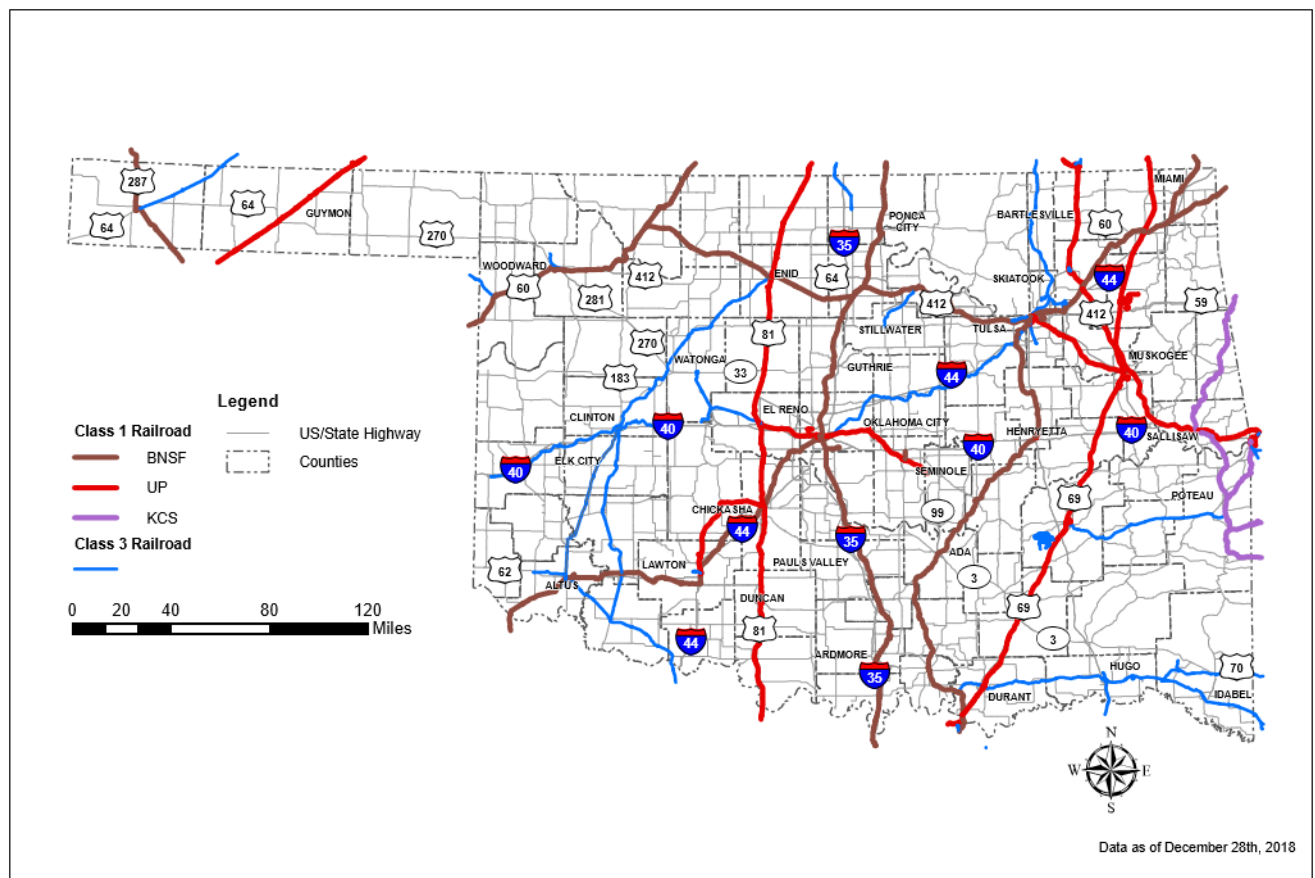


Source: ODOT Strategic Asset and Performance Management Division, December 2018

7.4.3. FREIGHT RAIL

Freight rail is categorized into six railroad classes as defined by annual operating revenue. There are currently three Class I freight operators in the state—the Burlington Northern Santa Fe (BNSF), the Union Pacific (UP), and Kansas City Southern Railway (KCS)—along with 20 Class III operators. Together, the rail operations in Oklahoma carry just over 41 percent of the freight tonnage. As of January 2019, ODOT has returned nearly 882 miles of rail lines to private ownership that had been acquired as a result of the Railroad Revitalization Act, House Bill 1623, which passed by the Oklahoma Legislature in 1978. The Sooner Sub Rail Line between Oklahoma and Tulsa was one of these lines returned to private ownership when it was sold to the Stillwater Central Railroad in August 2014 for \$75 million. The funds that were raised were used to improve more than 230 of Oklahoma’s nearly 3,800 at-grade rail crossings. **Figure 7-10** depicts the Oklahoma rail network.

Figure 7-10. Rail Network of Oklahoma Railroads



Source: ODOT Strategic Asset and Performance Management Division, December 2018

7.4.4. PORTS AND WATERWAYS

Marine Highway M40, also known as the McClellan-Kerr Arkansas River Navigational System (MKARNS) provides for waterborne freight transportation. Oklahoma's portion of the MKARNS consists of eight ports interspersed with five locks and dams at the upper reaches of the 445-mile long waterway that is linked to the Mississippi River. The 51 miles of waterway in Oklahoma provide a linkage for goods movement to and from the Midwestern U.S. and the global economy. Additionally, the five dams in Oklahoma not only assist in transporting freight, but also provide other benefits such as flood control, hydro-electric power generation, recreation, and conservation of fish and wildlife. Transporting freight by barge is a cost-effective way of transporting bulk and oversized cargo with minimal adverse impacts to the state roadway infrastructure and the environment. The MKARNS carries 0.8 percent of freight tonnage moving within or through Oklahoma annually.

7.5. PUBLIC TRANSPORTATION

Public transportation is a term that can be used interchangeably with 'public transit.' A variety of public transportation options are available in Oklahoma, including buses, vans, passenger rail, and streetcars. Public transportation may be the only available means motorized of transportation to some Oklahomans.

Oklahoma's public transportation services are funded through federal and state grants, as well as through local government funds. These transportation providers acquire additional funding through fares and through contracting for services with local businesses, educational institutions, civic groups, and other government organizations.

7.5.1. PASSENGER RAIL

Passenger rail returned to Oklahoma in 1999 and recently celebrated 20 years of operation. The Amtrak Heartland Flyer operates between Oklahoma City and Fort Worth, Texas and has stops in Norman, Purcell, Pauls Valley, and Ardmore in Oklahoma, as well as in Gainesville, Texas. The service has transported more than 1.4 million passengers over the last two decades and connects Oklahoma to the national passenger rail system. In 2018, the Heartland Flyer had an annual ridership of 68,075.

7.5.2. TRANSIT

Governor Stitt signed House Bill 1365, which created the new Office of Mobility and Public Transit at ODOT to replace the old Transit Programs Division and transferred a federal program for transit services for the elderly and disabled from the Oklahoma Department of Human Services to ODOT. ODOT is currently developing the Oklahoma Public Transit Policy Plan (OPTPP), which is an all-inclusive plan that will address Oklahoma's public transit systems. The OPTPP reflects the needs established in the 2018 Oklahoma Transit Needs Assessment.

7.5.2.1. RURAL TRANSIT

Oklahoma has twenty rural public transit providers located in small communities. Four of Oklahoma's rural transit agencies provide fixed-route service, while all provide demand-response services, as well as services for seniors and persons with disabilities.

ODOT assists these transit providers by administering FTA's Rural Area Funding Program which provides financial assistance to eligible local public transportation providers. In 2018, ODOT's Transit Program Division developed a Transit Asset Management Group Plan to inventory existing transit assets, and to discuss level of service, performance measures, life cycle strategies, funding levels, and investment needs. This inventory revealed a total of 1,111 revenue vehicles, 9 non-revenue vehicles, and 91 facilities.

7.5.2.2. URBAN TRANSIT

Oklahoma's five urban transit providers operate in Oklahoma City, Tulsa, Norman, Lawton, and Edmond. While all operators provide fixed-route and paratransit services, EMBARK (formerly METRO Transit) in Oklahoma City, offers additional ferryboat and streetcar services. Based on the national average, Oklahoma's urbanized areas continue to operate a higher percentage of CNG buses on their fixed-routes. In 2018, 46 percent of buses in Oklahoma's urban centers used alternative fuel sources, well above the national average of 28 percent.

7.5.2.3. TRIBAL TRANSIT

Twelve tribal agencies in Oklahoma provide transportation services that allow riders access to jobs and medical care among other services. Some tribes choose to contract for service provision by other transit operators. Tribal entities support transit programs with a variety of funding mechanisms, including their local tribal transportation program funds, fare box collections, and funds from FHWA and the Bureau of Indian Affairs funds.

7.6. ACTIVE TRANSPORTATION

ODOT is dedicated to supporting a safe and effective transportation system that provides multimodal opportunities for active transportation. Oklahoma's active transportation system includes approximately 520 miles of multi-use trails, bicycle routes, and sidewalks. An active transportation system provides for and promotes health and safety for users, and it can benefit the environment and the economy. Multi-use trails, bicycle routes, and sidewalks in Oklahoma are owned and maintained by partners of ODOT, including county and city governments. ODOT coordinates with local governments and applicable metropolitan planning organizations in considering

infrastructure options and facilitates inclusion of these features on projects when appropriate.

Bicycle and pedestrian accommodations are supported by federal and state legislation, policies, and practices. ODOT ensures that all state and federally funded transportation projects are constructed in compliance with the Americans with Disabilities Act.



OKLAHOMA Transportation

CHAPTER 8: MODAL NEEDS



8.1. INTRODUCTION

This chapter identifies how the multimodal transportation needs were developed for Oklahoma between 2020 and 2045. The estimated costs of the needs are presented in Chapter 9. The needs support achievement of the 2045 LRTP goals and objectives. Needs calculation is informed by existing trends, state performance targets, federal regulations, historical spending, and other known project needs. Responsibility for making the infrastructure improvements represented by these needs is shared among ODOT and other public-sector and private-sector partners. While infrastructure on the state highway system is primarily ODOT's responsibility, responsibility for roads that are not part of the state highway system and for other modes is shared with partners. ODOT collaborates with these partners to realize goals for the assets they own, which include safety on local roads, as well as rail, ports and waterways, public transportation, and provisions for active transportation.

The 25-year multimodal transportation system needs analyzed include the following modes and assets.

- State Highway System
 - Highway Pavement
 - Highway Expansion
 - Bridge Preservation and Expansion
 - Interchanges
 - Maintenance
 - Rest Areas
 - Weigh Stations
 - Intelligent Transportation Systems
 - Ports of Entry
 - Safety
- Assets Owned and Managed by Partners
 - Freight Rail
 - Passenger Rail
 - Active Transportation
 - Public Transportation
 - Ports and Waterways

8.2. STATE HIGHWAY SYSTEM NEEDS

8.2.1. HIGHWAY PAVEMENT NEEDS

Highway pavement needs encompass the costs to preserve the 12,254 centerline miles of the state highway system. Preserving the road surfaces of the highway system protects the public's investment in highways and primarily supports the goal of "infrastructure preservation." Highway pavement activities include regular road resurfacing and rebuilding roadways from their base for more severely deteriorated highways. Specifically, there are five activity types: preservation, minor rehabilitation, major rehabilitation, reconstruction, and shoulder treatments.

Highway pavement needs are derived from ODOT's pavement management system (PMS). The PMS is used to project pavement condition according to the pavement quality index (PQI) at different annual budgets for every year between 2020 and 2045. These PQI scores are converted to federal performance measures to describe the share of state highway system lane-miles in "good," "fair," and "poor" condition. To identify 25-year pavement needs, different budgets were used in PMS and the condition results were compared to pavement performance targets. The lowest budget used in the analysis became the 25-year pavement needs. The performance targets are to keep the state highway system "at or near current condition levels," which is consistent with the analysis conducted for Oklahoma's TAMP.⁸ This goal is modified only insofar as required to achieve—

- State agency accountability set by the Governor, aims to increase the share of pavement in "good" condition by 10 percentage points over a four-year period and maintain this condition level afterwards.
- Existing performance targets for 2022⁹ to keep the share of interstate highway lane-miles in "poor" condition below 3 percent and non-interstate NHS lane-miles below 7 percent.

Highway pavement needs are based on the lowest level of spending that achieve these performance standards.

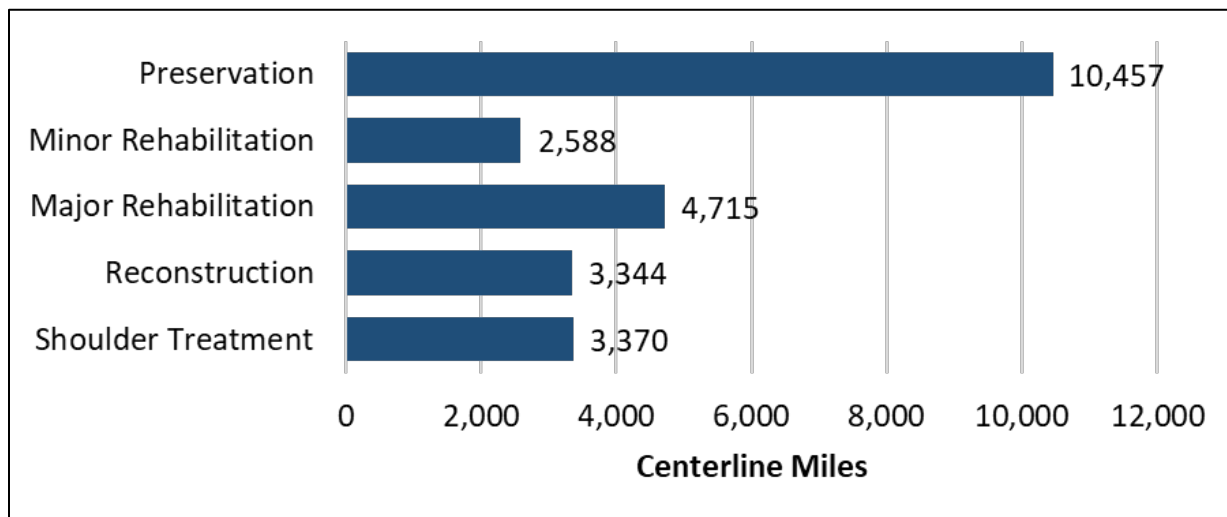
The vast majority of the state highway system requires treatments at least once during the 25-year period. In fact, 95.8 percent of the state highway system as measured by centerline miles receives at least one treatment between 2020 and 2045 with spending corresponding with the state highway system's needs. The largest activity is "preservation"; 85.2 percent of the state highway system receives at least one preservation treatment, and many receive multiple over the 25-year period. "Major

⁸ ODOT (2019). Transportation Asset Management Plan: 2019-2028. Retrieved from https://www.ok.gov/odot/Programs_and_Projects/Transportation_Programs/TAMP/.

⁹ ODOT (2019). Target Book. Provided by email by ODOT's Strategic Asset and Performance Management Division on November 19, 2019.

rehabilitation” is the second most common treatment, with 38.5 percent of the state highway system receiving major rehabilitation work. The remaining treatments of “minor rehabilitation,” “reconstruction,” and “shoulder treatments” affect between 20 and 29 percent of the state highway system each. These numbers sum to more than 100 percent because many road segments require more than one treatment type during the 25-year period. **Figure 8-1** shows the number of centerline miles that will need some type of pavement treatment by 2045.

Figure 8-1. Pavement Treatments (Centerline Miles of State Highway System)



Source: Output from ODOT’s Pavement Management System associated with needs.

