

# Oklahoma Long Range TRANSPORTATION PLAN



Moving Oklahoma  
**FORWARD**

Technical Memorandum

## MULTIMODAL NEEDS

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Oklahoma Department of Transportation

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The Technical Memos were written to document early research for the 2015-2040 Oklahoma Long Range Transportation Plan (LRTP). Most of these memos were written in 2014; all precede the writing of the 2015-2040 Oklahoma LRTP *Document* and 2015-2040 Oklahoma LRTP *Executive Summary*.

The 2015-2040 Oklahoma LRTP *Document* and 2015-2040 Oklahoma LRTP *Executive Summary* were composed in Spring 2015.

If there is an inconsistency between the Tech Memos and the 2015-2040 Oklahoma LRTP *Document* or 2015-2040 Oklahoma LRTP *Executive Summary*, the reader should assume that the *Document* and *Executive Summary* contain the most current and accurate information.



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# Oklahoma Long Range TRANSPORTATION PLAN

## 1. INTRODUCTION

The Oklahoma Department of Transportation (ODOT) 2015-2040 Long Range Transportation Plan (LRTP) establishes a framework for the future using a policy approach to guide ODOT as it maintains and enhances a multimodal transportation<sup>1</sup> system for the State of Oklahoma. This technical memorandum supports the development of the policy framework for the LRTP by identifying and analyzing multimodal needs and estimated costs in light of LRTP goals, existing trends, and desired future performance.

This technical memorandum details the future multimodal needs and estimated costs for the following transportation assets/functions that are ODOT's responsibility or under the jurisdiction of partner<sup>2</sup> agencies or governmental entities. (**Appendix A** lists sources that were used to develop cost estimates and to calculate projected revenues.)

### 1.1 State Transportation Assets – ODOT as Lead Agency

Based on available information, this technical memorandum describes the needs and estimated costs for the following transportation assets that are the responsibility of ODOT:

- State highway system<sup>3</sup> – span bridge and bridge box structures;
- State highway system – highways;
- State highway system – interchanges; and,
- Transportation appurtenances<sup>4</sup>
  - Safety
  - Maintenance
  - Ports of Entry
  - Weigh stations and rest areas
  - Intelligent Transportation Systems (ITS)
  - State owned freight rail and at-grade highway-railroad crossings
  - Preliminary Engineering

The needs for *bridges* and *highways* on the state highway system were determined using analytical models developed by the Federal Highway Administration (the National Bridge Investment Analysis Software or NBIAS and the Highway Economics Requirements System – State Version or HERS-ST), as well as input from ODOT staff and the public. Airport access needs were considered as a part of highway and bridge needs. The state bridge and highway system needs were assessed within the context of a forecasted average annual travel growth rate,<sup>5</sup> measured in vehicle miles of travel, of 1.24 percent per year over the next 25 years. This growth rate is consistent with Oklahoma and national transportation planning<sup>6</sup> data.





State highway system *interchange* needs and estimated costs were developed by analyzing historical ODOT programming of such improvements.

*Transportation appurtenances* (accessory items or items associated with the transportation system), such as safety, maintenance, Ports of Entry, weigh stations and rest areas, ITS, state-owned freight rail and at-grade highway grade crossings add to transportation investment costs. Improvements that will be needed over the next 25 years were determined based on consultation with ODOT staff and comments from stakeholders, and costs were based on analysis of historical data.

## **1.2 Transportation Assets under Jurisdiction of Partner Entities/Agencies**

Although ODOT is involved in multiple aspects of planning and developing the Oklahoma transportation system, there are many occasions where the Department works in cooperation with partner agencies to address transportation and mobility needs. Additionally, ODOT recognizes that there are institutional and jurisdictional arrangements, for example with counties or MPOs, where ODOT may serve as the second tier rather than the lead agency. The Department acknowledges that its experience and information related to the topics discussed below is a beginning, and is not fully comprehensive. ODOT fully expects that the work here can be amplified and updated by the lead entities.

Based on available information, this technical memorandum describes the needs and estimated costs for the following transportation assets that are the responsibility of federal or local partners:

- Private railroads;<sup>7</sup>
- Ports and waterways;
- Passenger rail;
- Public transportation;
  - Urban
  - Rural
  - Tribal
- Intermodal facilities;<sup>8</sup>
- Bicycle and pedestrian facilities;
- Congestion management; and,
- Non-state owned federal aid highway system.

In addition to the highways, bridges, interchanges, and other state-owned transportation assets - privately owned railroads, and public and private ports and waterways provide vital freight infrastructure in the state. Freight traffic tonnage (highway, freight rail, waterways) is expected to grow at an average annual rate of about 2 percent per year<sup>9</sup> with average annual commercial vehicle miles travel growth rates nearing 1.5 percent.



Likewise, personal travel requires access to and connectivity with passenger rail, public transit, bicycle and pedestrian facilities, intermodal hubs, and the city, town, and county streets and roads that link to the highway system. These transportation systems and services are an important part of the state's transportation and mobility system, even though their jurisdiction may not be directly under the Oklahoma Department of Transportation. ODOT and US DOT see the importance of an integrated system that considers all modes of transportation, and a planning process that is based on intergovernmental cooperation; thus the 2015-2040 Plan includes analysis of the eight transportation features listed above.

### **1.3 Funding Sources to Address Needs**

#### **ODOT responsible for funding improvements over 25 years**

The identified modal transportation needs are "owned" or addressed by multiple entities and institutional funding arrangements. The needs for state highway system bridges, roadways, interchanges, and transportation appurtenances are addressed by ODOT using federal and state funds.

#### **Partner entities, private sector finance some transportation improvements**

The partner owned modal programs are vitally important to providing an efficient transportation system. ODOT also provides some funding for these, including resources to support passenger rail operations, bicycle and pedestrian, and urban and rural transit. The LRTP assumes that passenger rail services are supported by the private operator, Amtrak,<sup>10</sup> fare box revenue, and state operating assistance provided through ODOT for the Heartland Flyer. There are multiple funding sources for bicycle and pedestrian facilities, including but not limited to: ODOT pass through of federal funds, local funding, developer fees and/or private contributions. Public transportation needs (urban, rural, and tribal) are also addressed in part by ODOT pass through of federal funds, as well as through local funding, contract and fare box revenue.

The privately owned freight rail improvement needs are addressed by railroad owners. The waterway needs, such as channel dredging, are the responsibility of the U.S. Army Corps of Engineers (USACE).

#### **Collaboration required to address multimodal transportation needs**

ODOT is not responsible for addressing all of the wide range of multimodal transportation needs in Oklahoma. However, ODOT and numerous federal, state, local partners work collaboratively to preserve, maintain, operate, and expand Oklahoma's multimodal transportation system.



# Oklahoma Long Range TRANSPORTATION PLAN

## 2. NEEDS, ESTIMATED COSTS, AND ANTICIPATED REVENUE

### 2.1 State Highway System and Appurtenances: Anticipated Revenue, Identified Needs, and Estimated Costs for ODOT

ODOT is charged with the planning, designing, construction, operation, and maintenance of Oklahoma's highway transportation infrastructure including the non-toll interstate highways, US highways, and state highways, and this collection is often described as the "state highway system." This infrastructure includes 12,265 miles of highways and 6,828 bridges. According to the needs analysis conducted for the 2015-2040 LRTP, ODOT should prepare to upgrade and improve transportation system components for bridges, highways, interchanges, and transportation appurtenances. A predominant theme in developing the needs assessment was to preserve and maintain the system in a state of good repair (SGR), maximizing the existing transportation system efficiency and minimizing highway expansion.

The cost of meeting the 25-year needs to preserve, maintain, modernize, and expand the state system totals **\$32.2 billion**, as shown in **Table 2-1**. The projected 25-year federal and state revenue to address these needs totals **\$25.0 billion**. Thus, ODOT's 25-year funding gap for the four categories enumerated below, totals **\$7.2 billion** (\$328 million average annual gap). The detailed description of these improvements and how cost estimates were calculated follows this section.

**Table 2-1: ODOT/State Highway System & Appurtenances: Anticipated Revenues and Costs**

ODOT/State Highway System	Projected Revenue <sup>1</sup>	Estimated Cost <sup>1</sup>	Difference <sup>1</sup>
Bridges		\$3,703.0	
Highways		\$16,567.4	
Interchanges		\$2,925.0	
Transportation Appurtenances		\$9,037.7	
<b>TOTAL</b>	<b>\$25,025.0</b>	<b>\$32,233.1</b>	<b>\$7,208.1</b>

<sup>1</sup> All figures shown in millions of 2013 dollars



ODOT is responsible for the entire \$32.2 billion of estimated costs listed above. **Table 2-2** provides the breakdown of the ODOT owned multimodal needs and estimated costs.

**Table 2-2: ODOT/State Highway System and Appurtenances:  
Transportation Needs and Estimated Costs**

Category		2015 – 2040 Oklahoma Estimated Multimodal Costs <sup>1, 2</sup>
Bridge	Rehabilitate	\$847.80
	Reconstruct	\$217.60
	Replace	\$2,637.60
	<b>Total Bridge</b>	<b>\$3,703.00</b>
Highway	Preserve	\$9,055.60
	Reconstruct	\$6,512.10
	Expand	\$999.70
	<b>Total Highway</b>	<b>\$16,567.40</b>
<b>Interchanges</b>		<b>\$2,925.00</b>
Transportation Appurtenances	Safety	\$874.21
	Maintenance	\$7,417.85
	Port of Entry	\$72.00
	Weigh Stations, Rest Areas	\$110.00
	ITS	\$52.10
	State Freight Rail	\$230.00
	Preliminary Engineering	\$281.50
	<b>Total Transportation Appurtenances</b>	<b>\$9,037.66</b>
<b>TOTAL</b>		<b>\$32,233.06</b>

<sup>1</sup> All figures shown in millions of 2013 dollars

<sup>2</sup> ODOT is responsible for the entire costs listed in this table



## 2.2 Partner-owned Transportation Assets: Anticipated Revenue, Identified Needs, and Estimated Costs for ODOT and Partner Entities

In addition to highway and bridge assets, ODOT works with its local, regional, federal, and private partners to address other needs including passenger rail operations, bicycle and pedestrian facilities, public transit, and tribal transportation; and assists local governments with maintaining the non-state owned federal aid highway system needs. ODOT also coordinates with the Oklahoma ports and waterways that are a part of the McClellan-Kerr Arkansas River Navigation System (MKARNS)<sup>11</sup>, and provides support in the form of in-kind services and improved highway connections. The port and waterway needs have been estimated by consulting with waterways stakeholders and the U.S. Army Corps of Engineers.<sup>12</sup>

This discussion of described needs, estimated costs and anticipated revenues for partner entities' transportation functions should be viewed as a beginning point. As stated earlier, the transportation programs and infrastructure discussed in this section are under the sponsorship of other entities, who have been helpful in creating this report. However, many of these entities are engaged in further efforts to expand or update their planning documents, and those sponsor agencies should be considered the most knowledgeable source.

The 25-year forecast of ODOT revenue shows that the Department expects state resources for this group of improvements at the level of \$2.41 billion. Based on available information, it is anticipated that other (public) partner entities will fund these various transportation improvements and functions at a total of \$1.87 billion. Summing the above amounts, the 25-year projected federal, state, and local revenue available to address these needs over the next 25 years is **\$4.29 billion**, as shown in **Table 2-3**.



**Table 2-3: Partner Transportation Assets and Functions: Projected Revenues**

Partner Transportation Assets and Functions		Projected ODOT Revenue <sup>1</sup>	Projected Partner Revenue <sup>1</sup>	Projected Total Revenue <sup>1</sup>
<i>Private Freight Rail (\$1,632.2)</i>				
<b>Passenger Rail</b>	Preserve Heartland Flyer, OKC to Ft. Worth TX, (operating subsidy)	\$53.5		\$53.5
	New: Extend Heartland Flyer to Newton KS- active 2035, (private sector capital: \$60M; public subsidy cost: \$13M )	\$0.0		\$0.0
	New: Tulsa to OKC passenger rail (private sector capital:\$355.7M)			
	<b>Total Passenger Rail (private capital~ : \$415.7M public subsidy:</b>	<b>\$53.5</b>		<b>\$53.5</b>
<b>Public Transportation</b>	Rural Transit	\$583.3 <sup>2</sup>	\$222.7 <sup>3</sup>	\$806.0
	Urban Transit	\$43.2 <sup>4</sup>	\$1,305.8 <sup>5</sup>	\$1,349.
	Tribal Transit		\$162.7 <sup>6</sup>	\$162.7
	<b>Total Public Transportation</b>	<b>\$626.5</b>	<b>\$1,691.2</b>	<b>\$2,317.7</b>
<b>Intermodal Facility</b>			<b>\$0.0</b>	<b>\$0.0</b>
<b>Ports and Waterways</b>			<b>\$72.4<sup>7</sup></b>	<b>\$72.4</b>
<b>Bicycle and Pedestrian</b>		<b>\$189.7<sup>8</sup></b>	<b>\$113.5<sup>9</sup></b>	<b>\$303.2</b>
<b>Locally owned Federal aid System</b>		<b>\$1521.2</b>		<b>\$1521.2</b>
<b>Congestion Management/Air Quality</b>		<b>\$30.5</b>		<b>\$30.5</b>
<b>Total</b>		<b>\$2,421.4</b>	<b>\$1,877.1</b>	<b>\$4,298.5</b>

<sup>1</sup> All figures shown in millions of 2013 dollars.

<sup>2</sup> Includes projected funds from the FTA 5311 & 5339 programs plus required local match, and 60% of the projected funds from state transit fund, and state public transit revolving fund.

<sup>3</sup> Includes projected funds based on the historic overmatch from rural transit agencies from years 2009 to 2013.

<sup>4</sup> Includes 40% of the projected funds from state transit fund, and state public transit revolving fund.