8.2.2. HIGHWAY EXPANSION NEEDS

Highway expansion accounts for the need to add capacity in the form of new lanes to the state highway system to maintain an acceptable level of service (LOS) as traffic volumes grow. Acceptable LOS’s conform with ODOT’s draft 2019 *Roadway Design Manual*, with a LOS of C or above as the standard for rural freeways, and a LOS of D or above for all other roads. Highway expansion needs account for the state highway system, but do not include interchanges or bridges. Highway expansion needs for both of these aspects of the state highway system are accounted for in their dedicated sections. Many factors are likely to affect the level of travel demand that the state highway system experiences. The presence of connected and autonomous vehicles, which may improve traveling convenience, could initially be slow due to the high cost of purchasing a connected and autonomous vehicle. Connected and autonomous vehicles’ effects on cost and mobility may be especially large in urban areas.¹⁰ Additionally, other factors such as transit and ITS increase highways’ effective capacity by either allowing

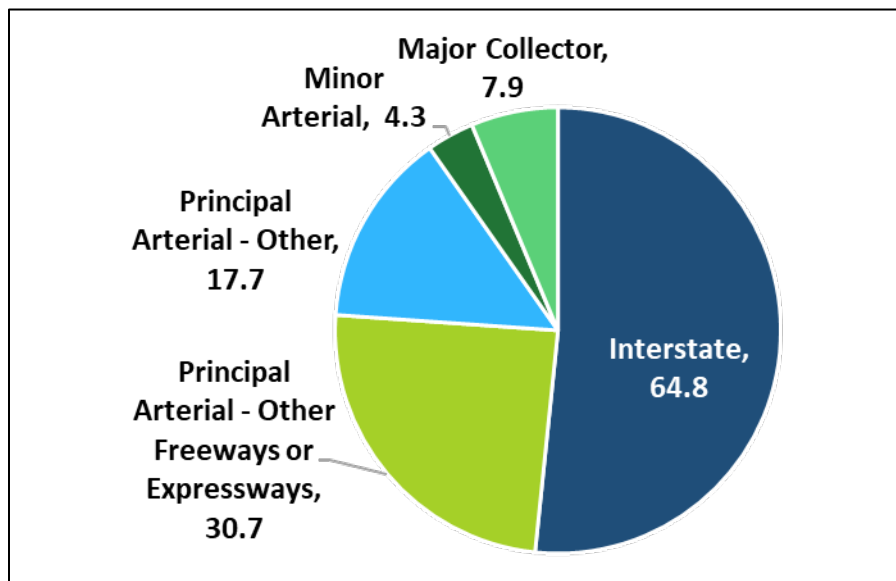
¹⁰ Litman, T. October 27, 2019. *Autonomous Vehicle Implementation Predictions: Implications for Transport Planning*. Victoria Transport Policy Institute. <https://vtpi.org/avip.pdf>.

them to move more people aboard buses than they would be able to move with automobiles alone or informing travelers of incidents to allow them to adjust their travel routes. All of these factors are considered in the highway expansion needs assessment.

Highway expansion needs are estimated by comparing forecasted LOS in 2045 based on peak-period forecasted Average Annual Daily Traffic (AADT) with existing capacity and adding one or more lanes in each direction to achieve the LOS standard where required. Peak-period 2045 AADT is forecasted by applying geometric growth rates to historic traffic counts, and roadway capacity considers the capacity enhancing effects related to ITS digital message signs and overlap with public transportation bus routes. Unit costs are applied for lanes that are added.

Highway expansion needs involve the construction of 125 lane-miles of road, of which the vast majority is in urban areas. Just over half of these lane-miles will be added to interstate highways (64.8 lane-miles), while 48.4 percent are associated with principal arterials (either “other freeways or expressways,” or “other”). The remaining 9.7 percent of new lane-miles are to be added to minor arterials (4.3 lane-miles) or major collectors (7.9 lane-miles). **Figure 8-2** shows the number of lane-miles expected to be added to roads of each functional system to achieve the LOS standards associated with the needs.

Figure 8-2. New Lane-Miles Associated with Highway Expansion



8.2.3. BRIDGE PRESERVATION AND EXPANSION NEEDS

The bridge preservation and expansion needs include the 6,794 bridges on the state highway system. Preserving these bridges and expanding them to accommodate expected growth in travel activity is the basis for identifying 25-year bridge needs. The bridge needs do not include the 16,372 bridges that are on local roads, or that are owned by counties, cities, and private companies.¹¹

Needs are the investment required to reach the goals of achieving and maintaining a share of 1 percent or fewer bridges in “poor” condition (which is equivalent to the term “structurally deficient”) while also keeping bridges that are defined as being in “good” condition as defined by federal performance measures at least as high as in 2020. These goals continue the progress that ODOT has made in decreasing the number of “poor” bridges on the state highway system from 1,168 in 2004 to 86 in 2019. In addition to these preservation functions, the needs also account for costs to widen bridges to account for projected AADT and for the costs to raise bridges that are candidates for replacement to rectify vertical clearance limitations.

The needs are developed by applying a custom asset management tool to ODOT-owned bridges. Deterioration models are developed for bridges as distinguished by structure type, materials, climate zones, NHS status, and year of construction based on 25 years of historical condition data. Using costs and standards that are tailored to Oklahoma, the tool identifies the optimal sets of activities over the 25-year forecast period. It simultaneously accounts for necessary widenings and bridge raisings. Conditions are predicted for multiple budget levels for a nine-year initial forecast period, and these conditions are projected for the remaining 16 years. The lowest level of spending that reaches the condition targets while also accounting for bridge widenings and raisings is the needs associated with bridges on the state highway system.

The asset management tool considers two activity types: rehabilitation and replacement. Replacement entails the construction of a new bridge structure in the place of an existing one. Replaced structures tend to swell in size for multiple reasons, including shoulder improvements to highways whose shoulders are absent or below standard.

Oklahoma is on path to achieve the target of having no more than 1 percent of state highway system bridges in “poor” condition. Annual spending needs associated with bridge preservation are highest in the first few years of the needs assessment to help achieve this target. Afterwards, annual spending needs decrease substantially since less spending is required to maintain the improvements that ODOT has made in bridge condition.

¹¹ ODOT (2019). Deficient Bridges: Replacement and Rehabilitation Progress. Retrieved from <https://www.ok.gov/odot/Bridges.html>.

8.2.4. INTERCHANGE NEEDS

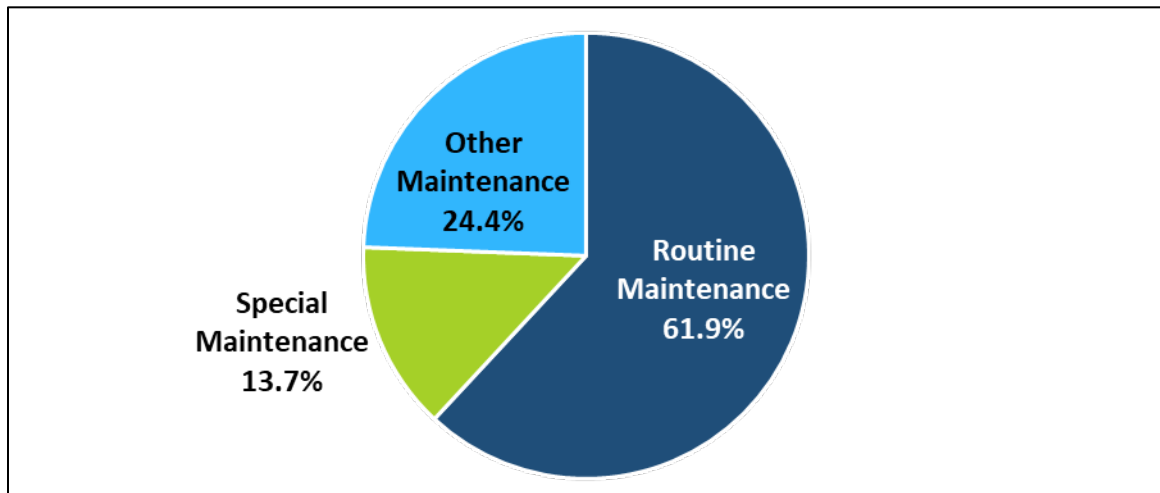
An interchange is a system of interconnecting roadways with one or more grade separations providing for traffic movement between two or more roadways of highways on different levels. As part of the analysis, needs for complex and simple interchanges were identified. A complex interchange connects two or more high-volume roads, such as freeways, while a simple interchange is connected to no more than one high-volume road. Interchange needs are the cost of necessary improvements at interchanges. Interchange improvements may be conducted for purposes of safety, capacity expansion, or travel time reliability, among others.

Needs are the costs to complete interchange projects that are expected during the 25-year period based on current plans, programs, and other information. Unit costs are applied to each simple and complex interchange to estimate costs, and a multiplier is applied to account for utility costs and expenditures to acquire necessary right-of-way. The state highway system is expected to require 10 complex and 50 simple interchange projects between 2020 and 2045. Complex interchange projects are generally over 13 times more expensive than simple interchange projects, meaning that monetized interchange needs are higher for the 10 complex interchanges than for the 50 simple interchanges.

8.2.5. MAINTENANCE NEEDS

Maintenance activities includes routine maintenance (e.g., mowing, snow removal, pothole repair, litter control), special maintenance (e.g., construction overlays), and other maintenance activities (i.e., operating shops and equipment, and warehouses). These activities support several of the 2045 LRTP goals, including safety and security, infrastructure preservation, and efficient intermodal system management and operations.

Maintenance needs are estimated by extrapolating historical spending for maintenance categories. These maintenance needs based on historical spending are the “met” maintenance need that can be funded under a business-as-usual funding scenario. Adjustments are made to account for deficits in historical spending. Adjustments to account for deficits in historical spending result in an “unmet” maintenance need corresponding with necessary activities for which funding has historically been inadequate. The met need makes up over two thirds of the total and is primarily composed of routine maintenance activities, as shown in **Figure 8-3**. If maintenance spending were increased to fund the unmet need, approximately 70 percent of the new spending would be associated with routine maintenance, 20 percent would be associated with special maintenance, and the remaining 10 percent with other maintenance activities.

Figure 8-3: Spending Shares Associated with Met Maintenance Need


8.2.6. REST AREAS

ODOT maintains 8 open Rest Areas and 4 closed Rest Areas, as shown in **Table 8-1**. ODOT is currently evaluating the condition and necessity of the existing open Rest Areas. Rest Area needs account for spending required to maintain Oklahoma's 8 open Rest Areas and potential removal of the 4 closed Rest Areas. ODOT expects that the Rest Areas that are still open will potentially be closed and removed. In the meantime, the open Rest Areas will incur costs for operations, pavement improvements, and maintenance. Needs do not account for welcome centers, which are maintained under contract with the Oklahoma Department of Tourism. Rest Area needs are estimated by applying unit costs for removal of all 12 Rest Areas and unit costs for pavement improvements, operations, and maintenance to the Rest Areas that remain open. Removal costs are based on studies conducted by states in the same region, and the costs related with pavement improvements, operations, and maintenance are based on ODOT's historical spending.

Table 8-1. Status of ODOT Rest Areas

Highway	Direction	Mile Marker	Status
I-35	Southbound	59	Open
I-35	Southbound	3	Closed
I-35	Northbound	59	Open
I-40	Eastbound	111	Open
I-40	Eastbound	197	Closed
I-40	Eastbound	251	Open

Highway	Direction	Mile Marker	Status
I-40	Eastbound	283	Open
I-40	Eastbound	316	Open
I-40	Westbound	283	Open
I-41	Westbound	251	Open
I-42	Westbound	197	Closed
I-43	Westbound	10	Closed

8.2.7. WEIGH STATIONS

ODOT currently operates 11 weigh stations, which allow for the inspection and identification of overweight vehicles to reduce pavement degradation associated with their travel. Weigh station needs account for annual maintenance costs for these 11 weigh stations, and for the costs to renovate six weigh stations between 2023 and 2024 based on average costs of previously renovated weigh stations. Two weigh stations will be closed between 2023 and 2027 and replaced with Ports of Entry (POE). Costs associated with the closure and repurposing of these two weigh stations are included in the POE needs.

8.2.8. INTELLIGENT TRANSPORTATION SYSTEMS (ITS)

ITS needs include fiber optic cable for operating variable message signs, road weather information dissemination, collection and storage of ITS data, and software required to operate traffic management centers (TMCs). Innovative approaches to vehicle communication and traffic management also influence the 25-year ITS needs in Oklahoma. There are two primary categories of needs which together make up statewide ITS needs. The first category is the Oklahoma Statewide ITS Implementation Plan,¹² which ODOT ITS engineers reviewed to ensure consistency with current needs and cost assumptions. The second category is ITS equipment and system management needs, which accounts for current trends influencing ITS and technology implementation. Estimated costs for this category were developed using reference project costs from other ITS deployments and project estimates from ODOT ITS engineers.

8.2.9. PORTS OF ENTRY (POE)

POEs are locations at the state border where commercial vehicles undergo electronic processing for items that include driver credentials, weight, tax and fee status, and safety inspections. ODOT is responsible for seven POEs. Needs for these POEs account for annual maintenance, renovation costs for the three POEs that have not already been updated, and portable equipment. Renovation needs for each POE are based on the costs from previously renovated POE. Annual maintenance needs are based on the costs incurred after renovation for the four POE that have been renovated. Portable equipment is expected to be purchased between 2023 and 2045 and include Optical Character Reading (OCR) technologies, a trailer to house the plate and U.S. DOT readers, and OCR-based e-screening system, and Tire Anomaly and Classification System.

8.2.10. SAFETY

¹² ODOT (2004). Oklahoma Statewide Intelligent Transportation Systems (ITS) Implementation Plan. <https://www.odot.org/hqdiv/p-r-div/itscvo/pdfs/statewideeval.pdf>.

Safety needs include costs associated with necessary programs, initiatives, and countermeasures to improve safety on the state highway system. Responsibility for improving statewide traffic safety is shared with local governments. ODOT's Local Government Division specializes in collaborative efforts with cities, towns, and counties to address the local system's unique characteristics. Safety needs for the state highway system include the following five categories of safety improvements. ODOT safety engineers developed long term safety need estimates in each of the categories. The safety needs were identified by estimating the types, quantity, and costs of countermeasures in each category needed over the next 25-years.

- **Intersection safety:** Intersection safety improvements include redesigning the intersection geometry to implement innovative intersection designs and improve intersection signage and traffic signals.
- **Roadway departures:** Roadway departure improvements are enhancements made to the highway to keep vehicles from leaving the travel lane or address the potential hazards adjacent to the roadway when vehicles leave the travel lane.
- **Active transportation safety:** These enhancements protect bicyclists and pedestrians by improving roadway crossings and making crossing more visible to vehicles.
- **Data and analysis:** Data and analysis needs account for the measurement and analytical foundation necessary to monitor performance measures required by federal regulations and estimate effects of countermeasures under consideration.
- **Human behavior:** The primary method to improve driver behavior is to continuously update driver education to ensure new information and safety practices are included in driver education.

Needs account for a total of 1,290 unique intersection-related countermeasures split between innovative and conventional intersections, which include installation of innovative intersections including roundabouts, advanced signage, traffic signals, and wrong-way driving technologies, among others. Over 31,000 miles of roadway departure countermeasures that keep vehicles on the road through such measures as rumble strips, paved shoulders, and nighttime visibility improvements, or provide for safe recovery with guardrails, median barriers, and clear zone reclamation are included in the safety needs. The safety needs also include 175 units of active transportation countermeasures, which include pedestrian hybrid beacons, pedestrian crossings, and leading pedestrian change intervals. Safety needs associated with data and analysis include both existing activities such as road safety audit and network screening, as well as new activities related to database management, integration, and advancement. Safety needs related to human behavior include an initiative to include new information and safety practices in driver education.

8.3. ASSETS OWNED AND MANAGED BY PARTNERS

8.3.1. FREIGHT RAIL

The privately owned rail network in Oklahoma consists of 3,244 route-miles, excluding leases and trackage rights. Currently there are three Class I rail operators in Oklahoma – the BNSF, the UP and KCS – along with 20 shortline (Class III) railroads. While some publicly financed programs¹³ are available to railroads to help fund rail network improvement projects and targeted job creation projects, the private sector supplies the majority of financial support for railroads.

The State of Oklahoma owns 136 operational rail miles as a result of the Railroad Revitalization Act, HB 1623, which created a fund to help maintain rail operations in the state as of January 2019. The needs assessment estimates monetary needs for the freight rail system in Oklahoma associated with three needs categories: Class I rail, Class III rail, and safety.