<sup>5</sup> Includes projected funds from the fiscally constrained long range plans for ACOG, INCOG, and Lawton MPOs.

<sup>6</sup> Includes projected funds from the FTA 5311 Tribal Transit Program.

<sup>7</sup> Includes projected funds based on the historic federal revenue available for the US Army Corps of Engineers.

<sup>8</sup> Includes projected funds from the recreational trails program, enhancement and transportation alternatives program (TAP), and part of CMAQ program, plus required local match.

<sup>9</sup> Includes projected funds from historic overmatch for federal TAP and CMAQ funds from ACOG, INCOG, Lawton and local governments.

Note: Information on transportation needs and related costs and revenues, for infrastructure or services in which local or tribal governments or other agencies are the lead entity, is described here based on information available. ODOT acknowledges that this is a preliminary and partial picture, and that updates and additional information can be generated by the sponsor entities.



The 25-year cost of these (partner entity) needs is estimated at **\$5.2 billion**, as shown in **Table 2-4**. Thus, the funding gap totals **\$903 million** (\$36 million average annual gap). Additional information about the needed improvements and related cost estimates follows this section.

**Table 2-4: Partner-Owned Transportation Assets and Functions: Estimated Costs**

Partner Transportation Assets and Functions		Expected ODOT Cost <sup>1</sup>	Estimated Partner Cost <sup>1</sup>	Estimated Total Cost <sup>1</sup>
<i>Private Freight Rail (\$1,632.2)</i>				
<b>Passenger Rail</b>	Preserve Heartland Flyer, OKC to Ft. Worth TX, (operating subsidy cost)	\$80.3	\$0.0	\$80.3
	New: Extend Heartland Flyer to Newton KS- active 2035, (private sector capital: \$60M; public subsidy cost: \$13M )	\$13.0	\$0.0	\$13.0
	New: Tulsa to OKC passenger rail (private sector capital:\$355.7M)			
	<b>Total Passenger Rail (private capital~ : \$415.7M public subsidy cost:</b>	<b>\$93.3</b>	<b>\$0.0</b>	<b>\$93.3</b>
<b>Public Transportation</b>	Rural Transit	\$583.3	325.7	\$909.0
	Urban Transit	\$43.2	\$1,305.8	\$1349.0
	Tribal Transit		\$162.7	\$162.7
	<b>Total Public Transportation</b>	<b>\$626.5</b>	<b>\$1,794.2</b>	<b>\$2,420.7</b>
<b>Intermodal Facility</b>			<b>\$94.5</b>	<b>\$94.5</b>
<b>Ports and Waterways</b>			<b>\$191.0</b>	<b>\$191.0</b>
<b>Bicycle and Pedestrian</b>		<b>\$189.7<sup>2</sup></b>	<b>\$661.3</b>	<b>\$851.0</b>
<b>Locally owned Federal aid System</b>		<b>\$1521.2</b>		<b>1521.2</b>
<b>Congestion Management/Air Quality</b>		<b>\$30.5</b>		<b>\$30.5</b>
<b>Total</b>		<b>\$2,461.2</b>	<b>\$2,741.0</b>	<b>\$5,202.2</b>

<sup>1</sup> All figures shown in millions of 2013 dollars

As a part of the planning process, ODOT also coordinated with the private Class I and Class III railroads that operate in Oklahoma. Based on the information collected, the 25-year total private railroad improvement needs total \$2.04 billion (\$1.6 billion for freight rail, and \$415.7 million for Tulsa to Oklahoma City Intercity passenger rail infrastructure). It is assumed that these needs will be addressed with private investments from the Class I and Class III railroads. (This information is mentioned here as the information is a part of the state's multimodal



investment picture, but the focus of the needs analysis as well as estimated cost and revenue analysis is on public sector resources.)

Of the \$5.2 billion of estimated costs listed above, ODOT is described as responsible for \$2.46 billion, whereas the partner entities are identified as responsible for the rest of \$2.74 billion of estimated costs. **Table 2-5** compares the breakdown of the ODOT and locally owned transportation needs and related estimated ODOT and partner entity revenue.

**Table 2-5: Partner Transportation Assets and Functions:  
Anticipated Revenues and Costs**

Partner Transportation Assets and Functions		Projected Revenue <sup>1</sup>	Estimated Cost <sup>1</sup>	Difference <sup>1</sup>
<i>Private Freight Rail (\$1,632.2)</i>				
Passenger Rail	Preserve Heartland Flyer, OKC to Ft. Worth TX, (operating subsidy)	\$53.5	\$80.3	\$26.8
	New: Extend Heartland Flyer to Newton KS- active 2035, (private sector capital: \$60M; public subsidy cost: \$13M )	\$0.0	\$13.0	\$13.0
	New: Tulsa to OKC passenger rail (private sector capital:\$355.7M)			
	<b>Total Passenger Rail (private capital~ : \$415.7M public subsidy cost:</b>	<b>\$53.5</b>	<b>\$93.3</b>	<b>\$39.8</b>
Public Transportation	Rural Transit	\$806	\$909.0	\$103
	Urban Transit	\$1349.0	\$1,349.0	\$0.0
	Tribal Transit	\$162.7	\$162.7	\$0
	<b>Total Public Transportation</b>	<b>\$2317.7</b>	<b>\$2420.7</b>	<b>\$103</b>
<b>Intermodal Facility</b>			<b>\$94.5</b>	<b>\$94.5</b>
<b>Ports and Waterways</b>		<b>\$72.4</b>	<b>\$191.0</b>	<b>\$118.6</b>
<b>Bicycle and Pedestrian</b>		<b>\$303.2</b>	<b>\$851.0</b>	<b>\$547.8</b>
<b>Locally owned Federal aid System</b>		<b>\$1521.2</b>	<b>\$1521.2</b>	<b>\$0.0</b>
<b>Congestion Management/Air Quality</b>		<b>\$30.5</b>	<b>\$30.5</b>	<b>\$0.0</b>
<b>Total</b>		<b>\$4,298.5</b>	<b>\$5,202.2</b>	<b>\$903.7</b>

<sup>1</sup> All figures shown in millions of 2013 dollars





### 2.3 Total 2015-2040 LRTP Anticipated Revenue, Identified Needs, and Estimated Costs

The estimated cost of meeting the 2015-2040 multimodal transportation needs in Oklahoma totals **\$37.4 billion** (2013\$). **Table 2-6** provides a summary of the projected revenues and costs for the 2015-2040 LRTP.

**Table 2-6: Projected Revenues and Estimated Costs for 2015-2040 Oklahoma Long Range Transportation Plan**

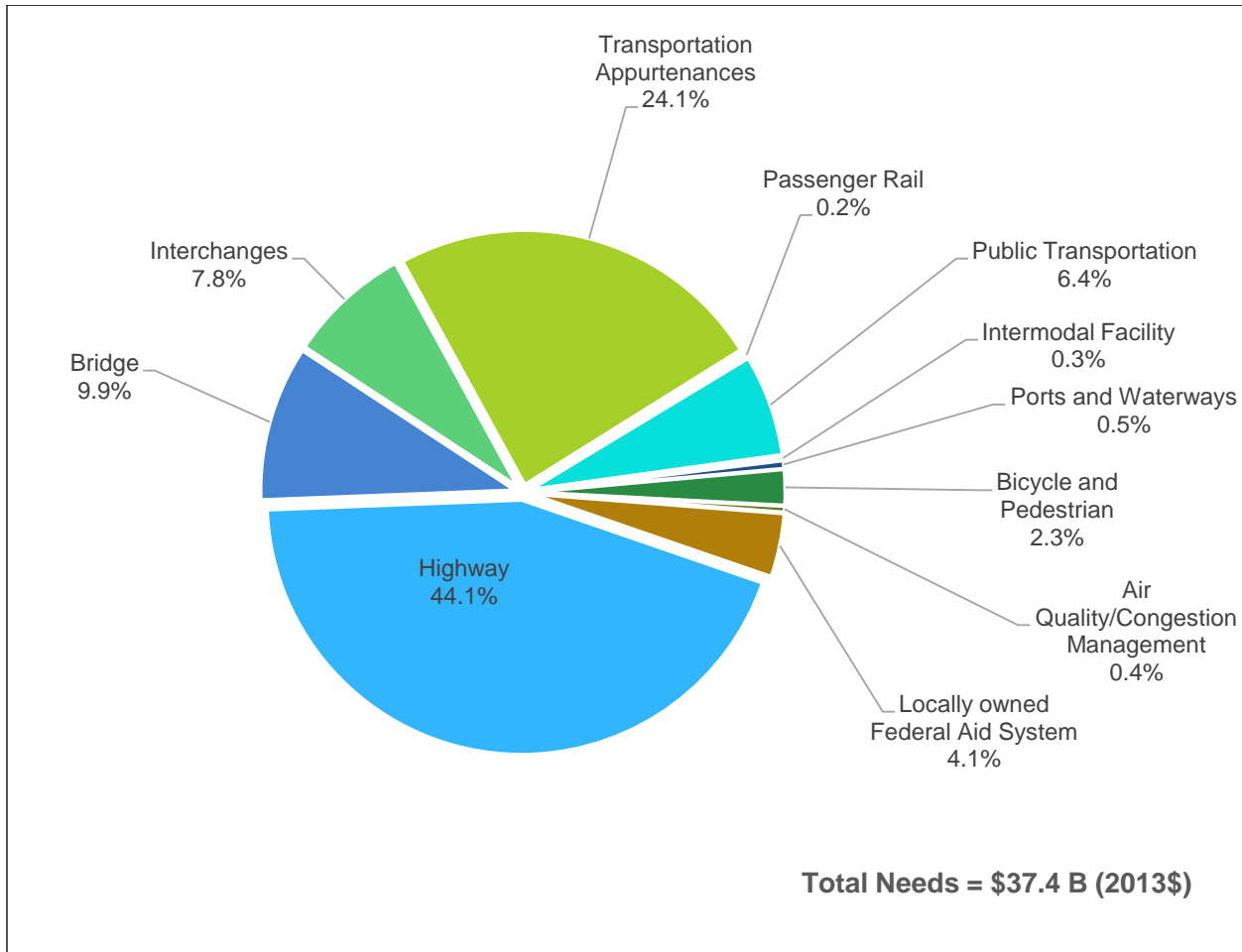
	Projected Revenue <sup>1</sup>	Estimated Cost <sup>1</sup>	Difference <sup>1</sup>
Bridges		\$3,703.0	
Highways		\$16,567.4	
Interchanges		\$2,925.0	
Transportation Appurtenances		\$9,037.7	
<b>ODOT/State Highway System Sub-Total</b>	<b>\$25,156.4</b>	<b>\$32,233.1</b>	<b>\$7,076.7</b>
<b>Local, Regional, Federal Partner Transportation Assets &amp; Functions</b>	<b>\$4,298.5</b>	<b>\$5,202.2</b>	<b>\$903.7</b>
<b>2015-2040 ODOT LRTP TOTAL</b>	<b>\$29,454.9</b>	<b>\$37,435.3</b>	<b>\$7,980.4</b>

<sup>1</sup> All figures shown in millions of 2013 dollars.

As shown in **Figure 2-1**, highway, bridge, interchanges, and transportation appurtenance needs constitute the majority (85.9 percent) of the total needs. Public transportation costs are estimated to be approximately 6.4 percent of the total LRTP cost; while the cost of passenger rail, bicycle and pedestrian facilities, intermodal improvements, ports and waterways, congestion management, and non-state owned federal aid highway system improvement needs constitute the remaining 7.7 percent of the total estimated cost.



**Figure 2-1: Oklahoma LRTP Needs and Estimated Costs (2015 – 2040)**





## 3. BRIDGES

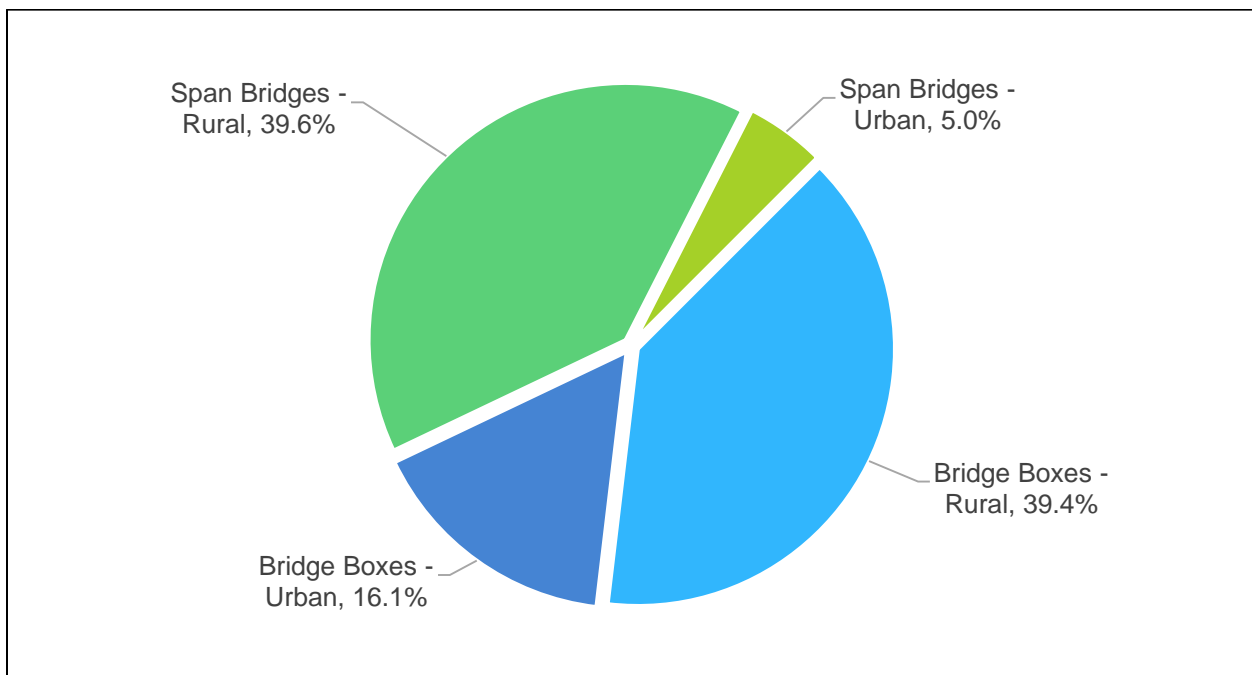
### 3.1 Bridge System Description

The ODOT 2013 National Bridge Inventory (NBI) was reviewed and used to summarize existing conditions of Oklahoma’s bridges on the State Highway System. The NBI is a database, compiled by the Federal Highway Administration (FHWA), with information on all bridges and tunnels in the United States that have roads passing above or below. The data is used by state DOTs to review bridge conditions and analyze needed improvements.