8.3.1.1. CLASS I RAIL

The three Class I railroads in Oklahoma own over 2,000 railroad miles in the state. Each Class I railroad has undertaken system investment. For instance, in 2019 BNSF announced a 2019 capital expenditure program of approximately \$110 million to replace and upgrade rail, rail ties, and ballast, and it has spent more than \$570 million over the previous five years in maintenance and new construction. Similarly, KCS initiated a \$24.6 million investment¹⁴ in construction and improvement projects in a multi-state commitment in 2017. Between 2012 and 2016, UP has invested more than \$236 million in capital improvements in Oklahoma^{15 16} and has completed installation of required Positive Train Control (PTC) infrastructure.

Needs associated with Class I rail are derived from known projects for the three Class I railroads, with recognition that railroads' planning and development timeframe is much

¹³ Public-private economic development or Industrial authorities (e.g. Blackwell Oklahoma industrial Authority) sometimes own and/or operate railroads. (Source: Blackwell Northern Gateway Railroad. Retrieved from <https://www.blackwellrr.com/>.) Better Utilizing Investments to Leverage Development (BUILD) Transportation Discretionary grants are for investments in surface transportation infrastructure and are awarded on a competitive basis to projects with a significant impact in their communities. BUILD funding supports roads, bridges, transit, rail, ports or intermodal transportation. (Source: U.S. Department of Transportation. BUILD Discretionary Grants. Retrieved from <https://www.transportation.gov/BUILDgrants>.)

¹⁴ *Transport Topics* (2017). Kansas City Southern Invests Money to Improve Railroad Tracks. Retrieved from <https://www.ttnews.com/articles/kansas-city-southern-invests-money-improve-railroad-tracks>.

¹⁵ Union Pacific (2017). Union Pacific Plans to Invest \$41 Million in its Oklahoma Rail Infrastructure. Retrieved from <https://www.up.com/media/releases/170512-oklahoma-investment.htm>.

¹⁶ Union Pacific (n.d.). 2019 Fast Facts. Retrieved from https://www.up.com/cs/groups/public/@uprr/@corprel/documents/up_pdf_nativedocs/pdf_oklahoma_usguid_e.pdf.

shorter than for the public sector. Projects include such activities as siding additions, bridge replacements, and double-tracking.

8.3.1.2. CLASS III RAIL

Movement of freight using shortline rail is critical in providing the “first and last mile” of rail services to connect rural areas to the national rail network. There are approximately 1,234 miles of Class III railroad in Oklahoma; a total of 1,041 miles is under private ownership.

Needs associated with Class III rail are derived from known projects for these railroads to preserve and grow shortline railroads. These projects include needs associated with 286,000 lbs. compliant track and bridges, and other projects like storage yard capacity expansion, development of transload facilities, and switch upgrades.

8.3.1.3. SAFETY AT HIGHWAY-RAIL GRADE CROSSINGS

Safety issues continue to be of upmost importance, with rail crossings specifically holding a high priority. The state’s initiative that was announced in 2014 to accelerate safety projects at railroad crossings statewide has resulted in safety features such as flashing light signals and crossing gate arms to be approved for more than 231 crossings. Federal funding, as well as funds provided by railroad companies and local governments, enabled ODOT to advance nearly ten years of improvements in about two years. Despite the success of the program, there is a continued need to improve rail crossings over the next 25 years.

ODOT identified crossings likely to require improvements over the next 25 years. ODOT anticipates improving 600 crossings over the next 25 years to improve safety for the traveling public. Typically, ODOT pays for 90 percent of the cost through use of federal funds,¹⁷ and the remaining 10 percent is covered by the railroad owner and/or the affected local governments.

8.3.2. PASSENGER RAIL

Oklahoma is presently served by one intercity Amtrak train, known as the Heartland Flyer, which operates between Oklahoma City and Fort Worth, Texas and carried 67,218 passengers in federal fiscal year 2018. The service is jointly funded by the states of Oklahoma and Texas. Additionally, Amtrak inaugurated a Thruway bus service in 2016 for rail passengers in Oklahoma and Kansas that connects Oklahoma City to Newton, Kansas, where travelers can connect to Amtrak’s Southwest Chief operating between

¹⁷ The Railway-Highway Crossings (Section 130) Program provides funds for the elimination of hazards at railway-highway crossings. <https://safety.fhwa.dot.gov/hsip/xings/>

Chicago and Los Angeles. Oklahoma continues to work with Amtrak and neighboring states on initiatives that could lead to expanded intercity and long-distance passenger service options within the state.

The needs assessment identifies the following five categories of passenger rail needs in Oklahoma and provides monetary costs estimates for each.

- **Continuation of operations of the Heartland Flyer between Oklahoma City and Fort Worth:** Oklahoma subsidizes the existing Heartland Flyer service. The majority of the corridor used by the Heartland Flyer from Oklahoma City to Fort Worth has double tracks installed for the BNSF operations, and PTC has been established for this facility. These features ensure the flow of both freight and passenger trains can be accomplished efficiently and effectively.
- **Addition of a second daily roundtrip between Oklahoma City and Fort Worth:** Amtrak continues to work with state DOTs in both Oklahoma and Texas to explore options for adding dual frequencies to the Heartland Flyer service. Oklahoma will support a share of the total costs.
- **Construction of a Heartland Flyer station near Thackerville:** Amtrak is working with the BNSF Railway, the Chickasaw Nation, and ODOT regarding consideration of a new stop for the Heartland Flyer near the I-35 Thackerville exit, which is close to the Texas border. Thackerville is the site of the WinStar World Casino and Resort, the largest casino in Oklahoma. Early projections from Amtrak indicated that the stop could potentially increase Heartland Flyer ridership by 12 percent based on the anticipated economic boost to the area.
- **Extension of Heartland Flyer service to Newton, Kansas:** Extending the Heartland Flyer to Newton, Kansas would provide connections to the national passenger rail network at both ends of the Heartland Flyer through the Texas Eagle at Fort Worth, Texas and the Southwest Chief in Newton, Kansas. The Southwest Chief in turn serves destinations between Los Angeles, California and Chicago, Illinois.
- **Intermodal passenger transportation:** Intermodal transportation allows linkages between two or more modes to reduce automobile dependence and congestion in metropolitan areas. Oklahoma is exploring several options for intermodal connections that include passenger rail in both Oklahoma City and Tulsa. In Oklahoma City, attention has focused on Santa Fe station to link passenger rail, transit, bike sharing, and the Oklahoma City Streetcar in addition to other rail or transit services in the future. As a large metropolitan area, Tulsa represents an unrealized opportunity for passenger rail service expansion. However, the appetite for establishing the service has not reached a point to make this a viable option for Amtrak to pursue at this time despite its long-term goal to connect Tulsa to Kansas City, Missouri. As an alternative consideration, Amtrak may, at some point, consider establishing a Thruway bus service similar to what is

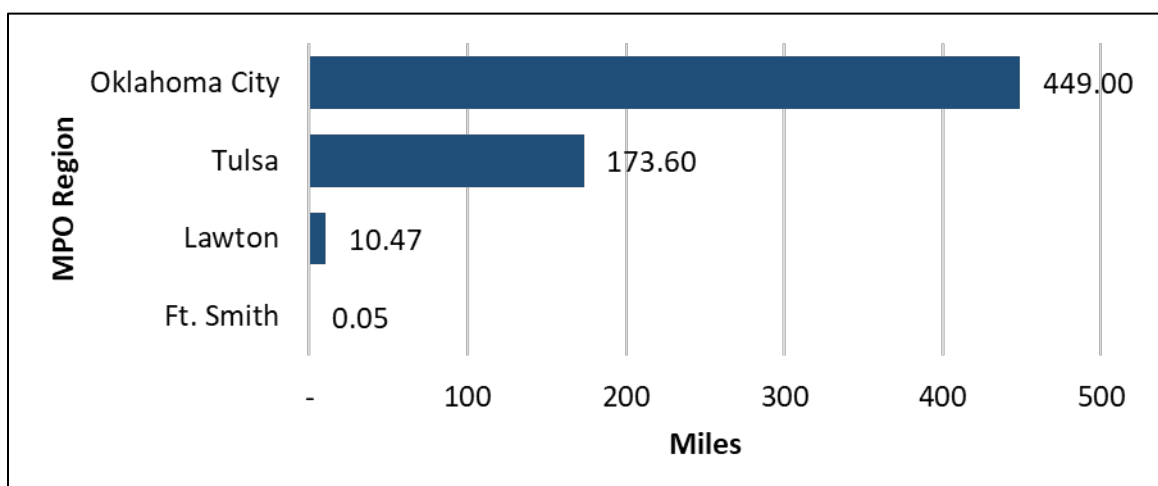
currently in operation from Oklahoma City to Newton, Kansas. The level of utilization of this bus service would provide data to assist Amtrak in determining the demand for a more substantial investment of establishing a rail component.

8.3.3. ACTIVE TRANSPORTATION

Oklahoma's bicycle and pedestrian facilities consist of bike routes, lanes, and shared use paths and trails. Funding for bicycle and pedestrian facilities is derived mainly from a combination of local, nonprofit, private, and/or federal sources. The planning, development, and maintenance of the facilities are coordinated by MPOs and local governments. Bicycle and pedestrian facilities have been implemented through statewide initiatives, including the federal TAP fund. ODOT receives applications for TAP funds as the funds are made available.

ODOT's bicycle and pedestrian needs were estimated by examining regional long range plans bicycle/pedestrian plans, prior TAP funding requests, and conferring with ODOT and MPO staff directly. In MPO regions, each MPO's planned mileage of bike routes, bike lanes, and shared use paths or trails from 2020-2045 is gathered. **Figure 8-4** shows the existing mileage of bike routes, bike lanes, and shared-use paths or trails in Oklahoma's four MPO regions. These regions are planning to expand the mileage, often by large amounts. For instance, the Ft. Smith region plans an additional 15.60 miles, and the Lawton MPO plans an additional 64.26 miles. The MPOs consider bicycle and pedestrian needs as a part of their long range planning and identify costs for these non-motorized modes of travel in the regional transportation plans. MPOs are required to develop financially constrained MTPs, thus estimated costs cannot exceed reasonably expected revenue.

Figure 8-4. Existing Mileage of Bike Routes, Bike Lanes, and Shared-Use Paths or Trails



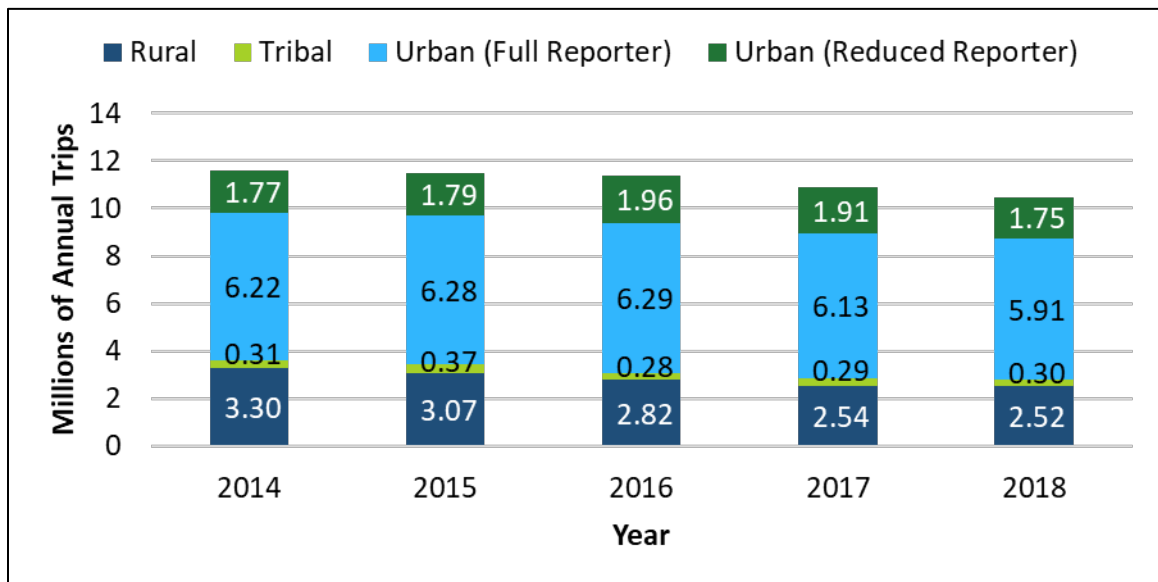
To estimate bicycle and pedestrian needs for small towns and counties outside of MPO regions, the average funds requested from TAP between 2016 and 2019 are calculated. The average funds requested are typically two to three times larger than the funds

available, and this is assumed to be a reasonable expectation of bicycle and pedestrian needs for small town and county governmental entities.¹⁸ The average amount requested is applied biennially over the 25-year planning horizon beginning with 2021, the next request year, and extending to 2045 and summed to determine total needs.

8.3.4. PUBLIC TRANSPORTATION

This needs assessment identifies 25-year needs for public transit in the state associated with rural, tribal, and urban operations, as described in the following subsections. **Figure 8-5** shows annual transit ridership for rural, tribal, and urban transit agencies in Oklahoma. The estimates in the 2045 LRTP largely stem from three sources: agency reports to ODOT, agency reports to FTA’s NTD, and the Metropolitan Transportation Plans (MTPs) for the three associated MPOs.

Figure 8-5. Annual Transit Ridership in Oklahoma



Source: National Transit Database. The three transit agencies in Norman, Lawton, and Edmond operate 30 or fewer vehicles and do not operate fixed guideway service. As a result, they are considered Reduced Reporters by the FTA.

8.3.4.1. RURAL TRANSIT

Rural public transportation systems serve communities outside of urban areas. Types of rural public transportation include demand–response public transportation (e.g., “dial-a-ride”), traditional and deviated fixed route services (e.g., shuttles, circulators), vanpool, or reimbursement programs. Oklahoma has 20 rural transit operators located in small communities throughout the state that are supported, in part, by designated state and federal funds in addition to fares collected by the providers and local government

¹⁸ ODOT (2019). Strategic Asset and Performance Management Division. Planning and Performance Branch.

matching monies. The 2019 data show that four of the rural transit systems provide fixed-route service, while all provide demand-response service, as well as services for the elderly and persons with disabilities.

Rural transit needs are calculated for administrative, operating, and capital costs, including vehicle replacement. Administrative, operating, and capital costs are estimated by averaging historical costs for these functions by rural transit agencies and extrapolating spending to 2045. Vehicle replacement costs are added to capital costs using data from the NTD because the revenue vehicle fleet represents a large portion of capital expenditures. Rural transit agencies currently maintain 1,111 revenue vehicles. These vehicles must be replaced as they reach and exceed the useful life of the asset.

8.3.4.2. TRIBAL TRANSIT

Ten tribal agencies in Oklahoma directly provide transit service as designated recipients of FTA Section 5311c funds. In addition to those ten tribal transit providers, two tribal entities elect to contract for service provision by other transit operators. Thus, tribal transit needs are met through several locally designed arrangements.

Tribal operating costs are estimated using average costs provided by the NTD between 2013 and 2018, and these operating costs are extrapolated to 2045. Capital costs including those for vehicle replacement are added. As of 2018, the tribal entities that provide service maintain 144 fleet vehicles. As with rural agencies, these vehicles must be replaced as they reach and exceed recommended life spans.

8.3.4.3. URBAN TRANSIT

Urban transit systems operate in urbanized areas with a population of more than fifty thousand people. Five urban transit systems serve Oklahoma. Located in Oklahoma City, Tulsa, Norman, Lawton, and Edmond, all five of these entities are recipients of 5307 Urbanized Area Formula Program funding but their sizes and service levels differ. The five urban systems provide demand response service, vanpool, commuter bus, fixed route bus and, from Oklahoma City's EMBARK, streetcar and ferryboat service.

Future urban transit needs are identified and integrated into the MTPs of the related MPO. The five urban transit systems in Oklahoma are represented by three MPOs: ACOG, INCOG, and LMPO. Needs include operating, maintenance, capital, and construction costs associated with maintaining existing service and adding select new services.

8.3.5. PORTS AND WATERWAYS

Marine Highway M40, also known as MKARNS is a 445-mile-long waterway linked to the Mississippi River that provides waterborne transportation for Oklahoma. Barge transportation is an economical means of transporting bulk and oversized cargo with minimal adverse impacts to the roadway transportation infrastructure of the State or to

the environment. The 51 miles of the MKARNS in Oklahoma consist of eight ports interspersed with five locks and dams. The five dams in Oklahoma not only assist in transporting freight, but also provide other benefits such as flood control, hydropower generation, recreation, and conservation of fish and wildlife. Additionally, key public facilities within the system are the Port of Catoosa and the Port of Muskogee, both of which are designated Foreign Trade Zones. Located at the head of the MKARNS, the Port of Catoosa is one of the largest inland river-ports in the country.

There are three categories of needs related to Oklahoma's ports and waterways, of which the first two are monetized in the needs assessment.

- **Critical maintenance:** There is a backlog in critical maintenance on the 100 percent federally funded navigation features of the MKARNS since funding has not kept pace with the deterioration of the system through continuous use of the nearly 50-year-old locks. Critical maintenance projects are those that are defined as having a 50 percent chance or greater at failing over the course of the next 5 years. The Three Rivers structure (at confluence of Arkansas, Mississippi, and White Rivers in southeast Arkansas) located on the Arkansas portion of the MKARNS is a top priority on the system, as its failure would be detrimental to the entire system. A 2018 Study recommended a new containment structure to reduce the risk of a cutoff forming near the entrance channel of the MKARNS between the Arkansas and White Rivers.
- **Capacity expansion:** MKARNS system capacity is greatly constrained because the current draft depth is nine feet. Congress authorized the expansion through deepening the channel to 12 feet in the Energy and Water Development Act of 2004, but funds have not yet been appropriated to deepen the waterway channel depth. Additional depth would allow for increased weight and higher volumes to be efficiently moved through the system.
- **Waterway ports access:** This need category supports groundside access to the ports via roads and bridges. Since 2000, ODOT has awarded 186 contracts for projects within a 10-mile radius of the Port of Catoosa and Oakley's Port 33. These contracts, ranging from right-of-way acquisition and utility relocation, begin the processes necessary to construct roads and bridges and totaled \$621.4 million. For the period from federal fiscal year 2019 through 2026, ODOT anticipates an additional 40 projects totaling approximately \$266 million to be awarded within that same 10-mile radius. Similarly, in a 10-mile radius of the Port of Muskogee, ODOT has awarded 53 contracts totaling \$100.7 million since 2000, and anticipates awarding 22 contracts for \$147.3 million from FFY 2019 through FFY 2026. The needs assessment does not estimate 25-year needs for waterway ports access.



OKLAHOMA Transportation

CHAPTER 9: PROJECTED COSTS AND FORECASTED REVENUES



9.1. INTRODUCTION

In planning for Oklahoma’s transportation future, it is important to understand the anticipated costs of Oklahoma’s transportation needs and the revenues reasonably expected to ODOT and its partners under current law.

This chapter provides a discussion of:

- **Costs** – The estimated costs of meeting the 2020-2045 LRTP transportation needs by mode and investment category over the next 25 years.
- **Revenue** – A baseline forecast of the revenues available to meet ODOT transportation needs for the 2020-2045 planning period.
- **Funding Gap** – The difference between projected costs and anticipated baseline revenues over the 25-year planning period.
- **Potential Additional Revenue Sources** – A brief discussion of additional revenue sources that decision makers could consider addressing the funding gap.

Unless otherwise noted, all figures are presented in constant 2019 dollars.

9.2. FUNDING JURISDICTION AND RESPONSIBILITIES

ODOT is responsible for portions of Oklahoma’s transportation system and works with other partner entities to address needs on non-highway modes and needs for portions of the road-related infrastructure for which partners are primarily responsible. Transportation assets and functions are described as being “owned” or addressed by ODOT and/or other agencies.

9.2.1. ODOT RESPONSIBILITIES

ODOT is principally responsible for meeting the needs for state highway system bridges, roadways, interchanges, safety, and maintenance. In addition to the general upkeep of the highways and associated right-of-way, the maintenance category includes safety improvements, ports of entry, weigh stations, rest areas, and ITS technology. ODOT makes use of state funding from fuel taxes, vehicle registration fees, and transfers of general revenue funds as well as apportionments of federal funding to construct, maintain, and operate the state highway system.

9.2.2. PARTNERS TO ODOT

Numerous public and private entities partner with ODOT to deliver Oklahoma’s integrated multimodal transportation system. Partner-owned assets and functions include bicycle and pedestrian facilities, intermodal facilities, passenger rail, public transportation, ports and waterways, congestion management, and locally owned public

streets and roads. Partner entities include ACOG, INCOG, Lawton MPO, Frontier MPO, RTPOs, OTA, cities, towns and counties, rural, urban, and tribal transit providers, and the U.S. Army Corps of Engineers (USACE).

Public-private or private entities such as Amtrak, private rail operators, private rail corporations, and private port and terminal operators also participate in the development and delivery of transportation in the state; however, only public costs and revenues are included in analyzing the Oklahoma transportation system's long-term costs, revenues, and funding gap.

9.3. COST AND REVENUE PROJECTIONS BY FUNCTION

This section discusses the costs associated with addressing the 2020-2045 LRTP needs identified in Chapter 8.

9.3.1. ODOT-OWNED ASSETS AND FUNCTIONS

Cost estimates for state highway system bridge and highway needs were determined using ODOT's PMS. Unit cost estimates for interchange needs were estimated using ODOT historical data on previous interchange construction projects. The costs of projected ancillary transportation appurtenance needs were estimated based on historical records and information from ODOT staff.

Table 9-1 summarizes the projected costs of addressing needs on the state highway system by function, the projected state and federal revenues anticipated to meet those needs, and the associated funding gap between needs and expected resources. Projected 2045 LRTP costs associated with ODOT owned assets and functions total **\$33.4 billion**. Revenues available to meet these needs expected under current law total **\$26.3 billion**, leaving a funding gap of **\$7.1 billion**.

Table 9-1. Projected 2020-2045 Costs, Revenues, and Funding Gap for ODOT Responsibilities (Millions)

Function	Cost	State Funds	Federal Funds	Funding Gap
Highways	\$18,339.7			
<i>Pavement</i>	<i>\$17,538.6</i>			
<i>Expansion</i>	<i>\$801.1</i>			
Bridges	\$2,720.0			
Interchanges	\$4,581.8			
Safety	\$1,255.9			
Maintenance	\$6,547.7			
<i>General Maintenance</i>	<i>\$6,153.8</i>			
<i>Intelligent Transp. Systems</i>	<i>\$281.9</i>			
<i>Ports of Entry</i>	<i>\$64.1</i>			
<i>Rest Areas</i>	<i>\$10.5</i>			
<i>Weigh Stations</i>	<i>\$37.5</i>			
Total	\$33,445.2	\$16,284.7	\$10,042.8	\$7,117.7

9.3.2. PARTNER-OWNED ASSETS AND FUNCTIONS

ODOT is involved in multiple aspects of planning and developing the transportation system; yet there are many occasions where ODOT works in cooperation with partner agencies to address transportation problems and/or fund improvements. Cost estimates for other modal transportation assets and for non-highway modes were determined using data from the sponsoring agency, local councils of government, ODOT publications, and input from ODOT staff.

The 25-year needs for assets owned and managed by partners—including bicycle and pedestrian facilities, ports and waterways, freight rail, passenger rail, and public transportation—total **\$6.9 billion**. Total resources projected to be available to meet these needs is **\$4.8 billion**. Of this, **\$943.3 million** is projected to come from state or federal funds passed through ODOT.

Table 9-2 shows the partner-owned and managed assets by category. The table also provides an estimated breakdown of the anticipated federal, state, and partner funding for maintaining and improving these assets and functions over the next 25 years and the resulting gap between estimated costs and financial resources.

The amounts shown in the “Federal and State Funds” column of **Table 9-2** are included in the baseline revenue forecast. Bicycle and pedestrian funding is equal to the Recreational Trails program funding apportioned to Oklahoma under the 2019 Consolidated Appropriations Act plus half of Transportation Alternatives set-aside. Highway-rail grade crossing funding is based on the amount apportioned to Oklahoma under the 2019 Consolidated Appropriations Act plus associated matching funding from ODOT’s state funds. Passenger rail funding derives from ongoing annual transfers of \$2.9 million from state fuel tax and general revenue funds to the Tourism & Passenger Rail Revolving Fund. Public transportation funding is based on formula apportionments under the 2019 Consolidated Appropriations Act and historical averages of competitive federal grant funding for which ODOT is the custodial agency. In addition, the transit figure reflects \$5.7 million per year from the state’s Public Transit Revolving Fund, which is derived from motor fuel taxes and general revenue funds.

Table 9-2. Projected 2020-2045 Costs, Revenues, and Funding Gap for Partner Responsibilities (Millions)

Function	Cost	Federal and State Funds	Partner Funds	Funding Gap
Bicycle and Pedestrian	\$900.5	\$122.8	\$368.2	\$409.6
Ports and Waterways	\$225.8	\$0.0	\$101.6	\$124.2
Freight Rail	\$1,266.2	\$170.8	\$16.4	\$1,079.0
<i>Class I and Class III Railroads</i>	<i>\$1,056.2</i>	<i>\$0.0</i>	<i>\$0.0</i>	<i>\$1,056.2</i>
<i>Highway-Rail Grade Crossings</i>	<i>\$210.0</i>	<i>\$170.8</i>	<i>\$16.4</i>	<i>\$22.8</i>
Passenger Rail	\$262.0	\$58.6	\$0.0	\$203.4
Public Transportation	\$4,288.9	\$591.1	\$3,335.3	\$362.5
<i>Rural Transit</i>	<i>\$1,209.8</i>	<i>\$546.2</i>	<i>\$416.2</i>	<i>\$247.4</i>
<i>Urban Transit</i>	<i>\$2,737.8</i>	<i>\$44.9</i>	<i>\$2,692.9</i>	<i>\$0.0</i>
<i>Tribal Transit</i>	<i>\$341.3</i>	<i>\$0.0</i>	<i>\$226.2</i>	<i>\$115.1</i>
Total	\$6,943.4	\$943.3	\$3,821.4	\$2,178.6

9.3.2.1. BICYCLE AND PEDESTRIAN

The bicycle and pedestrian needs were examined for each metropolitan area by reviewing the regional bicycle plans and/or bicycle-pedestrian elements of the latest LRTPs of the state’s MPOs, and by analyzing historic needs/costs as identified through the ODOT Transportation Alternatives Program.

ODOT projects it will provide **\$122.8 million** to support bicycle and pedestrian facility improvements. Local governments are projected to fund an additional **\$368.2 million**, leaving an unmet need of **\$409.6 million**.

9.3.2.2. PORTS AND WATERWAYS

The estimated cost to meet the 25-year ports and waterway needs for critical maintenance and capacity expansion totals **\$225.8 million**. These costs were developed based on information provided by the ODOT Waterways Program and the USACE.

ODOT does not provide funding for ports and waterways. Projected revenues available to the USACE and private ports during the 2020-2045 period total **\$101.6 million**, leaving an unmet need of **\$124.2 million**.

9.3.2.3. FREIGHT RAIL

The estimated cost to meet the 25-year private freight rail needs totals **\$1.05 billion**. These costs will be borne by private railroads. In addition, highway-rail grade crossing needs are projected to be **\$210.0 million**. Through state funds and appropriations of federal funding, ODOT projects it will contribute **\$170.8 million** toward meeting this need. A further **\$16.4 million** is projected to be contributed by local governments and railroads, leaving **\$22.8 million** in unmet highway-rail grade crossing needs.

9.3.2.4. PASSENGER RAIL

The passenger rail cost estimates were developed based on information provided by the ODOT Rail Programs Division and the 2018 Oklahoma State Rail Plan. Over the next 25 years, operating costs are projected to be **\$262.0 million**, of which **\$58.6 million** will be provided by state funds passed through by ODOT, leaving \$203.4 million in unmet passenger rail needs.

9.3.2.5. PUBLIC TRANSIT

Rural Transit

Rural transit costs were projected based on an analysis of historical costs. Over the next 25 years, rural transit needs total **\$1.21 billion**. ODOT is projected to provide **\$546.2 million** in pass-through state and federal funding, and rural transit agencies are projected to provide **\$416.2 million** in local resources to meet rural transit needs. The unmet rural transit needs total **\$247.4 million**.

Urban Transit

Urban transit cost projections for partner agencies are based on information published in fiscally constrained metropolitan L RTPs. Over the next 25-years, urban transit needs total **\$2,737.8 million**. About one third of this cost is covered through FTA funds provided directly to the metropolitan transit agencies. The remainder of the cost is the responsibility of the local governments and related transit agencies.

Over the next 25 years, ODOT is projected to provide **\$44.9 million** in state funds to support urban transit. The remaining **\$2,692.9 million** is projected to be met through local funding, fare revenues, and federal transit funding apportioned directly to urban transit providers.

Tribal Transit

Over the next 25-years, tribal transit needs total **\$341.3 million**. Based on federal fiscal year 2019 formula apportionments and historical data regarding competitive awards from the 49 U.S.C. § 5311(c) Public Transportation on Indian Reservations program, ODOT projects **\$148.9 million** to be available in federal funding to address tribal transit needs. The federal funds are apportioned and awarded directly to tribal transit agencies and are not passed through ODOT. A further **\$226.2 million** is projected to be made available from tribal resources, resulting in an unmet need of **\$115.1 million**.

9.4. REVENUE FORECAST

A forecast that accurately reflects the complex structure of ODOT's funding sources and portrays a consistent story of how these sources generate revenue over time is a critical component in understanding the nature and magnitude of future funding gaps. Scenario analysis powered by the forecast's assumptions and parameters can inform discussions around new or enhanced funding sources for transportation in Oklahoma.

The baseline revenue forecast includes state revenues projected under current law and Oklahoma's share of federal apportionments for highways and transit over the 25-year forecast period of fiscal years 2020 to 2045. To develop the forecast, historic revenues and funding were documented. Next, growth rate assumptions for the forecast period were developed for each revenue and funding line item, in collaboration with ODOT staff.

9.4.1. METHODOLOGY

All sources of federal funding remain at fiscal year 2019 funding levels through the forecast horizon. This assumption is based on uncertainty related to solvency issues of the Federal Highway Trust Fund and the lack of a long-term funding act for surface transportation. The most recently enacted surface transportation funding authorization

was the FAST Act, which was signed into law in December 2015 and provided funding for federal fiscal years 2016 through 2020.

State revenues are projected according to the output of a model of the dynamics of Oklahoma's vehicle fleet, VMT, and vehicle registrations.

9.4.2. DEDUCTIONS

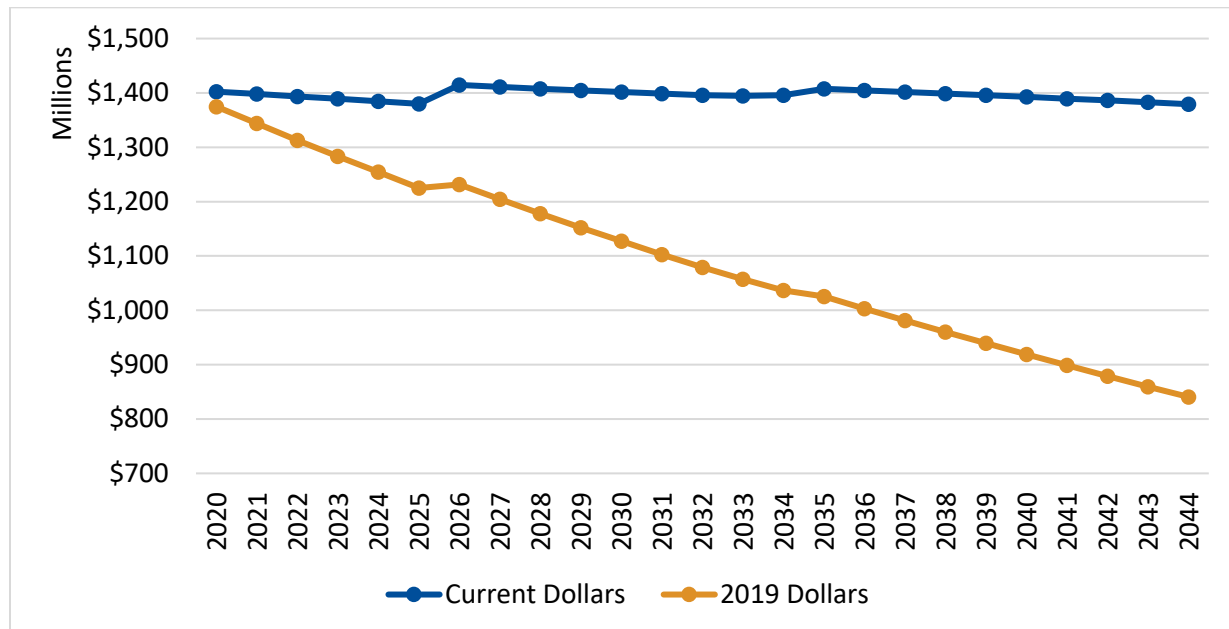
Deductions from the revenue forecast are made to account for required debt service payments on currently outstanding debt and an estimate of projected funds that will pay for non-infrastructure related costs such as the administration of ODOT, research, and planning.