Where additional data were necessary to understand existing bridge conditions, information from ODOT was reviewed and used to supplement the information provided in the NBI. This section provides details on Oklahoma’s 25-year bridge needs along the state highway system.

Oklahoma DOT is responsible for maintaining 6,828 bridges on the State Highway System, which include both span and bridge box structures. **Figure 3-1** shows the bridge type and area type breakdown. Approximately 79 percent of the span bridges and bridge boxes are located in rural areas, while the remaining 21 percent are located in urban locations.

**Figure 3-1: State Maintained Bridges by Type and Area Type**

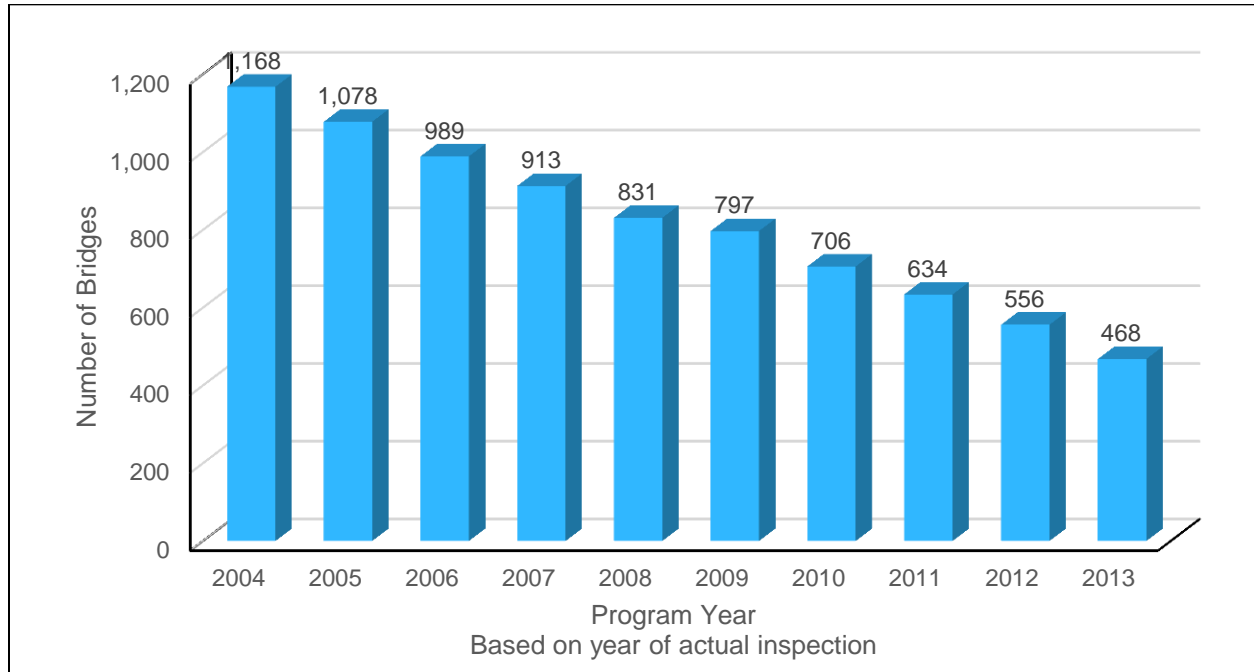


Source: Oklahoma Department of Transportation, 2013 NBI.



In 2004, Oklahoma led the nation in poor bridge conditions and had 1,168 bridges (17%) classified as structurally deficient on the state highway system. As indicated in **Figure 3-2**, the number of structurally deficient bridges on the state highway system has shown a steady decline from 1,168 in 2004 to 468 in 2013. This reduction is a result of the increased legislative priority in transportation funding, as well as ODOT's strategic focus on improving bridge conditions statewide.

**Figure 3-2: Number of Structurally Deficient Bridges by Year, 2001-2013**

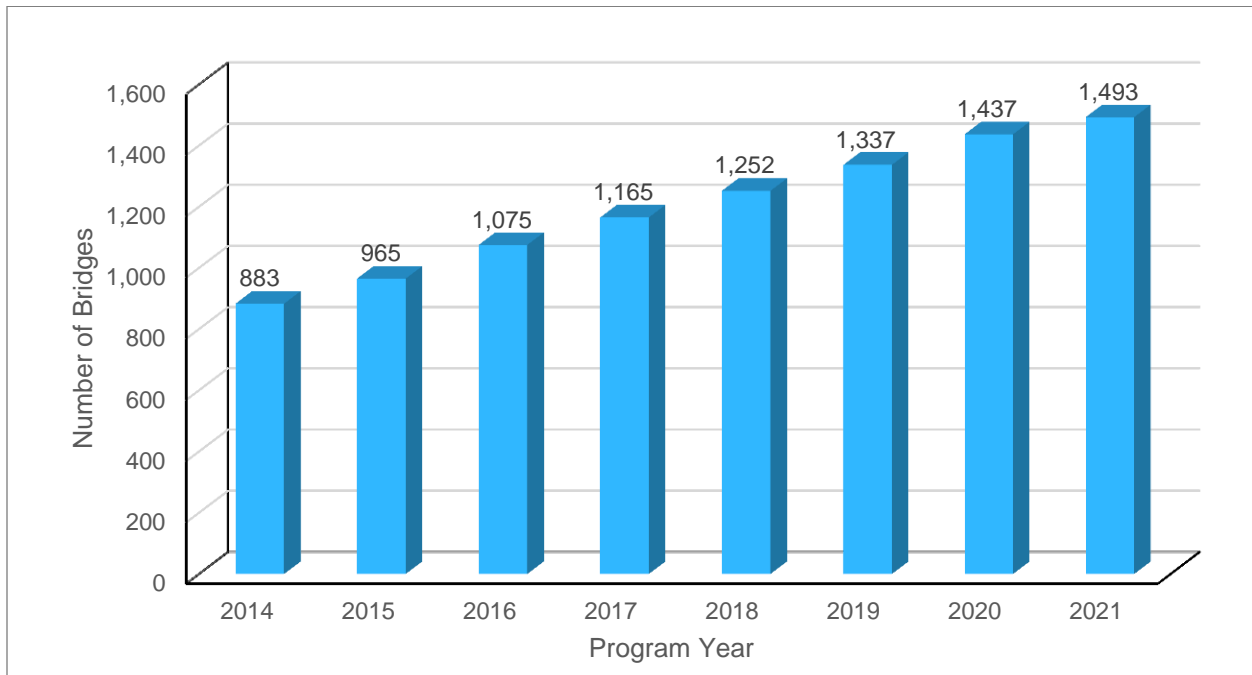


Source: Oklahoma Department of Transportation, Bridge Division



While the State of Oklahoma has made a commitment to minimize the number of structurally deficient bridges on the state highway system, it is important to note that even with this investment, the number of bridges over 80 years old on the state highway system will grow from 883 bridges in 2014 to an anticipated 1,493 in 2021. This trend is shown in **Figure 3-3** and clearly illustrates the need to continue with a dedicated bridge construction, rehabilitation, and maintenance program.

**Figure 3-3: Bridges over 80 Years Old on State Highway System by Year – 2014 to 2021**



Source: Oklahoma Department of Transportation, Bridge Division



## **3.2 Methodology for Bridge Needs Analysis**

The needs for improvement to span bridges on Oklahoma's state highway system were assessed using FHWA's – National Bridge Investment Analysis System (NBIAS) software tool; and needs for bridge boxes were estimated using life-cycle analysis and input from ODOT Bridge Division engineers.

### **3.2.1 National Bridge Investment Analysis System (NBIAS)**

NBIAS is an investment analysis software tool that predicts bridge repair, rehabilitation, and functional improvement needs. The criteria employed to determine bridge needs are described below. The system estimates bridge needs in dollars and by the number of bridges; distribution of work done; aggregate and user benefits; benefit-cost ratios for work performed, and physical measures of bridge conditions. Outcomes can be presented by type of work, functional classification, whether the bridges are part of the National Highway System (NHS) or the Strategic Highway Network (STRAHNET).

NBIAS is based on the same analytical framework as the Pontis bridge software program first developed by the FHWA in 1989, and subsequently taken over by the American Association of State Highway and Transportation Officials (AASHTO). AASHTO now owns and licenses Pontis to over 50 State transportation departments and other agencies. Pontis provides bridge engineers with the tools to conduct detailed bridge performance analysis. In order to perform analysis at such a detailed level, Pontis requires data on over 100 attributes pertaining to each individual bridge.

NBIAS is modified to work with bridge conditions as reported by the states for the National Bridge Inspection System, as well as the attribute/condition state inspection regime used in Pontis.

### **3.2.2 Public Input on Bridge Needs**

As a part of the Plan development process, public comment was solicited at Open House meetings, on the project website, and through committee meetings. The public is aware of progress made in the past 10 years in improving the State's bridges, and is supportive of the State's effort. Comments were brought forward, however, about the need to continue improving the State's bridges. Several comments received from the public indicated a preference that higher priority be given for funding and replacing rural bridges that have been closed to traffic.

### **3.2.3 Methodology for Span Bridge Needs**

Needs for span bridges on the state highway system were assessed using FHWA's NBIAS Tool – National Bridge Investment Analysis System. NBIAS analyzes span bridge structures only and excludes bridge box records from the NBI dataset. NBIAS only predicts needs for existing bridges, thus any bridges constructed after 2013 are not included in this analysis.



NBIAS uses a parameter table to determine if a bridge is under the ODOT minimum tolerable condition for a structure, based on roadway functional class, NHS status, or traffic level. If the bridge falls below the minimum tolerable condition, then NBIAS identifies a rehabilitation, reconstruction, or replacement improvement and calculates the dollar amount using unit costs approved by ODOT. Based on the cost/benefit ratio of the improvement, a recommended action will be identified or passed forward to the next annual analysis period.

The objective of NBIAS is to optimize the system condition and performance year by year. This provides guidance to ODOT on the costs to maintain an efficient and reliable bridge system. NBIAS uses the Pontis model to help determine the deterioration of the bridge over time and to decide whether the bridge falls into a structurally deficient or functionally obsolete status.

### 3.2.3.1 Minimum Tolerable Conditions to determine Bridge Needs

In order to identify bridge improvement needs, the NBIAS relies on input tables specific to Oklahoma. These include ODOT improvement criteria for when a bridge should be: widened, raised, or strengthened.

The criteria, also referred to as minimum tolerable conditions, are specific to Oklahoma and contain the legal condition standards for each bridge type, as defined by roadway functional class, NHS status, and Annual Average Daily Traffic (AADT) class. When the bridge falls below a minimum tolerable condition, it signals the need for an improvement action. The minimum tolerable conditions are specified for shoulder width (right and left), lane width (right and left) and vertical clearance. **Appendix B** summarizes the minimum tolerable conditions specific to Oklahoma which were considered to determine bridge needs.

Additionally, ODOT design standards were used as inputs for the bridge dimensions and engineering specifications that NBIAS uses to determine bridge replacement needs. Parameters used by NBIAS include design and legal standards for lane and shoulder widths, as well as a cost coefficient used to estimate bridge improvement costs.

All values used in the 25-year bridge analysis were reviewed and approved by ODOT Bridge Division engineers and are based on design manuals that reflect ODOT practices. The assumptions and inputs used for the bridge analysis are detailed further in **Appendix B**.

### 3.2.4 Methodology for Bridge Box Needs

As mentioned earlier, NBIAS analyzes span bridge structures only, and the needs for bridge box structures were determined using life-cycle analysis and input from ODOT Bridge Division staff. Bridge boxes along Oklahoma's state highway system were determined to have two types of needs – replacement and reconstruction.



There are approximately 3,000 bridge box structures on the state highway system. Of these, approximately 470 bridge boxes will require replacement over the next 25 years. Similarly, approximately 500 bridge boxes will require reconstruction between 2015 and 2040. Total bridge box improvement costs were estimated using ODOT approved replacement and reconstruction unit costs.

### 3.2.5 Types of Bridge Needs

Bridge needs are presented in terms of three improvement categories in this report:

- **Rehabilitation** – maintenance, repair and rehabilitation.
- **Reconstruction** – widening existing bridge lanes, raising bridges to increase vertical clearances, and strengthening bridges to increase load carrying capacity.
- **Replacement** – If needed functional improvement is infeasible because of the bridge design, or impractical because of its inferior structural condition, then the bridge is designated for replacement.

When the age and recurring maintenance of a given bridge overshadows the cost to replace it, a bridge replacement is recommended since the long-term benefit/cost ratio is favorable. When a potential action is determined, for example, raising a bridge with clearance deficiencies, NBIAS will also consider the long-term impacts and the potential benefits that could be realized if the bridge were to be replaced. If the long-term benefit/cost ratio of replacement is just as viable (or better) than the long-term benefit/cost for the respective reconstruction of major maintenance action, NBIAS will recommend replacing the bridge.