The baseline revenue forecast does not assume:

- Any changes to state or federal legislation that determine the amount of revenues ODOT receives.
- Any changes in tax rates, fee levels, or existing revenues.
- Receipt of any new revenue sources.
- Receipt of any proceeds from newly issued debt, general revenue appropriations from the state, or other special one-time funding.

9.4.3. FORECAST FINDINGS

As shown in **Figure 9-1**, over the forecast period, it is projected that state and federal funding to ODOT will total **\$34.9 billion** in current year dollars, which equates to **\$26.3 billion** in inflation-adjusted 2019 dollars. The adjustment for inflation assumes a 2.0 percent annual discount factor to equate the value of future dollars to the 2019 base year. The **\$34.9 billion** current year dollar amount is shown in **Figure 9-1** as the sum of the individual data points blue line. The **\$26.3 billion** inflation-adjusted amount is the sum of the individual data points on the orange line. The **\$8.6 billion** difference, or 24.6 percent cost of inflation, is the area between the blue and orange lines.

Figure 9-1. Projected Annual Revenue to ODOT


The model underlying the baseline revenue forecast produced several other outcomes relevant to long-term planning for Oklahoma's transportation system. They include:

- The percentage of Oklahoma VMT that generates fuel tax revenue is projected to decrease from 99 percent in 2020 to 78 percent by 2045.
- Fleet fuel economy is projected to increase from 17.4 miles per gallon (mpg) in 2020 to 25.0 mpg by 2045.
- By 2045, the amount of fuel tax revenue generated per VMT is projected to decrease by 44.7 percent compared to the 2020 baseline.
- Assuming annual construction cost inflation averaging 2.0 percent, the purchasing power of fuel tax revenue generated per VMT will decrease by 65.6 percent by 2045 compared to 2020.
- Under current law, the annual transfer of general revenue funds to ODOT through the ROADS Fund will gradually decrease from **\$266.5 million** in 2020 to **\$115.0 million** by 2045 (current dollars). This is due to increases in projected vehicle registration fee revenue to ODOT growing at a greater rate than projected decreases in incremental fuel tax proceeds.

9.5. FUNDING GAP AND IMPLICATIONS

As in many states, Oklahoma faces long-term challenge to maintaining its transportation system in a state of good repair. Under current state and federal law, most of the revenue that supports Oklahoma's transportation system is generated from fixed excise taxes on motor fuel tax. Over time, it is expected that this method of raising revenue will become increasingly obsolete because advancements in fleet fuel economy will cause less revenue to be raised from any given level of VMT. Increasing adoption of electric vehicles will exacerbate this problem, and the purchasing power of future revenues will be diminished by the compounding effects of inflation.

As shown in **Table 9-1** and **Table 9-2**, the gaps between projected needs and projected funding resources to meet needs on ODOT-owned infrastructure and assets that are owned and managed by partners stand at **\$7.1 billion** and **\$2.2 billion**, respectively. The aggregate **\$9.3 billion** gap on **\$40.4 billion** in aggregate need represents a 23.0 percent shortfall.

Based on projections of the long term trends on fleet fuel economy and the market share of electric vehicles, it is expected that the bulk of the **\$9.3 billion** gap will occur in the later years of the 2020-2045 timeline. Therefore, policymakers have some time to find solutions that are supported by the public, are sufficient to close the projected gap, and can be implemented before the transportation system deteriorates beyond repair.

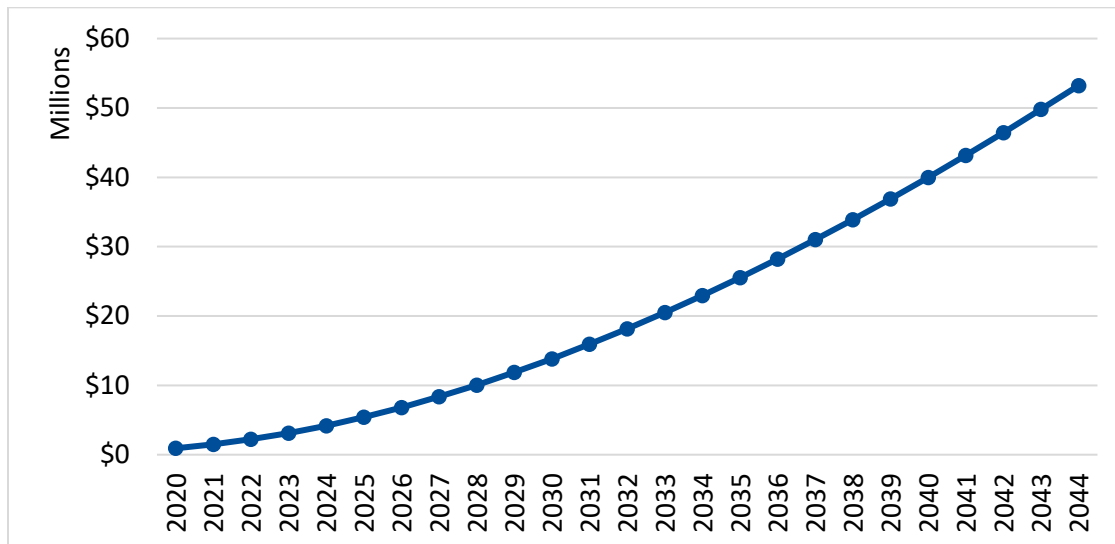
9.6. POTENTIAL EXAMPLES TO ADDRESS THE FUNDING GAP

As motor fuel taxes are projected to cease to be a viable long-run source of funding for the transportation system, an analysis of three alternative sustainable sources of funding were examined. This section summarizes the benefits of three potential sources of new revenue for ODOT: Electric vehicle fees, indexing existing motor fuel tax rates to inflation, and levying a RUC.

9.6.1. ELECTRIC VEHICLE FEES

Until motor fuel excise taxes are replaced as the primary method of financing surface transportation, user fees for plug-in hybrid and fully electric vehicles will grow in importance as a method to address the structural gap in the transportation system's finances.

The baseline forecasts projects that there will be almost 875,000 EVs on Oklahoma highways by 2045. If each of these vehicles were subject to a \$100 surcharge in lieu of paying fuel taxes, this would generate **\$772.9 million** for ODOT over the forecast period (**\$533.9 million** in constant 2019 dollars). **Figure 9-2** shows the projected growth of EV registration surcharge revenue over time in constant 2019 dollars.

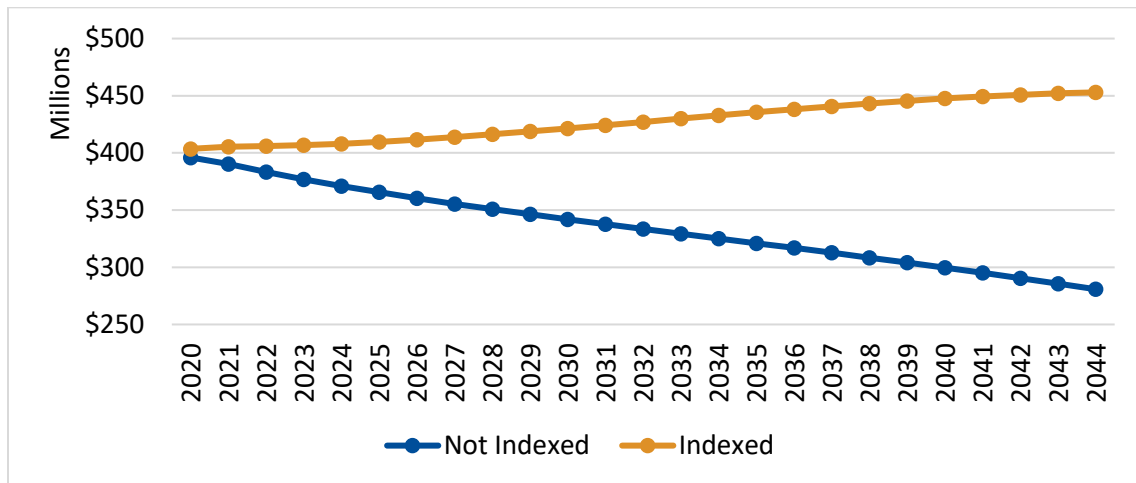
Figure 9-2. Projected Annual Revenue from \$100 EV surcharge (2019 Dollars)


At present, the number of EVs registered in Oklahoma represents a fraction of 1.0 percent of vehicle registrations in the state. However, as EVs capture a larger share of the market over time, a revenue source that offsets the loss in motor fuel tax revenues will become an increasingly important tool to bridge some of the gap between needs and resources.

9.6.2. INDEXING MOTOR FUEL TAX RATES TO INFLATION

Indexing motor fuel tax rates to a measure of inflation ensures that the long-run purchasing power of the tax revenue generated from the sale of a gallon of motor fuel does not deteriorate. Motor fuel taxation will still become increasingly obsolete as a user fee and the primary source for funding the transportation system due to advancements in fleet fuel economy and the adoption of EVs. However, indexing tax rates will buy policymakers time in designing and securing popular support for a sustainable replacement.

If Oklahoma indexed existing state motor fuel taxes to inflation without changing the statutory distribution of tax revenues, and if inflation averaged 2.0 percent per year to 2045, this would result in an additional **\$1.67 billion** in revenue to ODOT through the forecast period. **Figure 9-3** shows the large cumulative impact of a small annual adjustment in motor fuel tax rates to preserve purchasing power.

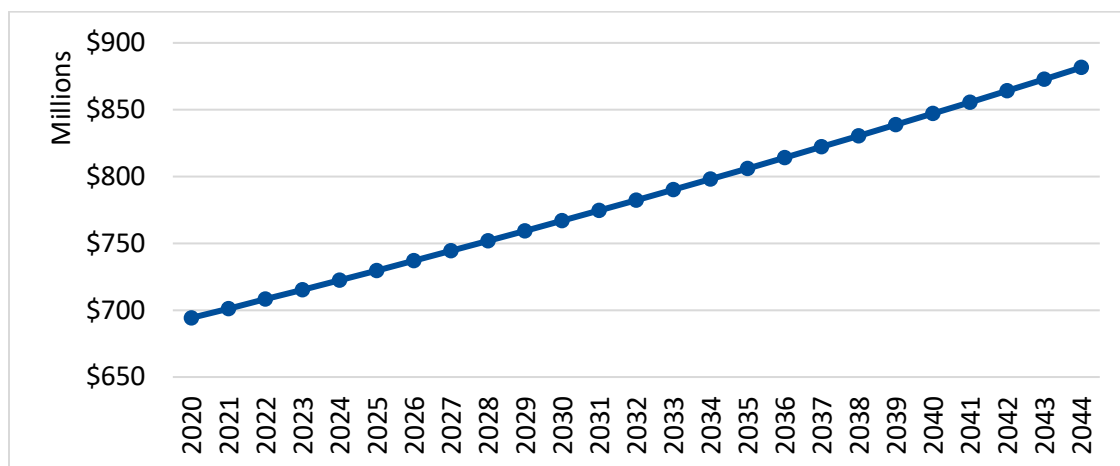
Figure 9-3. Impact over Time of Indexing Motor Fuel Tax Rates (Current Dollars)


9.6.3. VMT FEES / ROAD USER CHARGES (RUC)

A RUC is a direct charge to the user of the transportation system where motor vehicle operators pay for their per-mile use of public roads.

A fee averaging \$0.01 per mile for passenger vehicles and \$0.04 per mile for commercial vehicles would generate an estimated **\$680.6 million** per year, growing at the same rate as VMT, and would be unaffected by the dynamics of fleet fuel economy or the increasing market share of EVs. Over 25 years at 1.0 percent annual VMT growth, this revenue source would generate **\$15.2 billion**. This hypothetical RUC schedule would raise more revenue for ODOT than its current share of all existing state taxes and fees under current law with respect to the ownership or operation of a motor vehicle.

Figure 9-4 shows the trajectory of this hypothetical revenue stream to ODOT with 1.0 percent annual VMT growth.

Figure 9-4. RUC receipts to ODOT with 1.0% Annual VMT Growth (Constant Dollars)




OKLAHOMA Transportation

CHAPTER 10: POLICIES AND STRATEGIES



10.1. INTRODUCTION

Oklahoma's multimodal transportation system assets are the state's largest capital investment. Most of the transportation system investments were constructed over the last century, and this investment has connected Oklahoma's cities and towns to local, regional, national, and global economies. Today, there are numerous emerging trends that will impact how we develop, manage, and operate our transportation systems. For instance, technological advancements are changing rapidly, and this impacts how and where people commute to work and how goods are moved to and from markets. Technological advancements in CAVs, truck platooning, vehicle to infrastructure (V2I), MaaS, EVs, and many other areas will transform how people and goods move. Deploying fully connected and autonomous vehicles requires new technology and changes to highway infrastructure. Just as the U.S. and Oklahoma built the Interstate System in the 20th century, we must be prepared to adapt 21st century technology into Oklahoma's transportation system in the coming years. For instance, the U.S. DOT has estimated that 20 percent of intersections may be V2I-capable in 2025 and 80 percent will be V2I capable by 2040. Emerging transportation technologies are advancing fast and will be adopted even faster. While we do not know all the answers on how this will impact the transportation system, the updated and new 2045 LRTP policies and strategies will help prepare ODOT and other modal agencies to plan, manage, and operate a 21st-century transportation system.

The policies and strategies from the 2040 LRTP were used as the foundation for updating and developing new 2045 LRTP policies and strategies. During the planning process, the Advisory Committee provided input on how the following emerging trends impact the development of the 2045 LRTP policies and strategies:

- Connected and autonomous vehicles (CAV)
- Cybersecurity
- Electric vehicles
- Severe weather impacts
- Mobility as a service (MaaS)
- Alternative freight movement and demand

The policies and strategies are organized into the following seven categories:

- Highways and bridges
- Freight rail
- Passenger rail
- Public transportation
- Multimodal transportation
- Active Transportation
- Ports and waterways

10.2. HIGHWAYS AND BRIDGES

Oklahoma has an extensive highway network, which positions the state system as a vital link in the national transportation network. With its location at the crossroads of America, interstates cross Oklahoma connecting east and west coasts as well as facilitating movements from the Gulf of Mexico and Texas to and from all points north. A number of US highways and state highways stretch across the state connecting its communities and commercial centers. Many of these statewide highways, highways designated as critical for national defense, and interstate, are classified as part of the National Highway System (NHS).

ODOT is responsible for maintaining the 12,254 centerline mile state highway system and over 6,700 bridges. ODOT's ITS program employs and maintains technologies that benefit the movement of people and freight, and ODOT is planning to expand its effort. ITS improvements over time will benefit Oklahoma transportation considerably; and support ODOT's efforts toward improving safety, infrastructure preservation, mobility, economic vitality, environmental responsibility, and efficient system management and operation. ODOT remains committed to ensuring the safety of the traveling public. ODOT continues to implement safety measures, such as implementing centerline rumble strips on two-lane highways and 685 miles of cable barrier on multi-lane divided highways in an effort to reduce crossover crashes.

Despite significant financial hardships for the State of Oklahoma in recent years that necessitated deferring full funding for all the department's programs, ODOT has managed to construct, maintain, and operate the state transportation system in a thoughtful, fiscally responsible manner. More recently in 2019, the ROADS Fund reached the level agreed upon in 2012 legislation, ushering in what is hoped to be a period of improved financial support for transportation in the state.