## 3.3 Projected Bridge Needs and Estimated Costs

The estimated cost of meeting 2015 – 2040 Oklahoma’s state highway bridge system (span bridge and bridge box) needs is **\$3.7 billion**. As shown in **Figure 3-4**, rehabilitation needs total \$847.8 million (23%); reconstruction needs total \$217.6 million (6%); and replacement needs \$2,637.6 million (71%).

As shown in **Figure 3-5**, the cost of span bridge improvements needed over the 25-year period total **\$3.2 billion** (87%), while the cost of bridge box improvements totals **\$466 million** (13%).

Based on the bridge replacements programmed in the Eight Year Construction Work Plan, the substandard deck area for span bridges will be significantly reduced over the life of the Plan. **Figure 3-6** summarizes the expected percentage of substandard deck area for span bridges on Oklahoma’s state highway system from 2015 to 2040. Additionally, by 2020, the number of structurally deficient span bridges is expected to be less than 1 percent.





Figure 3-4: State Highway Bridge System Needs – 25 years

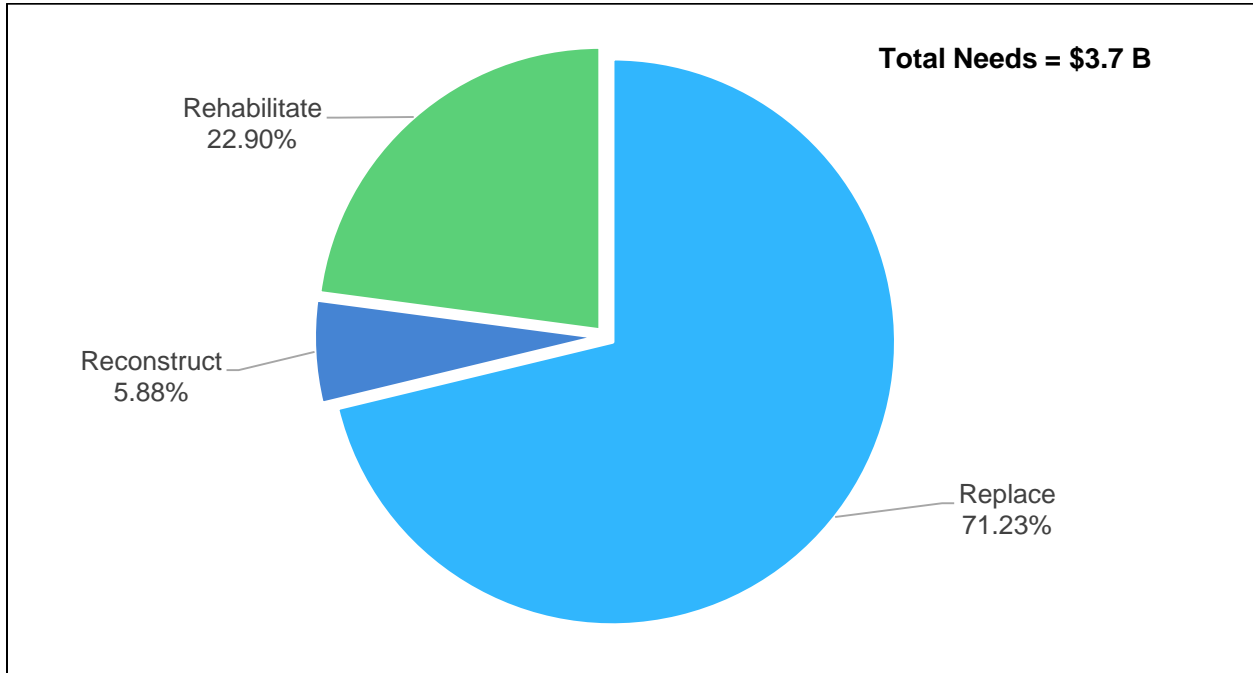


Figure 3-5: Needed Bridge Box and Span Bridge Improvements and Related Costs, 2015-2040

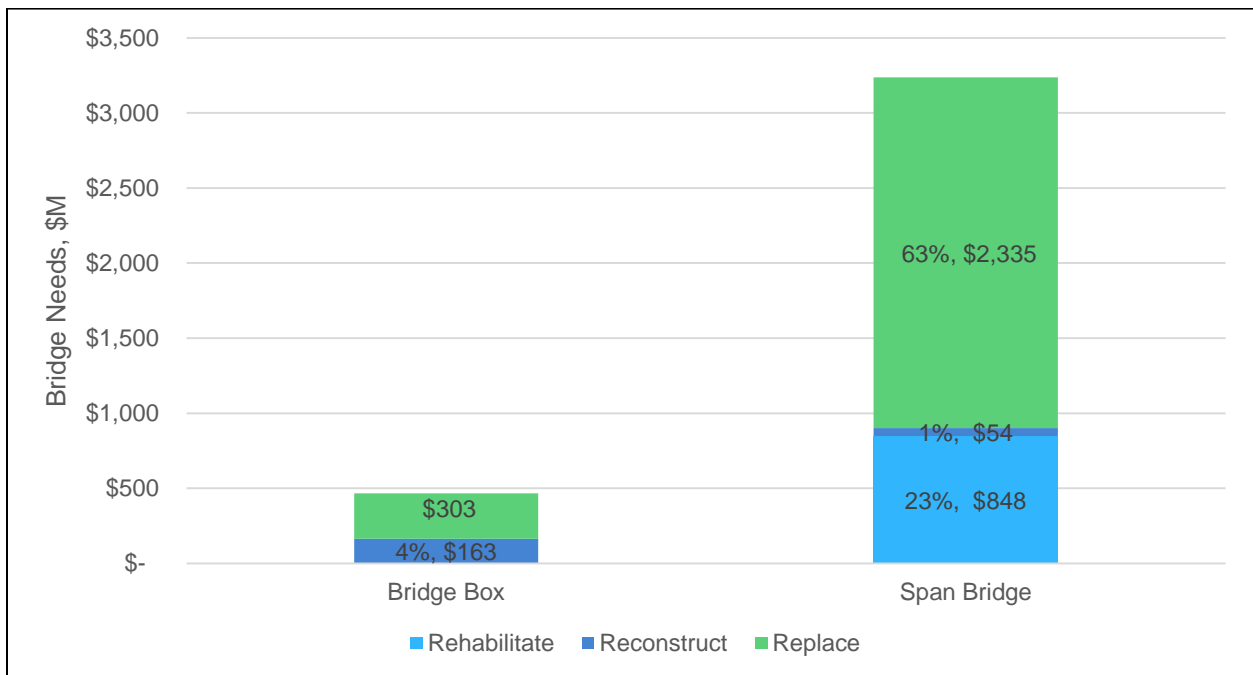
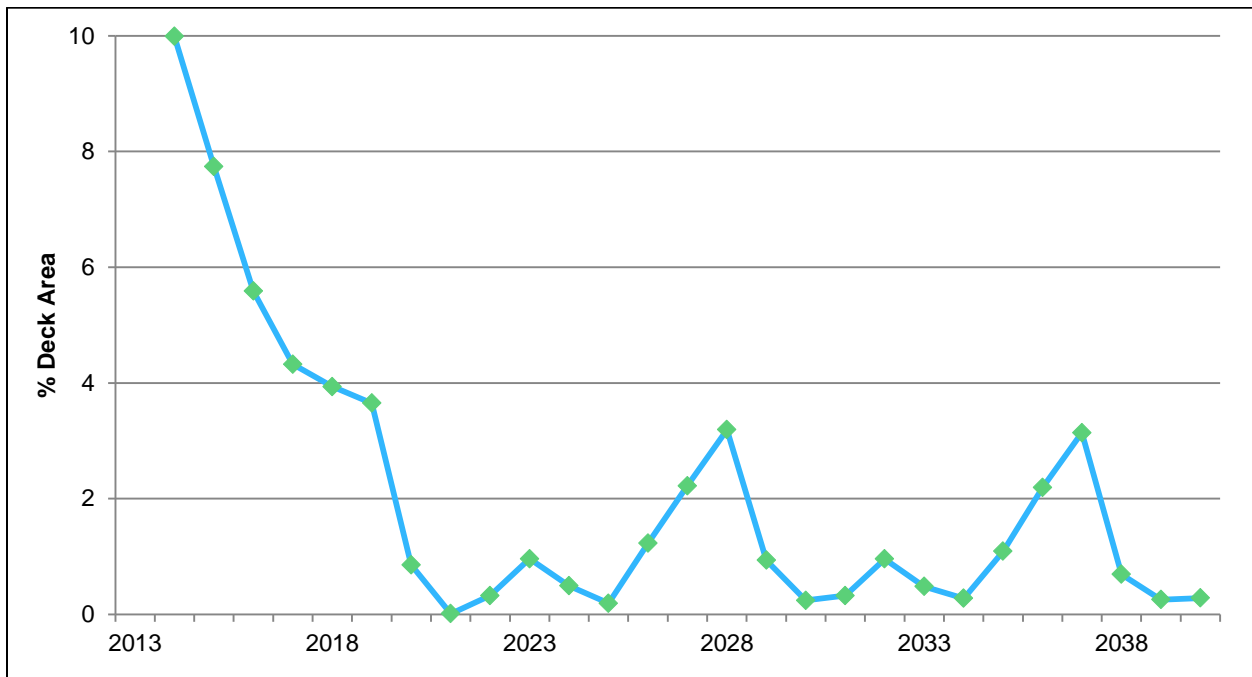




Figure 3-6: Expected Substandard Bridge Deck Area (Span Bridges) by Year



Source: Bridge Needs Analysis using NBIAS

After 2020, newly emerging structurally deficient bridges are recommended for replacement when it is economically feasible. As a result, the expected substandard deck area for span bridges is anticipated to spike up every few years.

Figure 3-6, the expected substandard deck area for span bridges, and **Figure 3-7**, describing bridge improvements needed by year, are directly correlated to each other.

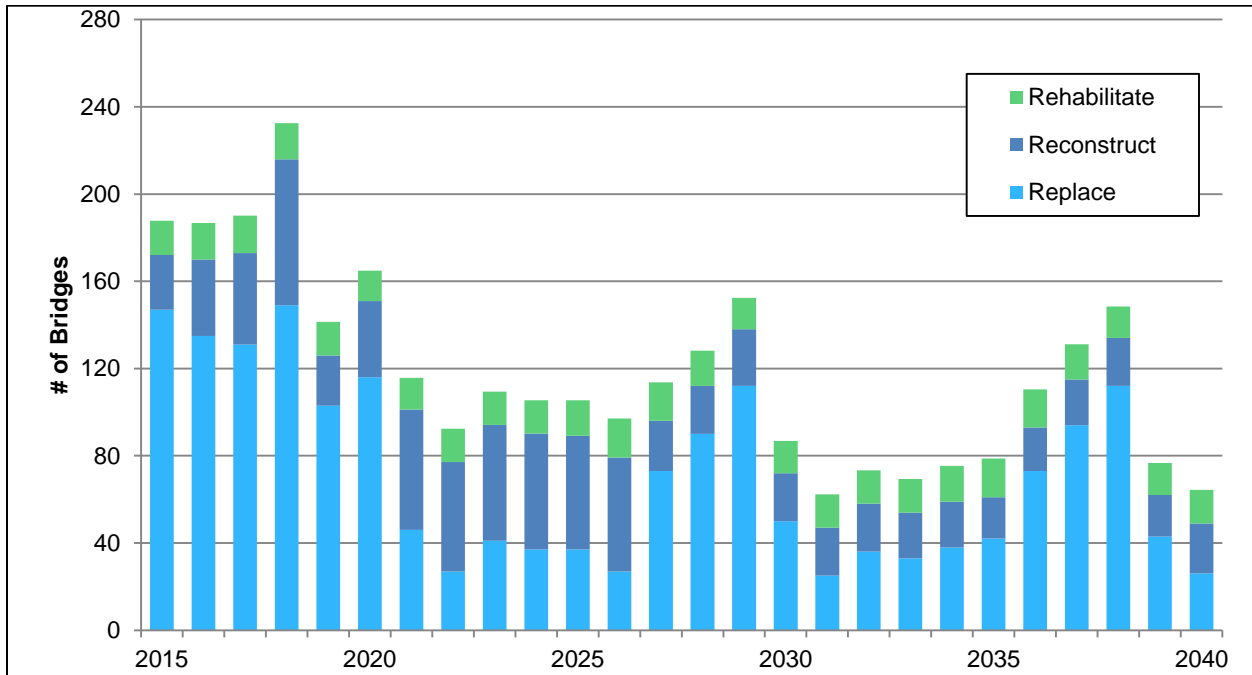
Figure 3-7 illustrates an example of an annual bridge improvement schedule identifying the number of bridges (span bridges and bridge boxes) that will require replacement, reconstruction, or rehabilitation. A total of 3,101 bridges will require some type of improvement by 2040. This includes 1,843 bridge replacements, 846 bridge reconstructions, and 412 bridge rehabilitations.

As shown in Figure 3-7, the number of bridges replacements between 2015 and 2020 is a high percentage of all bridge improvement projects. This suggested improvement schedule is consistent with the adopted Eight Year Construction Work Plan, and ensures meeting the ODOT performance target of less than 1 percent of structurally deficient bridges on the state highway system by 2020.

**Figure 3-8** provides a summary of the cumulative costs for bridge (span bridges and bridge boxes) needs by improvement category and year.

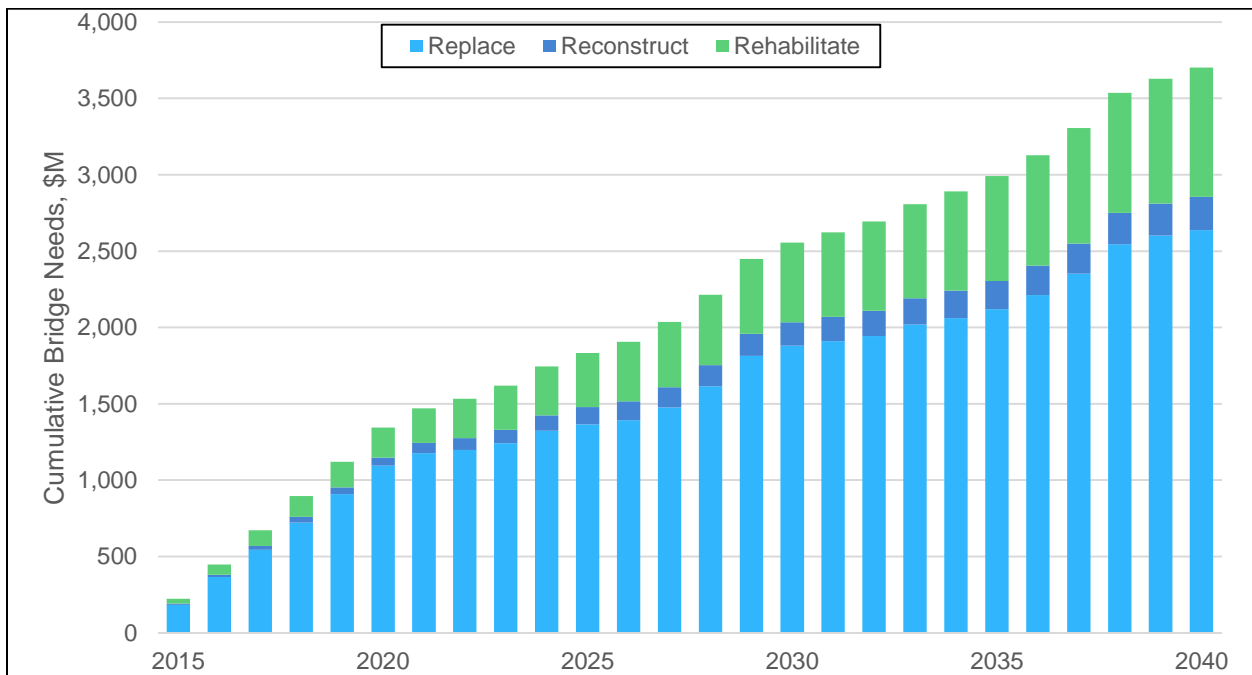


**Figure 3-7: Suggested Number and Type of Bridge Improvements by Year**



Source: Bridge Needs Analysis using NBIAS.

**Figure 3-8: Cumulative Bridge Needs (\$M) by Improvement Type and Year**



Source: Bridge Needs Analysis using NBIAS.



# Oklahoma Long Range TRANSPORTATION PLAN

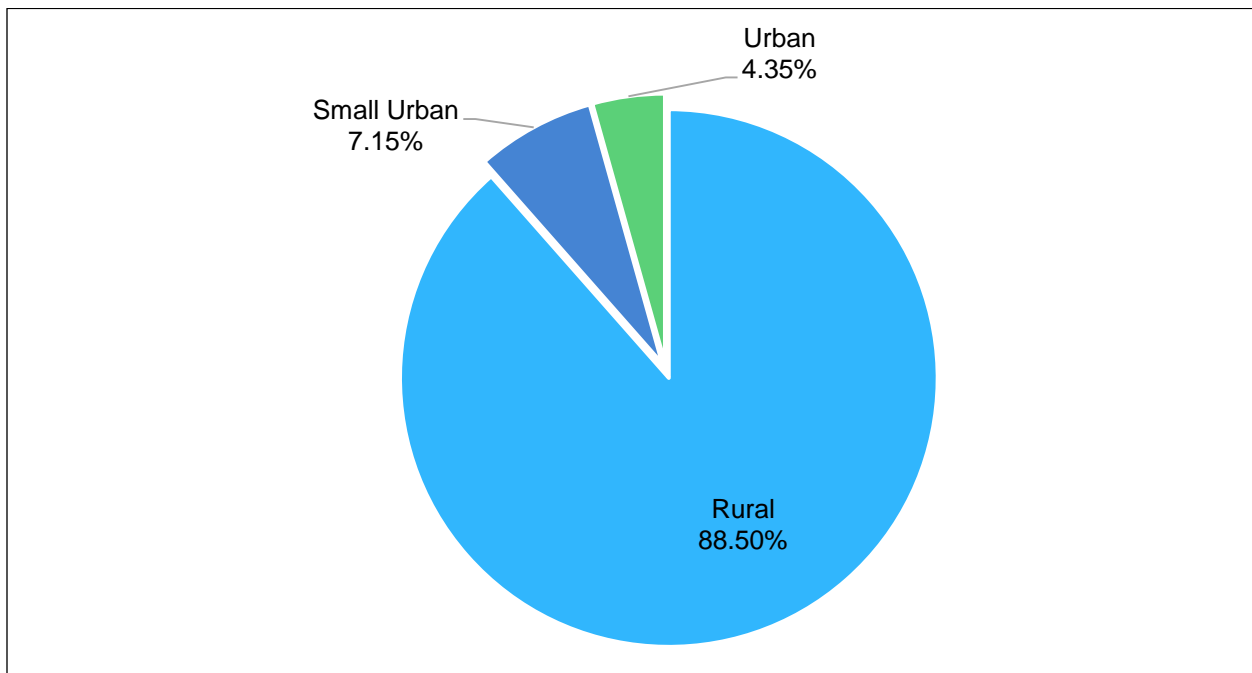
## 4. HIGHWAYS

### 4.1 Highway System Description

Information provided by ODOT to FHWA for the 2013 Highway Performance Monitoring System (HPMS)<sup>13</sup> report was reviewed and used to summarize existing roadway conditions on the state highway system. Where additional data were necessary, information from ODOT was used to supplement the HPMS roadway condition data. This section briefly describes Oklahoma's state highway system, and then proceeds to describe the improvements needed over the next 25 years.

Oklahoma's 12,265 mile state highway system is mostly rural in nature with two major metropolitan areas (Oklahoma City and Tulsa) accounting for urbanized area highways and expressways. Highways within local municipalities with population greater than 5,000 are categorized as urban. **Figure 4-1** classifies the state highway system based on area type. As shown, approximately 89 percent of the state highway system is classified as rural, while only eleven percent is urban or small urban.

**Figure 4-1: State Highway System by Area Type**



Source: Oklahoma Department of Transportation, 2013 HPMS



**Table 4-1** summarizes the state highway system centerline miles and lane miles based on functional classification. Interstates account for only 5 percent of the centerline miles and 10 percent of lane miles, whereas major collectors account for 48 percent of centerline miles and 40 percent of lane miles.

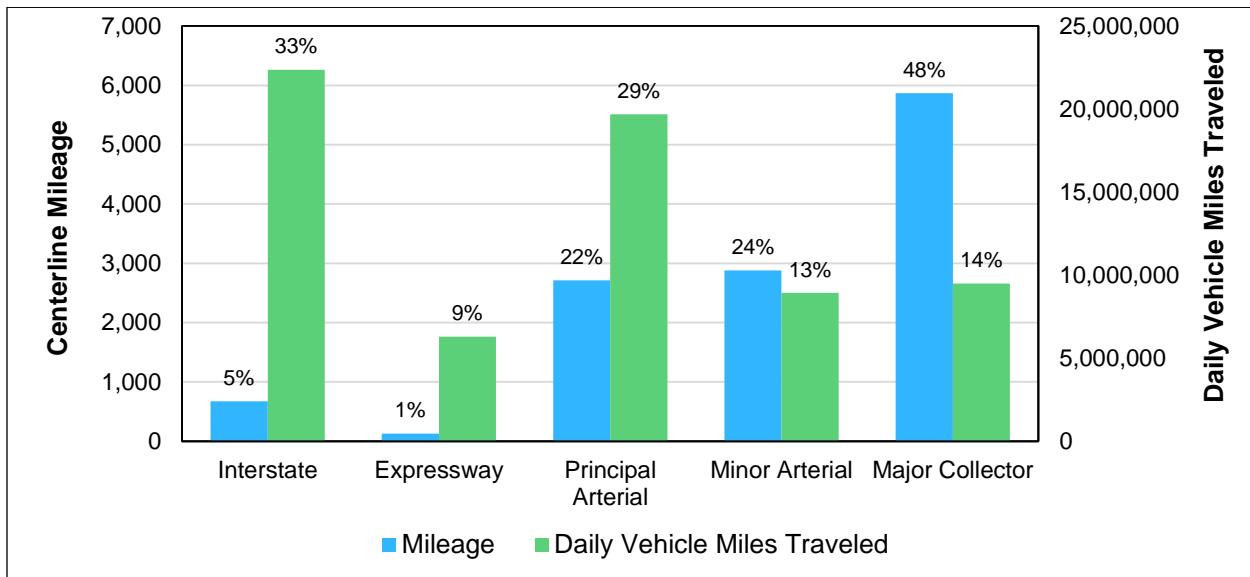
**Table 4-1: State Highway System – Functional Classification**

Category	Centerline Miles		Lane Miles	
	Number	Percent	Number	Percent
Interstate	673	5%	2,943	10%
Expressway	129	1%	641	2%
Principal Arterial	2,714	22%	8,243	27%
Minor Arterial	2,882	24%	6,496	21%
Major Collector	5,867	48%	12,029	40%
<b>Total</b>	<b>12,265</b>	<b>100%</b>	<b>30,352</b>	<b>100%</b>

Source: Oklahoma Department of Transportation, 2013 HPMS

The interstate highway system is the highest roadway classification and is designed to be the national defense and commerce highway that moves large volumes of people and goods across the United States. **Figure 4-2** provides information on the centerline miles and daily vehicle miles traveled along Oklahoma’s state highway system. While Oklahoma’s interstate highways account for only 5 percent of the centerline miles of the state highway system, they carry 33 percent of the daily vehicle miles traveled. Major collectors account for 48 percent of the centerline miles, and they carry only 14 percent of the daily vehicle miles traveled.

**Figure 4-2: State Highway System Mileage and VMT by Functional Class**



Source: Oklahoma Department of Transportation, GIS Management Branch, 2013 Data



## 4.2 Methodology for Highway Needs Analysis

State highway needs were analyzed using the Federal Highway Administration's (FHWA) Highway Economics Requirements System, State Version (HERS-ST). The model simulates highway conditions and performance levels, and identifies existing and future deficiencies through the use of engineering principles and Oklahoma-specific design standards and unit costs. The HERS-ST model is designed to analyze the effects of funding on highway performance. In selecting improvements for implementation, the model is designed to select only enhancements whose benefits exceed costs.

In addition to FHWA's HERS-ST model, information from ODOT's Eight Year (2015-2022) Construction Work Plan and Four Year (2015-2018) Asset Preservation Plan was also utilized to determine highway needs.

### 4.2.1 Highway Needs Analysis Process

The highway needs analysis process included several procedural steps as listed below. The specific Oklahoma highway analysis assumptions and inputs are provided in **Appendix C**.

#### 4.2.1.1 Highway System Database

The highway database used for this analysis is the Oklahoma's 2013 Highway Performance Monitoring System (HPMS) database. The highway database provides essential data on the existing state highway system, such as geometric, structural and operational features. Additionally, the database provides future traffic projections that are used to determine future (2040) system capacity and pavement deficiencies. ODOT staff updates the state-maintained roadway system component of the HPMS annually, and it is used by FHWA to develop needs analyses, fiscal projections, and performance studies for Congress.

#### 4.2.1.2 Minimum Tolerable Conditions to Determine Highway Needs

When a highway section falls below a minimum tolerable condition, an improvement action is triggered. Minimum tolerable conditions reflect ODOT judgment about the level of congestion and the minimum structural conditions for pavements that the travelling public can reasonably tolerate. Minimum tolerable conditions also consider acceptable lane width, shoulder conditions, and cost effectiveness principles. Criteria were defined for different types of facilities reflecting functional classification, traffic volume, and location (as defined by terrain and rural/urban characteristics). Any condition below the minimum tolerable criteria was classified as a deficiency (need), and the cost to bring the facility up to standard was quantified using ODOT improvement costs.

Historic Highway Performance Monitoring System (HPMS) data from Oklahoma and 2012-2032 growth forecasts by ODOT Strategic Asset and Performance Management Division were analyzed to develop planning level forecasts for the 2015-2040 LRTP. The highway needs were assessed within the context of a long



term average annual growth rate of 1.24 percent per year in vehicle miles of travel, which is consistent with national transportation planning data.

#### 4.2.1.3 Public Input on Highway Needs

Comments at Open House meetings, advisory committee meetings, and through the web indicated that the public is well aware of highway system issues including:

- Increase in injuries due to congestion
- Increased demand for fulfillment (warehouse) centers
- Lack of truck drivers
- Weight restrictions for commercial motor vehicles
- Desires of local communities that local access be balanced against routes for truck traffic
- Role of technology in solving some freight transport conflicts
- Deteriorating infrastructure/pavement
- Need for more durable, longer lasting repairs

Many of the state residents that commented also indicated that they were aware of the depleted state of the federal highway trust fund. Some commenters indicated they would be willing to pay more in gas tax in return for an improved highway system.

#### 4.2.1.4 Improvements Needs Identified

Based on the types of deficiencies and the year in which the deficiencies occur, existing and future preservation, reconstruction, and expansion improvements that would correct the problem(s) were identified by HERS-ST.

Deficiencies identified by HERS-ST were analyzed to determine the level of effort needed to improve each functional classification of facility and bring it up to ODOT design standards (**Appendix C, Section 4**).

#### 4.2.1.5 Estimated Costs

The cost of each improvement was estimated using unit costs that reflect practices and cost experience in the state of Oklahoma for each functional class of highways. Costs were expressed in constant 2013 dollars.

#### 4.2.1.6 Information from ODOT's Eight Year Construction Work Plan

Since the HERS-ST model used HPMS data from 2013 as the input, the needs determined by HERS-ST were from 2013 to 2040. Information from ODOT's Eight Year Construction Work Plans (2013 – 2020 and 2014 – 2021) was reviewed to determine improvements constructed or completed on highways during 2013 and 2014. Based on the results from HERS-ST, and removal of projects completed in 2013 or 2014, the 2015 to 2040 state highway needs were estimated.