The policies and strategies listed in **Table 10-1** will help prepare ODOT and other modal agencies in managing and operating a 21st century transportation system.

Table 10-1. Highway and Bridge Policies and Strategies

Reduce fatalities and serious injuries on Oklahoma highways through appropriate engineering solutions, systemic improvements, and educational policies. (Updated Policy)
• Consider public-private programs to increase driver awareness of the safety benefits of existing and near-future in-vehicle technology, such as automatic emergency braking and lane departure warnings. (New) • Improve safety of roadway infrastructure and— ○ Add shoulders on portions of the state highway system that lack them or have deficient shoulders. (Updated) ○ Continue to apply appropriate safety countermeasures to targeted locations. (Updated) • Continue to implement approaches outlined in the Oklahoma Strategic Highway Safety Plan and address crash types exhibiting increases in fatalities, notably pedestrian fatalities and those involving other vulnerable roadway users. (Updated)
Improve safety and bridge conditions by replacing or rehabilitating structurally deficient bridges on the state highway system and averting growth in the share of structurally deficient bridges. (Updated Policy)
• Implement Bridge Management System (BMS) and use BMS to inform a schedule program for replacing or rehabilitating bridges on the state highway system that might otherwise become structurally deficient. (Updated) • Continue to identify, rehabilitate, and replace at risk and fracture-critical bridges. (Updated) • Continue to follow a programmatic approach to identify and address potential preservation issues on historic bridges, working collaboratively with community partners. (Updated)
Preserve and improve the condition of highways and bridges. (Existing Policy)
• Continue to invest in bridge preservation to achieve and maintain a share of state-system structurally deficient bridges no greater than 1 percent. (New). • Continue to invest in pavement preservation and use the Pavement Management System to enhance conditions on the state highway system, particularly to increase the share of “good” pavement by 10 percent and meet state and federal performance targets. (Updated) • Implement the regulations outlined in the MAP-21 and FAST Act as they pertain to performance measures and asset management. (Updated)

Identify, assess, and mitigate risks to highway assets. (New Policy)

- Monitor risks to bridges and highway assets, including pavement and bridges, via the risk management process documented in the TAMP (New)
- Collect data required for risk analysis, including collection of trends or forecasts related to seismic activity, extreme weather, and other risk categories identified in the TAMP. (New)
- Consider new design standards to mitigate the risk associated with damage to bridges due to vehicle strikes. (New)
- Lend ODOT's expertise to local governments to model seismic risks to local bridges and update design standards if necessary. (New)
- Investigate the causes of past highway failures related to flooding and update design standards or hydraulic guidelines as needed. (New)

Improve operational performance of highways through operations management. (Updated Policy)

- Utilize operational strategies to reduce the impact of congestion-causing incidents on transportation systems. These include effective traffic incident management, traveler information systems, and technologies to manage safety in work zones. (Existing)
- Consider utilization of internet-based systems and emerging technologies for managing traveler information and user notifications. (Existing)
- Improve ITS communication and the use of variable highway message signs to inform motorists of congestion, bottlenecks, and work zones. (Existing)
- Develop a Transportation System Management and Operations (TSMO) Plan to guide ITS investment and improve efficiencies while minimizing cost. (New)
- Continue the use of ITS (e.g., variable message signs) to alert drivers of incidents, disruptions, and severe weather conditions. (New)

Improve commercial motor vehicle mobility and connectivity. (Updated Policy)

- Continue the use of Oklahoma Permitting and Routing Optimization System (OKiePROS) to provide assistance to oversize, overweight commercial motor vehicle users for making safe and efficient route choices. (Updated)
- Continue the use of and enhance Ports of Entry—technology-based commercial motor vehicle weight and credential screening stations located at major highway entry points to the state. (Existing)
- Monitor and manage congestion using ITS programs in cooperation with commercial vehicle industry and other stakeholders. (Existing)

- Make targeted investments on the National Highway System to accommodate traffic growth and truck routes and strengthen system safety and efficiency for truck operations. (Existing)
- Pursue opportunities to partner with private sector to provide for truck parking, including sharing information on parking locations and real-time availability. (Updated)
- Partner with the trucking industry to facilitate that adequate truck parking is available throughout the state. (New)
- Analyze truck travel time data to assist in decision making about freight related system improvements on the National Highway System. (Existing)

Support testing, development frameworks, trials, and appropriate implementation of new transportation technologies with potential to improve highway safety and/or mobility. (New Policy)

- Consider pilot programs for emerging transportation technology and identify preferred implementation strategies that address interactions between new and existing technology, and the application of lessons learned to future locations (New).
- Develop data sharing agreements with private companies providing transportation services to support operations management and project development. (New)
- Identify best practices on the collecting, storing, using, and sharing of data derived from emerging transportation technology. (New)
- Explore modifications to existing infrastructure to accommodate emerging transportation technologies. (New)
- Explore what is required to develop a fully integrated CAV system on clearly defined corridors (New)
- Investigate the use of emerging transportation technologies and explore their impact on operational and safety performance. (Updated)
- Consider policies related to communications technology (e.g., 5G, broadband) to support public-private implementation of emerging transportation technologies. (New)
- Coordinate with the Office of Management and Enterprise Services (OMES) to identify cyber and data security practices for ODOT platforms, particularly for data related to emerging transportation technologies. (New)

10.3. FREIGHT RAIL

Freight rail is vital in maintaining and improving both the state and national economies. Nearly three-quarters of all of the rail traffic in Oklahoma is through traffic, without an Oklahoma destination. The top weight commodity group transported by rail is coal, followed by nonmetallic minerals. Chemical products are the largest commodity group by value. Freight rail brings finished goods and raw materials to and from Oklahoma businesses, and moves material through and across the state. This system has proven valuable to the agricultural and energy industries.

Oklahoma shortline railroads provide critical connection to businesses across the state and play an important role in local economies. Freight rail safety will continue to be a priority with ODOT. Improvements to public highway-rail grade crossings in Oklahoma will continue to be included in the annual work program. The following policies and strategies listed in **Table 10-2** focus on strengthening the state's rail system, recognizing the key national, regional, and state roles it plays in economic competitiveness and safety.

Table 10-2. Freight Rail Policies and Strategies

Improve rail operations and operational effectiveness by encouraging public-private partnerships. (Existing Policy)
• Support identification and elimination of bottlenecks both on main lines and classification yards (the multi-track facilities where freight cars are transferred from one engine to another based on their destination) by the use of Class I railroads. (Existing) • Support double tracking and signal/operations improvements to mitigate freight rail congestion and to meet projected increase in rail traffic. (Existing) • Maintain coordination between government agencies and Class I railroads. (Updated) • Support upgrades to Class III track and structures to permit use of 286,000-pound standard rail cars and larger, which in turn will support service and improve service efficiency. (Updated) • Develop options for statewide programs to target preservation and upgrading of Class III lines. (Existing)

Improve rail conditions, operations, and safety through continued support and refinement of the Oklahoma Statewide Freight and Passenger Rail Plan. (Updated Policy)

- Periodically, perform an analysis of Oklahoma’s rail network to identify future connectivity gaps based on changing freight patterns and the Oklahoma Freight and Passenger Rail Plan. (Updated)
- Evaluate the new rail crossing inventory with rail and highway traffic data and review accident exposure ratings using the Federal Railroad Administration (FRA) safety program. (Updated)
- Provide technical assistance to local communities planning to improve highway -rail grade crossing facilities, including crossing surfaces and signal devices. (Existing)
- Continue to evaluate the consolidation of public highway-rail grade crossings to further improve safety. (Existing)

Improve rail-highway-port connections to facilitate intermodal freight movement. (Existing Policy)

- Monitor and promote opportunities for development of intermodal and multimodal facilities in Oklahoma. (Updated)
- Support the development of intermodal freight corridors that connect major population centers with freight generators and international gateways. (Existing)
- Encourage industrial development near rail corridors to enhance intermodal freight movement. (Existing)

10.4. PASSENGER RAIL

Passenger rail is an efficient transport mode, but because of its high capital cost, dense corridors are often required to justify the investment. By connecting the largest of Oklahoma's cities with rail connections to major population centers in adjacent states, the efficiencies of rail can be put to work. To gain the travel densities needed, local connections and other collector systems can be developed to serve less dense corridors and form a cohesive regional transportation system. Public sentiment about the existing passenger rail service in Oklahoma is positive and there is interest in expanding the passenger rail service. The following policies and strategies listed in **Table 10-3** endorse the continuation of passenger rail system and improving the intermodal connections in the state.

Table 10-3. Passenger Rail Policies and Strategies

Preserve and maintain existing service to provide people with multimodal options for intercity travel. (Existing Policy)
• Cooperate and coordinate with Amtrak, the Burlington Northern and Santa Fe Railway (BNSF), and the State of Kansas in evaluating potential passenger rail service by means of an Oklahoma City to Newton, Kansas, Amtrak route. To provide a direct link to Amtrak's national system. (Updated) • Evaluate current ridership trends and train frequencies to improve the existing Amtrak passenger rail service. (Existing)
Improve passenger rail as a modal choice by improving travel time, safety, and reliability of the service. (Existing Policy)
• Proceed with planning activities to determine feasibility of passenger rail service between Oklahoma City and Newton, Kansas. (New) • Identify, develop, and secure funding that promotes and enhances passenger rail system investment. (Existing) • Evaluate the new rail crossing inventory with current rail and highway traffic data and review incident exposure ratings using the FRA safety program. (Updated) • Provide technical assistance to local communities planning to improve public highway-rail grade crossing facilities, including crossing surfaces and signal devices. (Updated) • Continue to evaluate the consolidation of public highway-rail grade crossings to further improve safety. (Existing)

Increase intermodal passenger travel choices by improved connections at passenger rail stations with intercity bus services, public transportation, and park- and-ride facilities. (Existing Policy)

- Encourage expanded and improved connections to passenger rail stations from rural, tribal, and urban public transit, intercity buses, and airport terminals. (Existing)
- Coordinate schedules to provide better connections between local and regional public transportation systems and to provide seamless and convenient transportation throughout the state. (Existing)
- Evaluate the feasibility of a station stop at Thackerville, Oklahoma to serve the tourism market in the region. (New)

10.5. PUBLIC TRANSPORTATION

Recent state legislation, Oklahoma Statutes (O.S.) Title 69, Article 3, Section 322, has created the Office of Mobility and Public Transit at ODOT that will consolidate transit activities previously performed by a variety of agencies. This will allow ODOT to appropriately structure and suitably resource the efforts necessary to succeed in their charter. In response to the need for an Oklahoma Public Transit Policy Plan (OPTPP), ODOT has elected to select a consulting firm to assist in creating this plan which will be an all-inclusive plan addressing public transit systems in the state and reflecting the needs established in the 2018 Oklahoma Transit Needs Assessment. The Transit Plan efforts will involve obtaining stakeholder input and provide for future collaboration and coordination among all public transit agencies and systems in the state.

The 2045 LRTP avoids duplicating the transit plans' effort by reviewing services administered by ODOT before the 2019 legislation, evaluating existing LRTP policies for use in concert with the OPTPP, and relying on the findings of the OPTPP for specific future policies and strategies.

Oklahoma has twenty rural public transportation providers and five urban public transit providers. Oklahoma also has ten tribal transit providers that directly provide transit services and two tribal entities that elect to contract for service provisions by other transit providers.

Comments received through the 2045 LRTP public and stakeholder engagement indicated a desire for improved public transportation options across all three types of service and a desire for accessibility and service improvements in order to minimize traffic on the roadways throughout the state. The following policy and strategies focus on increasing public transportation options and bringing the systems' assets to a state of good repair. The policies and strategies listed in **Table 10-4** aim to fortify Oklahoma's existing transit services, while advancing service improvements and efficiencies in locations where current demand are unmet or underserved.

Table 10-4. Public Transportation Policies and Strategies

Improve public transportation system operations and performance by promoting coordination and connections statewide among rural, urban, tribal, and intercity bus services. (Updated Policy)
• Complete and implement the coordinated plans being developed by the Office of Mobility and Public Transit. (New) • Expand and improve connections between rural transit systems and tribal systems, intercity bus stops/terminals, urban transit system transfer points, airports, and Amtrak Heartland Flyer stops. (Existing) • Continue collaboration with stakeholders in development of an electronic database and mobility management system regarding the state's transit service routes and locations. (Existing)
Support multiple modes of transportation connecting residential areas and employment locations, health services, and other activity centers. (Existing Policy)
• Encourage coordination between land use and transit planning, including pedestrian and bicycle connections to transit routes, practical transit stop locations, transit shelters, park-and-ride lots, access for elderly and disabled, and transit-oriented development. (Updated) • Promote benefits of agreements between rural transit systems and health and hospital systems, social service providers, and major employers to expand transit service options. (Updated) • Coordinate with health and human service agencies and others to expand paratransit services for special needs populations and individuals with disabilities. (Existing)
Protect Oklahoma's investment in the public transportation system by seeking additional/dedicated funding. (Existing Policy)
• Encourage continued cooperation and collaboration among ODOT, the tribal transit agencies, and the urban transit systems and appear as one voice to the Oklahoma legislative delegation on Federal Transit Administration (FTA) funding requests. (Existing) • Promote development of dedicated transit funding sources beyond the existing Public Transportation Revolving Fund. (Existing) • Support metropolitan area transit, including passenger rail initiatives, regional transit authority (RTA) and dedicated transit funding. (Updated)
Develop a Statewide Public Transportation Plan that identifies and targets opportunities for strategic improvements to services. (Existing Policy)
• Complete and implement the Oklahoma Public Transit Policy Plan. (New)

10.6. MULTIMODAL TRANSPORTATION

Since the early 1990s, the U.S. DOT has focused on efforts to encourage communication and coordination among various transportation modes. Thus, use of the words ‘intermodal’ and ‘multimodal’ have become a larger part of the transportation planning vocabulary. For the purpose of 2045 LRTP, these terms are explained as follows:

- Multimodal transportation is considered when the passengers or goods have multiple options to travel modes from origin to destination, for example via one or more of automobile, bicycle, pedestrian, transit, air, water, or freight transportation modes. For example, on a multimodal street or highway, passengers may have the option to travel via automobile, bicycle, walking, or bus.
- Intermodal transportation is the movement of passengers or goods from origin to destination through the use of one or more transportation modes – automobile, bicycle, pedestrian, transit, air, water, or freight – sequentially. Locations where passengers or goods switch from one mode to another are typically called ‘intermodal facilities,’ ‘terminals,’ or ‘centers,’ although some intermodal connections are as simple as a bus stop or a parking lot.

Thus, this multimodal section addresses issues that overlap or affect several modes, as well as themes that are important to many modes. The following policies and strategies listed in **Table 10-5** reinforce the key role that Oklahoma’s transportation system plays with state and national economic competitiveness. The multimodal concepts acknowledge the importance of developing a diverse transportation system that offers the traveling public and businesses competitive, safe, convenient, affordable, and environmentally responsible transportation choices.

These multimodal policies and strategies focus on maintaining the system in a “state of good repair” while also recognizing the fiscal challenges facing the federal and state programs with current dedicated revenue sources inadequate to sustain current spending limits.

The 2045 LRTP focuses on connectivity and safety among all of the modes: highways to railroads to ports; pedestrian and bicycle paths to public transit, passenger rail, and airports to various destinations. Many linkages also promote more livable communities. The strategies also recognize the special role that the transportation system plays in times of natural disasters and national emergencies.

Table 10-5. Multimodal Policies and Strategies

Protect Oklahoma’s investment in transportation by seeking to preserve and enhance current and/or new funding mechanisms for all modal systems. (Existing Policy)
• Develop and maintain information on historical trends and provide this information to state government leaders and the Congressional Delegation to support their search for new funding sources for the transportation system. Continue to assist government leaders in determining appropriate transportation funding and improvements priorities. (Existing) • Explore various alternatives for funding the state’s surface transportation program, such as: securing increased percentage of state motor vehicle revenue, increasing diesel tax, increasing freight fees, considering a vehicle miles traveled fee, innovative tolling, and applying road use pricing of CAV systems. (Updated) • Provide information to state government leaders and Oklahoma’s Congressional Delegation to assist them in finding additional sources of funding for rural, urban, and tribal transit; passenger and freight rail service improvements; aviation improvements; and waterways improvements. (Existing) • Continue to work with sovereign Native American tribes and nations to leverage resources for transportation improvements. (Existing) • Cooperate and coordinate with local governments to research possible new funding partnerships for transportation projects of mutual interest. (Existing)
Improve efficiency, economic vitality, and intermodal connectivity by following the goals, objectives, and strategies identified in the Oklahoma Freight Transportation Plan (Updated Policy)
• Implement the multimodal freight strategies identified in the 2018-2022 Oklahoma Freight Transportation Plan. (Updated) • Collaborate with freight stakeholders and utilize latest technologies and data to address freight bottlenecks and prioritize investments to eliminate the bottlenecks. (Updated) • Support investments to improve linkages between the airports, highways, railways, and water systems. (Existing)
Enhance modal choice for people and provide favorable conditions for transit ridership growth by identifying and improving intermodal connection points for travel by public transportation, intercity bus, passenger rail, airport, walking, bicycling, and automobile. (Existing Policy)
• Identify gaps and opportunities in urban, tribal, and rural public transportation, intercity bus, passenger rail, airports, automobiles, and bicycle and pedestrian facilities and operations. (Existing)

Protect the environment by promoting clean fuel and energy conservation practices within ODOT and to the traveling public. (Existing Policy)

- Assess current ODOT practices in construction, maintenance, and agency operations to identify areas for potential energy conservation. This could include installing light emitting diode traffic signals, reducing roadside mowing, using warm-mix asphalt, and other measures. (Existing)
- Focus efforts to assist the traveling public in conserving fuel, such as developing efficient traffic operations, traffic signal optimization, and work zone design to minimize idling time, etc. (Existing)
- Improve air quality by reducing traffic congestion and bottlenecks that result in increased emissions. (Existing)
- Support the use of clean fuels by ODOT, other state agencies, and the public. (Existing)
- Prepare for future extreme weather impacts on transportation infrastructure through site and stressor identification and risk assessment. (New)
- Develop after-action reports with clear recommendations for improvement following extreme weather events. (New)

Improve and promote security across all transportation modes through adoption of emergency preparedness protocols for managing natural and man-made threats to human resources, transportation capital assets, and information. (Existing Policy)

- Contribute to the public's safety by coordinating with the Oklahoma Department of Emergency Management, the U.S. Departments of Homeland Security and Defense, and the U.S. DOT to plan for the restoration, and ensure the availability, of transportation services after a disaster and during times of national emergencies. (Existing)
- Improve the security and resilience of the transportation system, including highways, transit, rail, ports and marine, air cargo, and passenger aviation, through identification of "safety-critical" assets. (Existing)
- Develop alternate routes and transportation system redundancy to maintain mobility during emergencies or natural disasters. (Existing)
- Maintain and improve urban area program to remove debris and litter from drains, culverts, and roadsides to minimize roadway flooding. (Existing)

Develop a comprehensive performance management framework for ODOT. (Updated Policy)

- Strengthen working relationships with MPOs, the FHWA, Tribal Transportation Assistance Program (TTAP) members, and other planning partners through development of performance measures and performance targets. (New)
- Continue communications with the Transportation Asset Management (TAM) Committee to reevaluate performance targets and investment priorities to work toward targets. (New)
- Implement performance-based planning and decision-making through a data-driven approach to project selection and prioritization for the Eight Year Construction Work Plan tying decisions to performance targets. (New)
- Create an electronic performance measures dashboard as part of ODOT's website and update regularly. (Existing)

Leverage public/ private partnerships to understand the public's travel patterns and best educate the public on the development of new technology. (New Policy)

- Create public/private partnerships (with companies such as Uber, Lyft, Lime, and Bird.) to assist with sharing data about travel patterns. (New)
- Explore data collection and sharing options and opportunities to enhance ODOT's cybersecurity. (New)

10.7. ACTIVE TRANSPORTATION

ODOT is dedicated to supporting a safe and effective transportation system that provides multimodal opportunities for active transportation. Consisting of multi-use trails, bicycle routes, and sidewalks, an active transportation system provides for and promotes health and safety for users and benefits the environment and the economy. Offering access to multiple modes of transportation makes Oklahoma a better place to live and visit. Bicycle and pedestrian accommodations are supported by federal and state legislation, policies, and practices. ODOT ensures that all state and federally funded transportation projects are constructed in compliance with the Americans with Disabilities Act.

Most of the multi-use trails, bicycle routes, and sidewalks in Oklahoma are owned and maintained by partners of ODOT, including county and city governments. ODOT coordinates with local governments and applicable MPOs in considering infrastructure options; and it facilitates the inclusion of these features in projects when appropriate. It is estimated that in 2018 Oklahoma had approximately 520 miles of bicycle trails, multi-use bicycle and pedestrian trails, and/or designated bicycle lanes, based on information from ODOT Enhancement/TAP grants, MPOs, and local governments. The following policies and strategies listed in **Table 10-6** will help promote active transportation systems throughout Oklahoma.

Table 10-6. Active Transportation Policies and Strategies

Support bicycle and pedestrian modal choices and promote healthy affordable modes of transportation. (Existing Policy)
• Continue to pursue opportunities to bring state highways in small communities into compliance with the Americans with Disabilities Act. (Existing) • Incorporate bicycle facility design standards into the next version of the ODOT Roadway Design Manual. (Existing) • Develop a statewide bicycle plan that emphasizes safety and builds and expands upon the work of MPOs. (Existing)

Improve modal choices and safety by incorporating pedestrian and bicyclist facilities in accordance with approved design standards. (Existing Policy)

- Continue to provide pedestrian signals, warning beacons, signage, striping, and lighting at intersections of state routes with high-volume pedestrian crossings. (Existing)
- Support inclusion of bicycle and pedestrian facilities into new and renovated intermodal facilities and connection points, such as train depots and bus terminals. (Existing)
- Support efforts by local governments, public transit providers, passenger rail systems, and others to expand and improve bicycle ways and walkway connections. (Existing)
- Leverage local funding contributions and encourage bicycle and pedestrian improvements by private developers. (New)
- Assess and respond to needs for pedestrian and bicycle infrastructure on or adjacent to state highways concurrent with related highway improvements, and as a part of the project development process. (Existing)
- Inform bicycle/pedestrian community about coordinating with the state's bicycle and pedestrian coordinator and about the public involvement process. (Existing)
- Improve curb access and parking options for all active transportation users. (New)

Promote and support public information outreach and education regarding safe and accessible transportation routes for bicyclists and pedestrians. (Existing Policy)

- Continue to educate communities about sidewalk and trail requirements associated with the Americans with Disabilities Act. (Existing)
- Promote statewide and local-area education programs to make transportation users aware of pedestrian and bicyclist rights and responsibilities. (Existing)
- Support efforts by health departments, educational facilities, and public safety agencies to provide bicycle and pedestrian safety lessons/workshops. (Existing)
- Encourage local communities that are planning or constructing new facilities for pedestrians and bicyclists to seek technical support from the state's bicycle and pedestrian coordinator. (Existing)

Promote access to active transportation options statewide. (New Policy)

- Support efforts to expand access to active transportation (Lime, Bird, etc.) options in urban and rural areas. (New)

10.8. PORTS AND WATERWAYS

The MKARNS is Oklahoma's primary navigable waterway originating from the Tulsa Port of Catoosa and flowing southeast through Arkansas to the Mississippi River. The strength of Oklahoma's waterways sets the state apart from other areas by providing greater options for the shipping and distribution of goods. However, waterways often do not receive the necessary funding to maximize their use. The available funding has not kept pace with the demand over the years, and wear and tear continues on the locks that are now over 45 years old. Faced with decreased federal funding, there have been discussions regarding contributions from the stakeholders, not only with funds, but other shared resources including equipment, labor, and materials. The following policies and strategies listed in **Table 10-7** seek to strengthen the MKARNS's economic competitiveness and security.

Table 10-7. Ports and Waterways Policies and Strategies

Protect the investment in the MKARNS by seeking increased federal funding. (Updated Policy)	
- Continue to work with federal and state officials to obtain funding for the maintenance of existing locks and dams as well as on-going critical needs. (Updated) - Continue to work with federal and state officials from Oklahoma and Arkansas to protect the confluence of the White and Arkansas Rivers. (Existing) - Continue to work with federal and state officials to authorize the deepening of the MKARNS channel. (Existing)	
Enhance intermodal connectivity by targeting improvements to truck corridors and railroads that provide access to MKARNS ports. (Existing Policy)	
Work collaboratively with the ports and other stakeholders to address issues related to transporting "super" loads from the ports. This could include improvement to bridge structures and pavement on routes to accommodate the "super" loads. (Existing)	
Facilitate modal choices for goods movement and provide a sustainable budget for marketing and development of Oklahoma ports and waterways. (Existing Policy)	
Seek partnerships with private-sector user groups, economic development associations, and other stakeholders to support promotion of the MKARNS channel. (Existing)	



OKLAHOMA Transportation

GLOSSARY



5-1-1 Travel Information Telephone Services	511 is the single travel information telephone number available to states and local jurisdictions across the country. It was designated in 2000 by the Federal Communications Commission (FCC), but there is on mandate to implement it.
8 Year Construction Work Plan (CWP)	the eight-year construction work plan administered by ODOT that guides the scheduling and conducting of the complex engineering, environmental, and right-of- way activities necessary to complete construction projects in a timely fashion. The first four years of the Eight Year Construction Work Plan are represented in the Statewide Transportation Improvement Program (STIP).
Association of Central Governments (ACOG)	a voluntary association of local governments in the Oklahoma City metropolitan area in central Oklahoma comprising Canadian, Cleveland, Grady, Logan, McClain, and Oklahoma Counties which serves as the Metropolitan Planning Organization.
Alternative Fuel Corridors	the U.S. Department of Transportation has designated national plug-in electric vehicle charging and hydrogen, propane, and natural gas fueling corridors to improve alternative fuel vehicle mobility.
Attenuators	an electronic device that reduces the power of a radio or audio signal.
Automated/autonomous vehicle technology (AV)	robotic vehicle that is designed to travel between destinations without a human operator. To qualify as fully autonomous, a vehicle must be able to navigate without human intervention to a predetermined destination over roads that have not been adapted for its use.
Auto Regressive Integrated Moving Average (ARIMA)	a popular and widely used statistical method for time series forecasting modeling.
Average Annual Daily Traffic (AADT)	the total volume of traffic on a highway segment for one year, divided by the number of days in the year.
Average Annual Daily Truck Traffic (AADTT)	the total volume of truck traffic on a highway segment for one year, divided by the number of days in the year.
Connected vehicles (CVs)	technologies that allow vehicles to communicate with other vehicles and the outside world around them through the internet.
Barge	the cargo-carrying vehicle that inland water carriers primarily use. Basic barges have open tops, but there are covered barges for both dry and liquid cargoes.
Bayesian Analysis	a method of statistical inference used to describe the probability of events based on prior knowledge of conditions that might be related to the event; Full Bayesian Analysis Tools versus Empirical Bayesian Analysis.
Bike Lane	a marked space for bicyclists on the street. This excludes locations with shared-lane (sharrow) markings.

Bottleneck	a section of a highway or rail network that experiences operational congestion.
Bulk Cargo	cargo that is transported unpackaged in large quantities in either liquid or granular, particulate form, as a mass of relatively small solids, such as petroleum/crude oil, grain, coal, or gravel.
Burlington Northern Santa Fe (BNSF)	BNSF operates one of the largest freight railroad networks in North America, with 32,500 miles of rail across the western two-thirds of the United States.
Capacity	physical facilities, personnel, and process available to meet the product of service needs of the customers. Capacity generally refers to maximum output of transportation network or facility.
Centerline Miles	represent the total length of a road from its beginning point to its end point. The number of the lanes on that road are ignored when calculating centerline mileage.
Class I Rail Carrier	classification of rail carriers having annual operating revenues of \$447,621,226 (current dollars) or more.
Class II Rail Carrier	classification of rail carriers having annual operating revenues less than \$447,621,226 but more than \$35,809,698 (current dollars).
Class III Rail Carrier	classification of rail carriers having annual operating revenues of \$35,809,698 (current dollars) or less.
Code of Federal Regulations (CFR)	Encapsulates the rules promulgated by federal agencies to implement the authority of laws, including transportation-related laws passed by the U.S. Congress.
Comparison Group Methodology	in non-experiment research design, a comparison group refers to a group of units (e.g., people) that either receive no treatment or intervention or receive an alternative treatment; used in “Comparison Group Methodology / Cross Sectional”.
Connected and Autonomous Vehicle (CAV)	Connected vehicles use various communication technologies to exchange information with other cars on the road. Autonomous, or “self-driving” vehicles operate without direct driver input to control the steering, acceleration, and braking and are designed so that the driver is not expected to constantly monitor the roadway while operating in self-driving mode.
Controlled Access Facility	a roadway where the spacing and design of driveways, medians, median openings, traffic signals and intersections are strictly regulated by consideration of such factors as traffic volume, number of lanes and adjacent land use.

Corridor Access Management	the design, application, and control of entry and exit points along a roadway to improve safety for all modes, facilitate walking and biking, and reduce trip delay and congestion.
Crash Modification Factors (CMFs)	a multiplicative factor used to compute the expected number of crashes after implementing a countermeasure on a road or intersection; the CMF Clearinghouse, funded by the FHWA, contains the database of CMFs used for transportation planning.
Daily Vehicle Miles Traveled (DVMT)	is calculated by adding up all the daily miles driven by all the cars and trucks on all the roadways in a region.
Displaced Left Turn (DLT) intersection	any intersection form relocating one or more left-turn movements on an approach to the other side of the opposing traffic flow, allowing left-turn movements to proceed simultaneously with the through movements and eliminating the left-turn phase for the approach. Also called a continuous flow intersection and a crossover displaced left-turn intersection.
Diverging Diamond Interchange (DD)	an interchange in which drivers make right turns as they would in a conventional diamond interchange but use crossovers to gently transition from the right side of the road to the left side of the road and then back again. All left turns occur without having to cross opposing traffic. Also called a Double Crossover Diamond.
Dynamic Message Signs (also called Variable Message Signs) (DMS)	large, electronic signs that overhang or appear along major highways. The signs are typically used to display information about traffic conditions, travel times, construction, and road incidents.
Fatality Rate	the number of fatalities per 100 million vehicle miles traveled.
Fatality Reporting System (FARS)	is a census of motor vehicle traffic crashes that result in a fatality to a vehicle occupant or nonmotorist within 30 days of the crash.
Federal Highway Administration (FHWA)	U.S. Department of Transportation agency responsible for administering the federal highway aid program to individual states, and helping to plan, develop and coordinate construction of federally funded highway projects.
Federal Railroad Administration (FRA)	is an agency in the United States Department of Transportation that creates and enforces rail safety regulations, administers rail funding, and researches rail improvement strategies and technologies.
Federal Transit Administration (FTA)	U.S. Department of Transportation agency that provides financial and planning assistance to help plan, build and operate rail, bus, and paratransit systems. The agency also assists in the development of local and regional traffic reduction programs.
Financial Constraint	a federal requirement that long-range transportation plans include only projects that have a reasonable expectation of being funded, based upon anticipated revenues. In other words, long-range transportation plans cannot

	be pie-in-the-sky wish lists of projects. They must reflect realistic assumptions about revenues that will likely be available looking forward at least 20 years
Fixing America's Surface Transportation Act (FAST ACT)	authorized \$305 billion over fiscal years 2016 through 2020 for highway, highway and motor vehicle safety, public transportation, motor carrier safety, hazardous materials safety, rail, and research, technology, and statistics programs.
Geolocation	the estimation of the physical location of an object such as a mobile phone or internet-connected device using geographic coordinates.
Greenhouse Gas (GHG)	A greenhouse gas is any gaseous compound in the atmosphere that is capable of absorbing infrared radiation, thereby trapping and holding heat in the atmosphere.
Highway Performance Monitoring System	a national level highway information system that includes data on the extent, condition, performance, use and operating characteristics of the nation's highways.
Hundred Million Vehicle Miles Traveled (HVMVT)	is used to calculate the ratio of total number of fatalities and serious injuries to the number of vehicle miles traveled (VMT, in 100 Million VMT) in a calendar year.
Indian Nations Council of Governments (INCOG)	a voluntary association of local and tribal governments in the Tulsa metropolitan area in northeast Oklahoma comprising Creek, Osage, Rogers, Tulsa, and Wagoner Counties which serves as the Metropolitan Planning Organization.
Intelligent Transportation System (ITS)	a system that collects, stores, processes, and distributes information relating to the movement of people and goods.
International Roughness Index (IRI)	a scale for roughness based on the simulated response of a generic motor vehicle to road surface irregularities.
Intermodal	term "mode" is used to refer to a means of transportation, such as automobile, bus, train, ship, bicycle, and walking. Intermodal refers specifically to the connections between modes.
Intermodal Connectors	facilities that provide access to intermodal facilities.
Intermodal terminal	a facility for the transfer of containers between railroad and truck.
J-Turn Intersection	an alternative to a traditional roadway intersection in which drivers turn right in the same direction of traffic, merge into the left lane, then make a U-turn in the direction they intend to travel, instead of crossing fast-moving lanes of traffic; see also RCUT intersection.