#### 4.2.2 Types of Highway Needs

The highway needs are presented in terms of three categories:

**Preservation** refers to regular resurfacing of a road. When a road has pavement deteriorating to unacceptable levels, resurfacing is the improvement choice to maintain the integrity of the roadway. Resurfacing preserves the highway, and it is the most common type of improvement.

**Reconstruction** is the improvement of an existing roadway by upgrading the geometrics and functionality of the segment. Improvements such as widening lanes and shoulders, and straightening curves, are examples of reconstruction. When roadways are so structurally deficient that they cannot be repaired by resurfacing alone and must be rebuilt from the base, they are slated for reconstruction.

**Expansion** deals with the need to provide additional capacity in order to address congestion issues. When future traffic volumes exceed a minimum tolerable condition, HERS-ST identifies additional lanes to alleviate the congestion and maintain an acceptable level of service. Expansion is the most costly improvement type on average.

#### 4.3 Projected Highway Needs and Estimated Costs

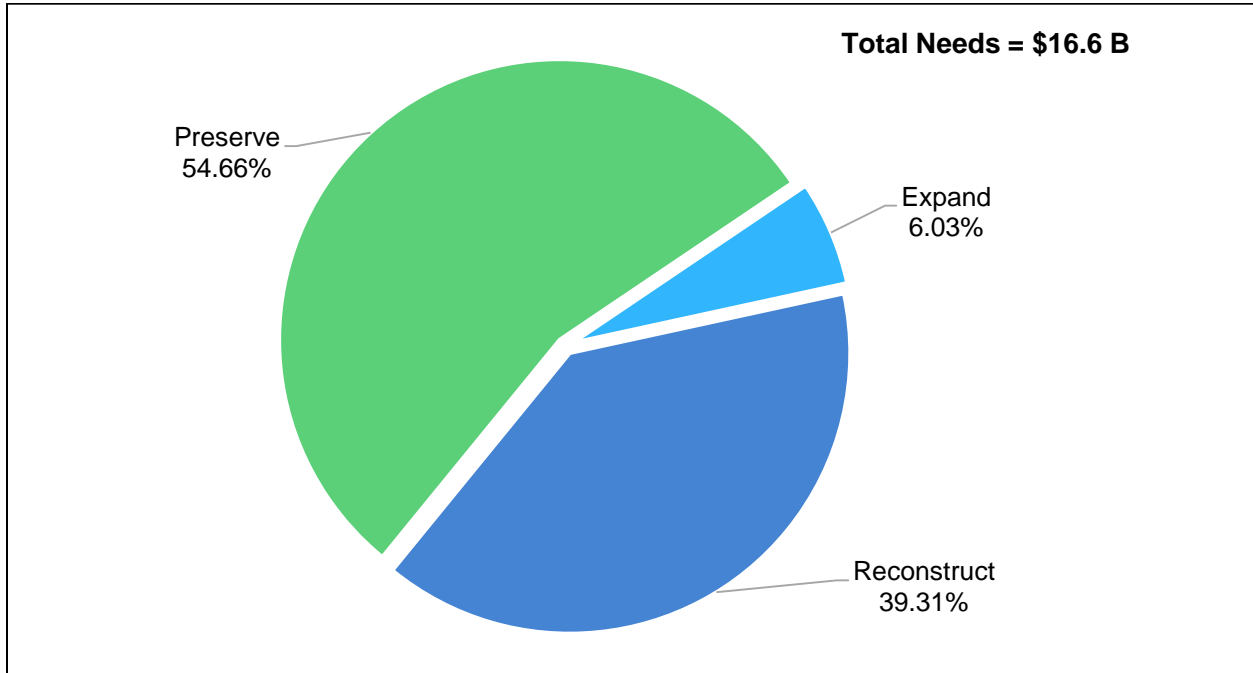
The estimated cost of needed 2015 – 2040 Oklahoma state highway system improvements totals **\$16.6 billion**. As shown in **Figure 4-3**, preservation needs total \$9.1 billion (55%), reconstruction needs total \$6.5 billion (39%), and the expansion needs total \$1 billion (6%).

**Figure 4-4** shows the 25-year needs by improvement type and centerline miles. Approximately 13,300 centerline miles of state highway system (67%) require preservation (over the 25 year period some segments will require two treatments); 6,400 centerlines miles of the state highway system (32%) need reconstruction; and 1 percent of the state highway system should be expanded.



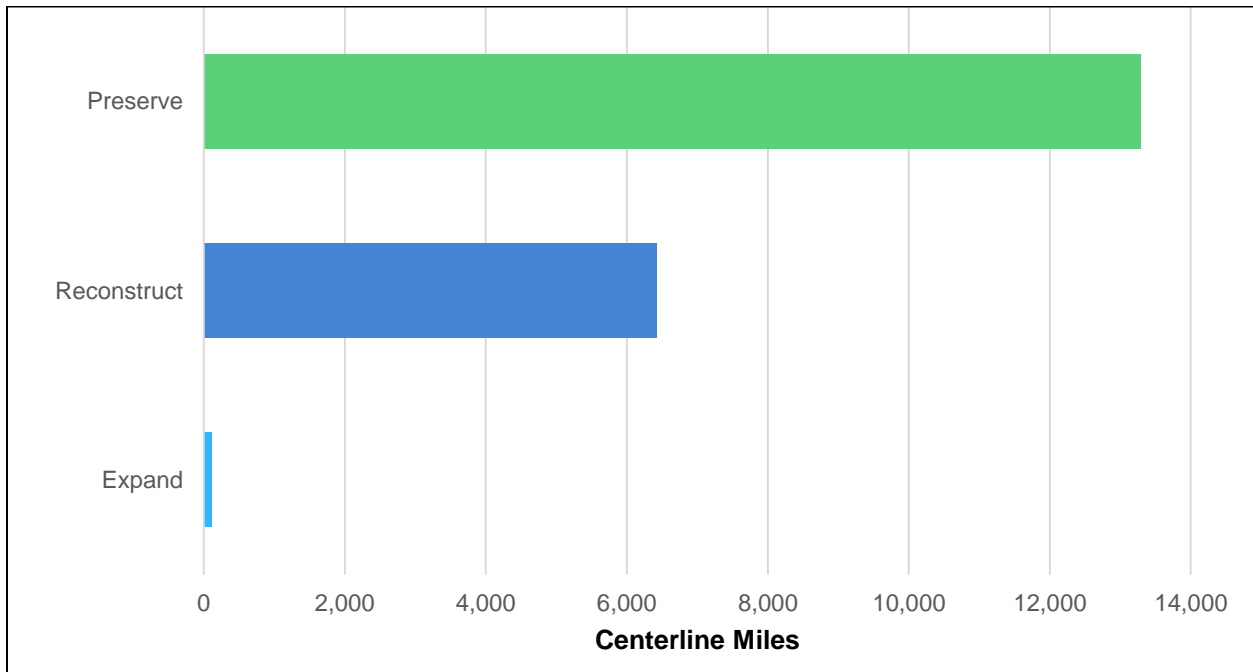


**Figure 4-3: State Highway System Needs – 25-years**



Source: Highway Needs Analysis using HERS-ST

**Figure 4-4: State Highway System Needs by Centerline Miles**



Source: Highway Needs Analysis using HERS-ST



# Oklahoma Long Range TRANSPORTATION PLAN

## 5. HIGHWAY INTERCHANGES

Interchanges<sup>14</sup> are another major category of highway needs which were considered for the 2015-2040 LRTP.

The 25-year interchange needs were estimated by ODOT staff based on historical records of ODOT's programming of such improvements.<sup>15</sup> Approximately 50 minor and seven major interchanges will require an improvement by 2040. Interchange improvements were identified and then a unit cost was applied to estimate the cost interchange needs on the state highway system. An approximate unit cost for right-of-way and utilities for the interchanges was also taken into account. Based on this review and analysis, state-maintained interchange needs total **\$2.9 billion**.

*Appendix D* provides greater detail on highway interchange needs and estimated costs.



# Oklahoma Long Range TRANSPORTATION PLAN

## 6. TRANSPORTATION APPURTENANCES

In addition to the highway, bridge and interchange needs, transportation appurtenances (accessory items or items associated with the transportation system) require improvement. These include safety, maintenance, Ports of Entry, weigh stations, rest areas, Intelligent Transportation System (ITS) improvements, and state freight rail, and at-grade highway railroad crossing improvements. The following sections provide details on these needs over the next 25 years.

### 6.1 Public Input on Transportation Appurtenances and Various Highway Issues

Comments at Open House meetings, advisory committee meetings, and through the project website indicated that the public is concerned about improving the transportation system and their travel experiences. Concerns include:

#### **Safety**

- Distracted driving
- Texting while driving
- Drunk or impaired driving
- Number of serious injuries and fatalities
- Safety needs of motorcycle and bicycle users and pedestrians
- Need for more data about motorcycle, bicycle, and pedestrian

#### **Intelligent Transportation Systems (ITS)**

- Improve use of ITS to inform people about congestion, accidents, work zones, etc.

#### **Ports of Entry**

- Share ports of entry (commercial vehicle weigh and screening stations) information with adjacent states.

#### **Miscellaneous Transportation Concerns**

- Improve or add shoulders,
- Post speed limits on rural roads,
- Improve maintenance of existing transportation facilities
- Maintain highway rights-of-way.



## 6.2 Safety

The 25-year safety needs were developed by ODOT safety engineers and are consistent with the Oklahoma Strategic Highway Safety Plan. The safety improvements were identified; and then a unit cost was applied to estimate the safety needs on the state highway system. Safety improvement examples include the following:

- Median cable barriers;
- Centerline rumble strips;
- Clear zones;
- Guardrails;
- J turns (a J-Turn requires side road movements to be made indirectly by making a right turn, traveling about a quarter-mile (pending speed and curves) on the divided main road, and then making a U-turn to proceed in the opposite direction on the main road toward the intended destination);
- Roundabouts; and
- Selected safety improvements at freeway ramps.

The 2015 – 2040 state highway system safety needs total **\$874.21 million**. **Table 6-1** shows the cost of safety needs based on the various improvements identified by ODOT safety staff. Details of the unit costs and quantities for various safety categories are provided in **Appendix E**.

**Table 6-1: State Highway System Safety Needs, 2015-2040**

Category	Estimated Cost (Millions)
Median Cable Barrier	\$95.375
Centerline Rumble Strip	\$55.352
Clear Zone	\$150.000
Guardrail Updates	\$75.480
J Turns	\$48.000
Roundabouts at intersections	\$310.000
Selected safety improvements at freeway ramps	\$140.000
<b>Total</b>	<b>\$874.207</b>

Source: Oklahoma Department of Transportation, Traffic Engineering Division



The safety needs identified above only include those that are tabulated and formulated by the Traffic Engineering Division at ODOT. Several other projects incorporate significant safety improvement components, and the needs for such projects are included elsewhere in this multimodal needs technical memorandum, such as highway and bridge needs and interchange needs. Some examples of these projects include:

- Adding shoulders to two lane highways with no shoulders;
- Geometric curve corrections on highways; and
- Urban interchange modifications.

### 6.3 Maintenance

The 25-year maintenance needs were developed by analyzing the ODOT maintenance budget from 2009 to 2013, and using trend analysis to forecast maintenance needs and related costs for 2015-2040. Maintenance needs were developed for routine maintenance as well as special maintenance. Routine maintenance encompasses all aspects of maintenance including mowing, snow removal, striping, painting, pothole repair, routine armor coats, etc. Special maintenance includes heavier construction overlays, etc. that may often be let to contract.

Based on the input from ODOT staff and the analysis conducted, state highway system maintenance needs total **\$7.4 billion**, of which \$0.5 billion is for special maintenance and the remaining \$6.9 billion is for routine maintenance.

### 6.4 Ports of Entry

The 25-year Ports of Entry needs were developed based on consultation with ODOT Facilities Management staff. (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.) Based on a review of recent and planned improvements<sup>16</sup>, approximately six Ports of Entry were identified for development between 2015 and 2040 and the cost to construct these facilities totals **\$72 million**. The six Ports of Entry are located in the following areas:

- Love County, I-35 at Texas State Line;
- Ottawa County, I-44 (Will Rogers Turnpike) at Missouri State Line;
- Bryan County, US 69 at Texas State line (South of Durant);
- Choctaw County, US 271 at Texas State line (South of Hugo);
- Cotton County, I-44 at Texas State Line; and
- Delaware County, US 412 at Arkansas State Line (West of Siloam Springs).



## 6.5 Weigh Stations and Rest Areas

The 25-year weigh station and rest area needs were developed in coordination with ODOT Facilities Management Division staff. Oklahoma has 22 weigh stations and truck scale areas; and of these, four weigh stations are planned for renovation over the next 25 years. Accounting for annual maintenance costs of the 22 weigh stations (\$25 million) and the overhaul of the four weigh stations (\$40 million), the estimated cost of 25-year weigh station improvements totals **\$65 million**.

Oklahoma has eight rest areas – four along I-40, three along I-35, and one along US 69. Two of these rest areas were renovated in 2006/2007 at an average cost of \$6.3 million (2006\$).<sup>17</sup> Based on information from these two recently improved rest areas, the 25-year rest area needs to renovate the remaining six rest areas are estimated to total \$45 million (2013\$).

## 6.6 Intelligent Transportation Systems (ITS)

ODOT's Statewide ITS Implementation Plan (2004) identified short-term and long-term ITS needs and related costs. The needs include statewide fiber optic cable expansion, implementation/expansion of a (regional traffic management center) (RTMC), field devices, statewide transportation information center implementation, ITS central software purchase, ITS data archiving, statewide road weather information system (RWIS) deployment, and 5-1-1 traveler information system development. The estimated costs were converted to 2013 dollars using the consumer price index (CPI). The short-term needs account for \$20.90 million and the long-term needs account for \$52.10 million. For the purpose of developing the LRTP, short-term needs were assumed to have been implemented between 2004 and 2014. As such, the 25-year ITS needs total **\$52.1 million**.