Kansas City Southern Railway (KCS)	is a Class I railroad that operates in 10 midwestern and southeastern U.S. states: Illinois, Missouri, Kansas, Oklahoma, Arkansas, Tennessee, Alabama, Mississippi, Louisiana, and Texas.
Last Mile	figure of speech describing movement of goods from a transportation hub to the final delivery destination.
Level of Service (LOS)	qualitative measure of a road's operating conditions.
Linear Referencing Systems (LRS)	a method of storing geographic locations by using relative positions along a linear feature often used to locate events along a road, like traffic accidents or recording roadway attributes.
Lock	device used for raising and lowering boats, ships, and other watercraft between stretches of water of different levels on river and canal
Logistics	all activities involved in the transport of goods to customers.
Long Range Transportation Plan (LRTP)	document produced by regional or statewide agency serving as the vision for the region's or state's transportation systems and services. In metropolitan areas, the plan typically indicates all the transportation improvements scheduled for funding over the next 20 years and is sometimes known as the metropolitan transportation plan.
Maintenance	activities undertaken to keep the state's transportation infrastructure and equipment operating as intended, to eliminate deficiencies, and to extend or achieve the expected life of facilities before reconstruction is needed. These include routine or day-to-day activities (e.g., pothole patching, mowing, litter removal, guardrail repair and striping, routine bus inspection and maintenance, and periodic dredging of channels) and periodic major projects (e.g., resurfacing roadways and runways, and rehabilitating bridges).
Mobility as a Service (Maas)	is the integration of various forms of transport services into a single mobility service accessible on demand, such as public transport, ride-, car- or bike-sharing, or taxi.
Moving Ahead for Progress in the 21st Century Act (Map-21)	in 2012, MAP-21 authorized over \$105 billion in federal funding for surface transportation programs for fiscal years 2013 and 2014. It was extended until the signing of the FAST Act in December 2015.
McClellan-Kerr Arkansas River Navigation System (MKARNS)	the 445-mile navigation channel that begins at the confluence of the White and Mississippi Rivers and proceeds one-half mile upstream on the White River to the Montgomery Point Lock and Dam. From there, the channel proceeds 9 miles upstream on the White River to the manmade Arkansas Post Canal, and then 9 miles through the canal to the Arkansas River. The McClellan-Kerr Arkansas River Navigation System crosses the state of Arkansas into Oklahoma, traversing the state until it reaches the confluence of the Arkansas and Verdigris Rivers where the navigation channel follows the

	Verdigris River terminating 51 miles upstream at the Port of Catoosa, near Tulsa.
Median U-Turn Intersection (MUT)	an alternative intersection design in which direct left turns from both the major and minor approaches are eliminated from the main intersection (full MUT) or where direct left turns from only the major approaches are eliminated (partial MUT). Drivers on major approaches are required to first travel straight through the at-grade main intersection and then execute their left turns by making U-turns at the median opening downstream of the intersection. On the minor street, drivers who want to turn left onto the major road must turn right at the main intersection, execute a U-turn at a downstream median opening, and proceed straight through the main intersection.
Metropolitan Planning Organization (MPO)	regional policy-setting body, required in urbanized areas with populations over 50,000, and designated by local officials and the governor of the state; responsible in cooperation with the state and other transportation providers for carrying out the metropolitan transportation planning requirements of federal highway and transit legislation.
Mileage-based User Fee (MBUF)	is a user charge based on miles driven in a specific vehicle as opposed to the current excise tax on fuel consumed.
Mobility	the ease with which people or goods move from place to place.
Metropolitan Transportation Plan (MTP)	a Metropolitan Planning Organization's long range multimodal transportation plan that identifies how the metropolitan area will manage and operate the transportation system for a 20+- year planning horizon.
Multi-objective Decision Analysis (MODA)	is an industry-standard best practice for transparently evaluating cross-discipline performance considerations on a level-playing-field in alignment with agency priorities.
Multi-use Trail	refers to a paved or smooth gravel pathway for walking and/or bicycling that is separated from motor vehicle traffic yet still functions as a transportation facility.
Multimodal	transportation of freight using several modes.
National Environmental Policy Act (NEPA)	is an environmental law that promotes the enhancement of the environment and established the President's Council on Environmental Quality that was enacted in law on January 1, 1970.
National Highway Freight Network (NHFN)	mandated by the Fixing America's Surface Transportation Act (FAST Act) to strategically direct federal resources and policies toward improved performance of highway portions of the U.S. freight transportation system and includes the Primary Highway Freight System (PHFS) plus remaining Interstates not on the PHFS.

National Highway System (NHS)	roadway system established by Congress consisting of roads important to the national economy, defense, and mobility. The NHS includes the following subsystems of roadways, Interstates, some Principal Arterials, the Strategic Highway Network, and Intermodal Connectors. The MAP-21 legislation made some significant changes to the NHS.
National Performance Management Research Data Set (NPMRDS)	Federal Highway Administration database that contains location information collected in five-minute intervals for road segments on the National Highway System. The data can be used to estimate speed for roadway segments (Sometimes referred to as National Travel Time Data.).
National Transit Database (NTD)	is a federal reporting program for transit agencies receiving Federal Transit Administration funding and it serves as a primary repository for all transit-related data and statistics.
Network Screening	the first step in the six-step safety management process outlined in the AASHTO Highway Safety Manual that involves identifying roadway sites for further investigation and potential treatment. These sites are expected to benefit the most from targeted, cost-effective treatments.
OKiePROS	Oklahoma Permitting and Routing Optimization System: Automated permitting and routing system for oversized or overweight truck loads.
Oklahoma Freight Transportation Plan (OFTP)	Oklahoma's statewide freight plan, developed in accordance with federal law, that addresses the state's strategy for providing a safe, reliable, and productive freight transportation system.
Oklahoma Public Transit Policy Plan (OPTPP)	Oklahoma HB1365, codified as Title 69 Section 322 of the Oklahoma Statutes requires the development of the Oklahoma Public Transit Policy Plan. The Oklahoma Public Transit Policy Plan is currently being developed jointly by ODOT and the Oklahoma Transit Association and must be submitted to the Governor, the Oklahoma Legislature by December 1, 2020.
Oklahoma Turnpike Authority (OTA)	is an instrumentality of the State created by the state legislature, by statute in 1947 for the purpose of constructing, operating, and maintaining the Turner Turnpike. In 1954, the original purpose was statutorily redefined to allow construction of additional turnpikes, and changes were made in the Authority's membership to include a representative from each of Oklahoma's congressional districts. The OTA's governing body (the Authority) consists of the Governor (ex-officio) and six members, appointed by the Governor and approved by the State Senate, serving an eight-year uncompensated term.
Pavement Management System (PMS)	is a set of defined procedures for collecting, analyzing, maintaining, and reporting pavement data, to assist the decision makers in finding optimum strategies for maintaining pavements in serviceable condition over a given period of time for the least cost.

Pavement Quality Index (PQI)	Does not require any new measurements or methods; rather, it simply utilizes procedures that are already in place and well established. The PQI is an amalgam of the Pavement Condition Rating (PCR) and the International Roughness Index (IRI).
Pedestrian Hybrid Beacon (PHB)	A traffic control device used to increase motorists' awareness of pedestrian crossings at uncontrolled marked crosswalk locations. PHBs remain dark until activated, removing any judgement from motorists and requires a complete stop.
Pedestrian Refuge	a small section of pavement or sidewalk in the street crosswalk where pedestrian can stop, allowing pedestrians to cross one direction of traffic at a time; used to reduce pedestrian crashes.
Performance Measures	metrics that can be used to track results and can serve as a basis for comparing progress against a target or other objective.
Public Participation Plan (PPP)	The Public Participation Plan (PPP) provides a framework to the public involvement process regarding statewide planning related activities. The plan identifies federal and state requirements; PPP goals, objectives, and policies; planning activities which require public involvement and the process(es) involved when providing the public with full access to and notice of planning activities.
Port of Entry (POE)	In Oklahoma, Ports of Entry are locations at the state border where commercial vehicles undergo electronic processing for a number of items, including but not limited to driver credentials, weight, tax and fee status, and safety inspection. At the national level, Ports of Entry usually means a place where foreign goods may be cleared through customs.
Positive Train Control (PTC)	systems are technologies designed to automatically stop a train before certain accidents related to human error occur.
Rebuilding Oklahoma Access and Driver Safety (ROADS) Fund	created by the Oklahoma Legislature in 2005 to ensure dedicated revenue for the maintenance and repair of state highways and bridges.
Regional Council of Government (COG)	Regional Councils are voluntary associations of local governments formed under Oklahoma law. These associations deal with the problems and planning needs that cross the boundaries of individual local governments or that require regional attention. Regional councils coordinate planning and provide a regional approach to problem solving through cooperative action.
Regional Railroad	see Class II railroad.
Regional Traffic Management Center (RTMC)	central facilities used to disseminate information to the traveling public; typically, operators use software to control field devices such as Dynamic

	Messaging Signs and view data and video collected throughout the monitored area; see also Traffic Management Center (TMC).
Regional Transit Authority (RTA)	is a public transportation service that provides fixed route and paratransit service in a given region.
Reliability	refers to the degree of travel time certainty and predictability on the transportation system.
Restricted Crossing U-Turn Intersection (R-Cut)	see J-turn intersection.
Retroreflective Backplate	Retroreflective borders installed around the perimeter of the face of the existing a traffic signal backplate used to enhance the visibility of the traffic signal and reduce red-light running; used in context of program.
Road Safety Audit	a formal safety performance examination of an existing or future road or intersection by an independent, multidisciplinary team; qualitatively estimates and reports on potential road safety issues and identifies opportunities for improvements in safety for all road users.
Road Usage Charge (RUC)	is a policy whereby motorists pay for use of the roadway network based on distance traveled.
Road Weather Information System (RWIS)	a system comprised of environmental sensor stations (ESS) located in the field, a communications system for data transfer, and central systems used to collect data from various ESS. Stations measure atmospheric, water level, and pavement conditions and data are used to support decision-making by road operators and maintainers.
Safety Edge	a safety solution designed to allow drivers who drift off the highway to return to the road safely; instead of a vertical drop-off, pavement edges are shaped to 30 degrees.
ShakeCast	created by the U.S. Geological Survey, to identify specific bridges for immediate inspection by comparing state bridge data with the severity of an earthquake's ground motions nearly in real time.
Short Line Railroad	see Class III railroad
State of Good Repair (SGR)	condition in which a capital asset is able to operate at a full level of performance.
State Highway System (SHS)	A network of approximately 12,000 miles of highways owned and maintained by the State of Florida or state-created authorities. Major elements include Interstate highways, Florida's Turnpike and other toll facilities operated by transportation authorities and arterial highways.
Statewide Transportation	is a financially constrained program which details the utilization of Oklahoma's federal and state transportation funds appropriated for regionally significant

Improvement Program (STIP)	projects requiring federal action. It includes a list of priority transportation projects to be carried out in a four (4) year period. The first four years of the Eight Year Construction Work Plan are represented in the Statewide Transportation Improvement Program (STIP).
Strategic Highway Network (STRAHNET)	critical to the Department of Defense's domestic operations. STRAHNET is a 62,000-mile system of roads deemed necessary for emergency mobilization and peacetime movement of heavy armor, fuel, ammunition, repair parts, other commodities to support U.S. military operations. STRAHNET facilities are also on the National Highway System. Strategic highway network connectors are highways that provide access between major military installations and highways that are part of the Strategic Highway Network.
Strategic Highway Safety Plan (SHSP)	a collaborative plan between ODOT, the OK Highway Safety Office, the OK Highway Patrol, and the OK Department of Public Safety developed to harmonize the highway safety goals and strategies among these agencies; the plan is required by FHWA and includes projects funded by the Highway Safety Improvement Program (HSIP).
Street	public thoroughfare especially in a city, town, or village including all areas within the right-of-way (such as sidewalks) and sometimes further distinguished as being wider than an alley or lane but narrower than an avenue or boulevard.
Supply Chain	system of organizations, people, activities, information, and resources involved in moving a product or service from supplier to customer.
Transit Economic Requirements Model (TERM)	the Federal Transit Administration's (FTA's) capital needs analysis tool used to assess the current physical condition and future investment needs of the nation's transit assets.
Transportation Alternatives Program (TAP)	is administered by the U.S. Federal Highway Administration (FHWA) and helps states fund a variety of activities related to improving transportation assets, including on- and off-road pedestrian and bicycle facilities, environmental mitigation, and creating or improving recreational trails projects.
Transportation Asset Management Plan (TAMP)	the risk-based plan, required by MAP-21 and developed for the National Highway System (NHS), that uses performance-based budgeting to improve or preserve the condition of the assets and the performance of the NHS.
Transportation Improvement Program (TIP)	a short-term program of MPO transportation projects that will be funded with all federal funds expected to flow to the region; the TIP also lists locally and state-funded regionally significant projects. The projects contained in the TIP are drawn from, and consistent with, the MPO long-range transportation plan.
Transloading	transferring bulk shipments from one mode to another.

Traffic Management Center (TMC)	the hub of most freeway management systems where data about the freeway are collected and processed, fused with other operational and control data, synthesized to produce "information", and distributed to stakeholders such as the media, other agencies, and the traveling public; see also Regional Traffic Management Center (RTMC).
Traffic Systems Management and Operations (TSMO)	a set of strategies that focus on operational improvements that can maintain or restore the performance of an existing transportation system before extra capacity is needed; solutions are ideally comprehensive and quickly administered at a relatively low cost; helps agencies balance supply and demand and remain flexible in changing conditions.
Tribal Transportation Assistance Program (TTAP)	is administered by the U.S. Federal Highway Administration (FHWA) that provides comprehensive transportation training and technical assistance to tribal communities, building skills and expertise to ensure the safety and maintenance of tribal roads.
Truck Platooning	is the linking of two or more trucks in convoy, using connectivity technology and automated driving support systems. These vehicles automatically maintain a set, close distance between each other when they are connected for certain parts of a journey, for instance on motorways.
Truck Travel Time Reliability (TTTR)	is defined by the FHWA as the percent of person-miles on the highway that are reliable.
Union Pacific Rail (UP)	Is a Class I railroad that operates over 32,200 miles routes in 23 states west of Chicago and New Orleans.
U.S. Army Corps of Engineers (USACE)	is an engineer formation of the United States Army that primarily oversees dams, canals, and flood protection in the United States, as well as a wide range of public works throughout the world.
Useful Life Benchmark (ULB)	is the average age-based equivalent of a 2.5 rating on the FTA Transit Economic Requirements Model (TERM) scale. Transit agencies can adjust their Useful Life Benchmarks with approval from FTA.
Vehicle to Everything (V2X)	is the passing of information from a vehicle to any entity that may affect the vehicle, and vice versa.
Vehicle-Miles Traveled (VMT)	unit for measuring vehicle travel distances; number of miles traveled nationally by vehicles for a period of one year.
Vehicle to Infrastructure (V2I)	a communications model that allows vehicles to share information with components of a highway system; examples of components include RFID. readers, cameras, traffic lights, and streetlights.