## 6.7 State Freight Rail Needs

Oklahoma DOT preserves and maintains state-owned rail infrastructure. At this time, the primary focus of the state's efforts has been to maintain the safety and condition of the existing system. The cost of needed capacity improvements for state owned Class III railroads totals \$30 million. These improvements include items such as tie replacements, ballast upgrade, and switching repairs.

The state of Oklahoma has 3,770 railroad crossings. Rail crossing safety affects passenger and freight rail, highway vehicles, school buses, and bicyclists and pedestrians. Safety issues are of high importance to ODOT and stakeholders throughout the state. The ODOT Rail Safety Program works to minimize risks to this mode through three primary focuses: single high-priority rail crossing locations, statewide minimum rail safety standards projects, and rail corridor safety improvements.

ODOT maintains records of rail crossing safety problems and has traditionally implemented crossing improvements at about 25 locations per year. Depending on



the specific needs, at-grade rail crossing improvements typically cost between \$200,000 and \$300,000. Upgrading at-grade rail road crossing equipment will extend the useful life for another 10 to 12 years in some cases, before a full replacement is needed. The Department anticipates spending \$8 million dollars per year over the next 25 years to improve railroad at-grade crossings at a total of \$200 million. The \$200 million will be used to improve both public and private rail crossings. The total publicly funded freight rail improvements are estimated at to cost **\$230 million**.

### 6.8 Preliminary Engineering

Preliminary Engineering (PE) is analysis and design work to develop construction engineering plans, specifications and cost estimates. The 25-year preliminary engineering needs total **\$281.5 million**.

### 6.9 Summary of Transportation Appurtenance Needs and Related Costs

There are various improvements that are needed to support the highway and bridge infrastructure. These include, but are not limited to: safety measures, state freight rail improvements, at-grade highway railroad crossing improvements, routine and special maintenance, ports of entry, weigh stations and rest areas, ITS technology and preliminary engineering. As shown in **Table 6-2**, the estimated costs for meeting transportation appurtenance needs over the plan period total **\$9.0 billion**.

**Table 6-2: Transportation Appurtenance Needs and Estimated Costs**

Category	Estimated Cost (Millions)
Safety	\$874.207
Maintenance	\$7,417.850
Ports of Entry	\$72.000
Weigh Stations and Rest Areas	\$110.000
ITS	\$52.100
State Freight Rail	\$230.000
Preliminary Engineering	\$281.500
<b>Total</b>	<b>\$9,037.657</b>



# Oklahoma Long Range TRANSPORTATION PLAN

## 7. PRIVATE FREIGHT RAIL

The State of Oklahoma has approximately 3600 miles of rail line, and over 90 percent of this is privately owned. The use of railroad to move freight continues to grow, and rail is an important component of the transportation system. Thus, this predominantly private infrastructure element is being reviewed as a part of the 2015-2040 LRTP. (The state-owned rail infrastructure was discussed in a previous section of this report.)

### 7.1 Private Freight Rail Description

Freight rail transportation in Oklahoma is provided by three major (Class I) railroads and 18 short line (Class III) railroads, each a private corporation. While the State of Oklahoma owns some rail lines (as discussed earlier), all of the rail miles in Oklahoma are operated by private companies. Freight rail has proven to be vital in maintaining and improving both the state and national economy. Nearly three-quarters of all of the rail traffic in Oklahoma is through traffic without an Oklahoma destination. The majority of the freight rail movement is transporting coal from Wyoming to Texas. Freight rail brings finished goods and raw materials to and from Oklahoma businesses, and moves material through and across the state. The freight rail system also provides critical transportation services to the agricultural and energy industries, as well as to two Oklahoma military bases – Fort Sill Army Base in Lawton and McAlester Army Ammunition Depot in McAlester.

### 7.2 Private Rail Volumes and Demand

Current freight rail traffic volumes range from 50 to 100 trains per day on the Burlington Northern Santa Fe railway (BNSF) line, in the northwestern part of Oklahoma. The north-south BNSF rail line carries similar train volumes on a daily basis.

Freight rail traffic is projected to experience significant growth over the next 25 years. The number of trains on some corridors is expected to double over the next the life of the Plan, and the largest growth in freight rail traffic per day is projected on the BNSF line in northern Oklahoma as a result of the recent construction of an additional mainline for its *TRANSCON*<sup>18</sup> system. Freight rail flows to, from, and within northeastern Oklahoma are expected to see strong growth as well, boosted by gains in exports from the Tulsa area to Arkansas and Missouri.<sup>19</sup> Additionally, west to east cross continent flows are substantial.

A study<sup>20</sup> conducted by the *Association of American Railroad*, indicates that most of Oklahoma's Class I railroads will be operating above capacity in 2035 if no capacity improvements are made to the rail lines. Planned rail capacity improvements as discussed by Class I railroads, are explained in greater detail in the following section.





FHWA's *Freight Analysis Framework*, Version 3.5 (FAF<sup>3</sup>) was utilized in developing the tonnage of freight movement for years 2013 and 2040. The freight tonnage transported through rail is expected to grow from an estimated 339 million tons in 2015 to approximately 412 billion tons in 2040, which is a 22 percent increase.

## 7.3 Private Freight Rail Needs

### 7.3.1 Freight Rail Issues and Needs

#### 7.3.1.1 Comments from the public regarding freight rail

Public sentiment about the existing freight rail service in Oklahoma is positive and commenters expressed that freight rail shipment is critical to the economic growth of Oklahoma State. There was a strong support to get more cars and trucks off the road by implementing a better freight rail system. There was an interest to expand and upgrade existing short line and regional railroads to provide better service for farmers. People also expressed a need for facilities which assist with transferring goods from train to truck.

#### 7.3.1.2 Class III 286,000 pound capacity issue

The shortline (Class III) railroad industry in Oklahoma has a significant portion of its rail system that is unable to accommodate industry-standard 286,000 pound gross weight railcars. Railroads that are not capable of these loads put shippers at a disadvantage by removing some of the efficiencies and advantages of rail freight shipments. In Oklahoma, expansion and growth in the energy sector is projected, which will increase freight rail demand over the next 20-years. According to *the 2012 Oklahoma Freight and Passenger Rail Plan*, approximately 130 miles of track and at least 230 structures need to be upgraded in order to handle 286,000 pound loads. At this time, there is no cost estimate associated with these needs.

#### 7.3.1.3 Class One Railroad Capacity Improvements

The Oklahoma State Rail Plan identifies many capacity improvement projects for the BNSF and UP Class I railroads. Capacity improvements include tie replacements, terminal and siding improvements, and corridor extension. During the development of this Statewide Long Range Transportation Plan, many capacity improvement needs were identified by UPRR and BNSF. These capacity improvements, summarized in **Appendix F**, include yard expansion, siding expansion, and double tracking of certain sections.

#### 7.3.1.4 Related Industry Needs

Additional needs were identified by business, local government and other stakeholders as a part of the *Oklahoma Freight and Passenger Rail Plan* process. These needs are for improvements at or near new industrial parks and facilities, as well as transload facilities. The proposed projects defined by business and industry further amplify the need for rail improvements and the related opportunities for economic development. As shown in **Table 7-1**, the 25-year freight rail-related industrial needs total **\$73.2 million**.



**Table 7-1: Industry-identified Rail Improvement Needs and Estimated Costs**

Project /County	Associated Entity or Railroad	Cost Estimate (millions)
Pre-construction initial line Logistics Center/Rogers	Port of Catoosa	\$2.7
Build wye to add north access/Muskogee	Port of Muskogee	\$1.0
Longer third track expand yard/Muskogee	Port of Muskogee	Not Available
Restore rail Shawnee to McAlester/ Pottawatomie/Seminole/ Hughes/Pittsburgh	City of Shawnee/UP	\$36.5
North American Opportunity Zone/Carter	WATCO/BNSF	\$33.0
WATCO-Kinder Morgan Crude Oil Transfer Facility/Lincoln	Stillwater Central RR	TBD
Citizen's Pottawatomie Nation industrial park/ Pottawatomie	UP and AOK RR	TBD
<b>Total</b>		<b>\$73.2</b>

Source: Oklahoma Freight and Passenger Rail Plan, Table 17-6 Industrial improvements, May 2012

**7.3.1.5 Needs Identified by Stakeholders and Committees**

The Oklahoma Freight Study (2014)<sup>21</sup> and stakeholders involved in the 2015-2040 LRTP process identified the following freight rail issues and needs throughout Oklahoma.

**Multimodal Facilities**

- Ensuring access to the rail system by providing connectivity to other modes is paramount for the competitive and efficient movement of goods. Oklahoma has a history of multimodal rail synergies, in particular through grain elevators, rail connections at industrial parks, and connections to the inland waterway system. Following the closure of BNSF’s intermodal terminal near Oklahoma City in 2005, Oklahoma intermodal rail shippers have moved containers by truck to terminals in other states.
- Oklahoma businesses have expressed interest in intermodal rail terminals and transload facilities. While BNSF, along with others, has worked with business and communities to encourage industrial parks or transload facilities to allow access to customers that do not have the volume to support a unit train facility (110+ cars), statewide access to transload facilities remains limited, particularly on the short-line railroads and in the western part of the state

**East-West Rail Connectivity**

- Rail lines, either being unutilized or underutilized in the state have led to a lack of connectivity to certain markets. The out-of-service UP line from Shawnee to McAllister is an example. If this line was brought back into service, it is anticipated that it would make a significant contribution to east



west connectivity. It is estimated that it would cost \$36.5 million to restore the line for freight rail service.

### **Railroad Crossing Safety**

- Safety issues are present at both state and national levels and are of high importance to ODOT and stakeholders throughout the state. ODOT and its state, local and private sector partners have made good progress through cooperative efforts to improve signage and safety at railroad crossings, but the needs continue to far outweigh the resources available. A discussion of railroad crossing improvements needed in the 2015-2040 Plan period is discussed under the earlier section on State Freight Rail.

### **Other Rail Safety Issues**

- With the increased use of rail tank cars for carrying crude oil, there has been heightened attention to the need to strengthen rules regarding labeling of hazardous material, tank car specifications, and potential route and/or speed restrictions. Other concerns include derailment and release of hazardous materials. Positive train control (PTC), a technology improvement<sup>22</sup> designed to automatically stop or slow a train before certain types of accidents occur will assist greatly with addressing train-to-train collisions, derailments caused by excessive speed, and movement of a train through a track switch left in the wrong position. All trains are required to comply with PTC by December 31, 2015. A federal Pipeline and Hazardous Material Safety Administration rulemaking is currently pending.

### **Traffic Congestion at At-Grade Crossings**

- At-grade railroad crossings, apart from being a safety factor, also contribute to traffic congestion and traffic issues. The current trend of railroads utilizing longer "unit trains" places pressure on facilities/communities served, such as increasing congestion at railroad crossings. Extended periods of congestion are realized in cities and communities such as Tulsa, Owasso, and Muskogee, where long and slow trains block critical crossings for long periods.

### **Competition and Captive Rail Markets**

- Efficient goods movement is not independent of competitive rail operations that provide fair pricing. Currently, many markets in the state are captive to a single rail service provider. In particular, Muskogee industries reported that each was captive to either BNSF or UP for rail service, although both railroads have tracks within the city. Industries in the state have reported additional recent challenges with rail access as a result of trends in the rail industry; for example requiring industries to build additional infrastructure or pay increasing rates for movements along the Class I lines.



### 7.4 Private Freight Railroad Needs and Estimated Costs

As indicated above, the 2015-2040 freight rail needs were developed based on a review of the *Oklahoma Freight and Passenger Rail Plan (2012)*<sup>23</sup> and through additional information from rail carriers and stakeholders. Cost estimates were developed through collaboration with the Oklahoma Rail Association, ODOT staff, and the private rail companies. The 25-year freight rail capacity/service and safety needs total **\$1,632.2 million**, as summarized in **Table 7-2**. Capacity improvements include tie replacements, terminal and siding improvements, selected double tracking and corridor extension.

Safety improvements include highway rail crossing upgrades yard rehabilitation, grade separation, and power switches.

**Table 7-2: Private Freight Railroad Needs and Estimated Costs**

Type of Need	Estimated Cost		
	Private		Total
	Class I	Class III	
Capacity/Service Improvements (Tie replacements, terminal and siding improvements, double tracking, corridor extensions)	\$1,408.5 M	\$112.7 M	\$1,551.2 M
Safety Improvements – B (Yard Rehabilitation, Power switches etc.)	\$111 M		\$111 M
<b>Total</b>	<b>\$1,519.5 M</b>	<b>\$112.7 M</b>	<b>\$1,632.2 M</b>

Source: Interview with Oklahoma Rail Association, November 2014; Oklahoma Statewide Freight and Passenger Rail Plan, Chapter 17, 2012.

The privately owned Class I railroad needs total **\$1,519.5 million** and the privately owned Class III railroads needs total **\$112.7 million**. Class I and Class III privately owned railroads are typically responsible for improvements associated with its railroads, while state-owned Class III railroads are maintained by the State. The full array of needs on the privately owned railroads may be greater than the estimates shown above, because some of the related information is not readily available for public use because of propriety rights.



# Oklahoma Long Range TRANSPORTATION PLAN

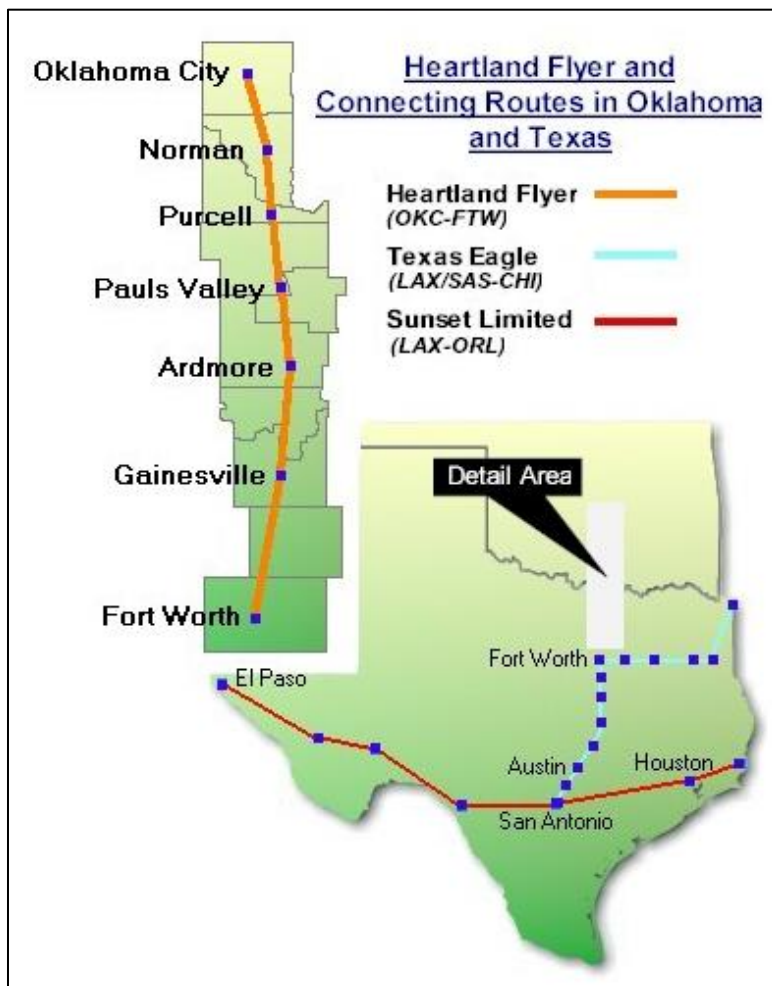
## 8. PASSENGER RAIL

### 8.1 Passenger Rail Description

Passenger rail returned to Oklahoma in 1999 after a 20-year absence. Amtrak, the national passenger rail company, operates the Heartland Flyer which is a daily passenger service that follows a 206 mile route between Oklahoma City and Ft. Worth, Texas. AMTRAK is currently the sole provider of intercity passenger rail service in Oklahoma, although private railroad companies have expressed interest in entering this market.

The Heartland Flyer carried its one millionth rider in 2013. The existing Heartland Flyer and connecting routes are illustrated in **Figure 8-1**.

**Figure 8-1: Existing Heartland Flyer and Connecting Routes**





## **8.2 Passenger Rail Issue and Needs**

Oklahoma continues to consider how it can maximize the efficiency of the Heartland Flyer Amtrak service, and to evaluate the possibilities for extension of passenger rail service into new markets. The State of Oklahoma has relatively little experience with passenger rail planning and service, so it was difficult to distinguish between needs and desires. The passenger rail needs listed in this report include plans and services for which commitments have been made and/or studies have been initiated. Additionally, initial estimates of improvements and costs included in recently completed studies were evaluated. These estimates served as a basis for review, and were further refined based on projections, growth rates, and coordination and communication with ODOT staff and stakeholders. These are high level, long-term planning estimates and should be viewed as a starting point for further exploration rather than a firm commitment by the State.

### **8.2.1 Public Comments about Needs and Preferences for Passenger Rail**

Public sentiment about the existing passenger rail service in Oklahoma is positive. The Amtrak Heartland Flyer from Oklahoma City to Ft. Worth is popular, and the Plan commenters expressed a desire for more than the current one-trip-per-day frequency between the two cities. There is interest in expanding passenger rail service to include Oklahoma City to Tulsa service, and service between Oklahoma City and Newton, Kansas. Some residents expressed the desire for high speed rail service to be set as a goal, particularly routes to connect major metropolitan areas, by the year 2040. Currently, there are no High Speed Rail (HSR) operations in Oklahoma. In fact, the only operational system in the US is the AMTRAK Acela Express Train that provides service between Boston, Massachusetts and Washington, D.C. with top speeds of up to 150 miles per hour (mph).

The Oklahoma Transit System Overview and Gap Analysis (2012) reported survey findings and provided suggestions to improve travel connections at Amtrak Stations (transfer points). The Analysis shows that the public is eager to have access to information about service that is available. Several comments were received about the need to know how and where to connect to existing services. The suggestions for improving travel connections included posting information about area bus schedules and transit providers at each of the Amtrak transfer stations. Additionally the study recommended that the transfer stations provide information for Amtrak and area providers. Finally, it was recommended that maps and other pertinent regional traveler information be available at the transfer stations.

### **8.2.2 Continuation of Amtrak Heartland Flyer Service from Oklahoma City to Ft. Worth**

The Amtrak Heartland Flyer operates a round trip service each day between the Santa Fe Depot in downtown Oklahoma City and the Fort Worth, Texas Intermodal Transfer Center. One way trip mileage is 206 miles. Oklahoma communities served along the way include Norman, Purcell, Pauls Valley, and Ardmore. Ridership



peaked in 2012 at 87,870 riders, and has declined slightly since. Average ridership for the 2010-2015 timeframe is about 82,550.

Utilizing FY 2010 Federal Railroad Administration (FRA) construction funds, ODOT recently completed a project to improve access to the Santa Fe Railroad station in downtown Oklahoma City. The project included the installation of a power switch and new rail line to provide the Heartland Flyer in-and-out access to the station.

As indicated above, there is strong public support for the Heartland Flyer service. However, the economics of financing the passenger rail route pose questions about how to efficiently provide the service. The state fee/subsidy has risen from \$2.5 million/year in the year 2010, to an FY 2015 subsidy of \$2.9 million. The State of Texas provides a comparable subsidy. The cost of providing this subsidy over the next 25 years is estimated to be **\$80.1 million**.

### 8.2.3 Texas-Oklahoma-Kansas Region Passenger Rail Studies and Suggestions

Passenger rail concepts that have been identified for the long-term include constructing, extending and/or improving rail lines, and a description of these concepts follows.

#### 8.2.3.1 Extend Heartland Flyer to Newton

Extending the Heartland Flyer intercity passenger rail, which is one of the alternatives highlighted in the *Kansas City-Wichita-Oklahoma City-Ft. Worth Corridor Passenger Rail Service Development Plan*,<sup>24</sup> would provide passenger service from Central Oklahoma to Wichita, Kansas; and connections at Newton, Kansas (approximately 30 miles north of Wichita) with the Southwest Chief destined for Los Angeles. The Plan calculations find that if the service began in the year 2035, the cost estimate for Oklahoma's share of this route would total **\$73 million**, which includes an operating subsidy of \$13 million. Trip mileage from Oklahoma City to Newton is approximately 185 miles one way.

#### 8.2.3.2 New Daytime Service between Kansas City–Wichita-Oklahoma City–Fort Worth

Extending the Heartland Flyer intercity passenger rail project from Oklahoma City to Kansas is also described as an alternative in the *Kansas City-Wichita-Oklahoma City- Ft. Worth Corridor Passenger Rail Service Development Plan*. The new service would add daytime service between Kansas City, Newton, Wichita, Oklahoma City and Fort Worth. (The estimated mileage between Newton, Kansas and Ft. Worth, Texas is 390 miles.) This new service is envisioned to use some of the Heartland Flyer infrastructure, and the estimated cost for this supplemental Heartland Flyer extension (to the Central Oklahoma to Newton, Kansas route) is \$107 million. This route would also provide connections to the Southwest Chief (to Los Angeles), from Kansas City, Missouri; to the Missouri River Runner (to St Louis) from Kansas City, Kansas; and to the Texas Eagle (to San Antonio) from Fort Worth, Texas. Thus, this



improvement would provide the public an alternative for extensive intercity travel. This project is expected to happen beyond the life time of this plan.

#### 8.2.3.3 Tulsa–Oklahoma City Intercity Passenger Rail Study

There is a long history of studying the need, and preparing for improved transportation service and an option to the traditional personal vehicle, for the 106 mile trip between Tulsa and Oklahoma City.

While numerous studies have been conducted, a strategic plan (to evaluate the options and determine the viable basis for implementation of this passenger rail program) has not been developed.

Prior studies identified the following issues: limited multimodal public transportation network between Tulsa and Oklahoma City; accident rate of passenger vehicles on I-44/the Turner Turnpike; and impact of limited travel options on restricting economic development opportunities. Thus, the need for a Tulsa to Oklahoma City Passenger Rail Corridor Plan resulted from an interest in improved fast, reliable, efficient and frequent intercity passenger rail service. In order to be eligible for federal funds, a definitive evaluation of feasibility, alternatives, and environmental impacts is required to move forward. The Tulsa to Oklahoma City concept is part of the South Central rail corridor, which extends from Tulsa to Oklahoma City, to Dallas/Ft. Worth to San Antonio, and is part of the federally designated national corridor network, developed in 2009 as the “*Vision for High Speed Rail in America.*” The corridors coincide with portions of existing AMTRAK routes.

With funding from an FY 2010 FRA High Speed Intercity Passenger Rail (HSIPR) planning grant, ODOT initiated the Tulsa to Oklahoma City Passenger Rail Corridor Investment Plan (Corridor Plan) in 2011. A corridor investment plan is a FRA requirement for federal funding for passenger rail investment.

The Corridor Plan was envisioned to include two components: a Service Development Plan (SDP) describing the proposed passenger rail service, and an Environmental Impact Study (EIS) consistent with the National Environmental Policy Act (NEPA) of 1969. The SDP includes an identification of alternatives, description of service, travel demand and revenue forecasts, operations analysis, benefit cost analysis, and a program management overview. The EIS includes detailed environmental evaluations of the relevant alternatives culminating in a recommended preferred alternative for federal approval. A summary of work to-date and current status of the project follows.

#### **Project Initiation**

The Corridor Plan began with development of the statement of the project purpose and need as required by the National Environmental Policy Act (NEPA). The purpose of the proposed passenger rail service is to meet existing and future regional travel needs, increase modal options, improve connectivity between





Oklahoma's two largest metropolitan areas, improve transportation safety, and enhance economic development opportunities.

Scoping meetings were conducted in 2013, which included the public comments and input to help define the range of alternatives, identify environmental issues, and provide general comments.

Following the scoping meetings, potential train technologies were identified and alternatives for rail alignments, maintenance facilities, station locations, and train technologies were listed and evaluated.

### **Alternative Analysis**

Following the outline of multiple options, a comparative screening process was utilized to determine feasible alternatives for alignments, **maintenance** facilities, and station locations.

### **Alignment Options**

The initial range of alternatives was based on the rail alignments from previous Amtrak and ODOT studies, with final alternatives developed based on identified design criteria. Following that, screening criteria - including but not limited to right of way impacts, safety, environmental impacts, and public comments - were used to refine the list to ten feasible alternatives. The feasible alternatives were developed around two mainlines - one that follows the Turner Turnpike (I-44) and one that follows the Sooner Subdivision rail<sup>25</sup> between Tulsa and Oklahoma City. Each is linked with multiple alignment options to access Tulsa and Oklahoma City.

### **Maintenance Facilities, Station Options and Technology**

The Tulsa-Oklahoma City intercity passenger rail service would need two types of maintenance facilities, a turn-around maintenance facility at both ends, and a centrally located major maintenance facility. The screening process identified two feasible turn-around maintenance facility sites in Oklahoma City and two in Tulsa. Six potential major maintenance facility site options were identified in the center of the corridor.

Station alternatives were identified to serve the end point cities, as well as selected locations to serve population centers along the corridor. Endpoint stations were identified to be the Santa Fe Station in Oklahoma City and a site adjacent to the former Union Depot in Tulsa.

The Federal Railroad Administration has defined three levels of high speed rail systems. These are: Emerging High Speed Rail (79 to 110 mph); Regional High Speed Rail (110 to 125 mph) and Core Express High Speed Rail (150 to 220 mph). In prior discussions with FRA, it was decided that the technology and high costs associated with Core Express High Speed Rail would not yield significant added benefits for this 106 mile route. Therefore the preliminary alignments were



developed for several operating speeds up to 125 mph. At this point, no train technology has been selected.

### **Service Evaluation**

Initially, ODOT had expected to complete the Corridor Plan producing a Draft Environmental Impact Statement and SDP. Since the inception of the Corridor Plan, several circumstances have affected the scope and scale of the study, including but not limited to: the announcement of a passenger service pilot project between Tulsa and Oklahoma City, an unexpected decline in State revenues, a higher than expected increase in freight rail traffic, and a level of uncertainty regarding the continued availability of federal funds for passenger services.

Due to the uncertain conditions, ODOT chose to reframe the Corridor Plan as a Service Evaluation Plan. This will allow ODOT to provide the legislature and other stakeholders with an understanding of the viability of passenger rail service and will provide planning level estimates of ridership, revenues, costs and public benefits.

The Service Evaluation will identify the possible impacts of passenger service on freight operations. Finally, the SDP will inform a state position on passenger rail service and provide a basis to gauge future funding possibilities.

As of the date of this report, there are no plans to commit ODOT financial resources to the Tulsa to Oklahoma City passenger rail service. The Service Evaluation is slated for completion in 2016 and it will provide substantial information for further deliberation and decision-making regarding the feasible choices for development of passenger rail service in the Tulsa to Oklahoma City corridor. The preliminary cost estimate for this service and facilities are estimated to be **\$355.7 million**.

#### **8.2.4 Other Passenger Rail Studies and Suggestions**

The *Texas-Oklahoma Passenger Rail Study (TOPRS)* is evaluating a range of passenger rail service options in an 850-mile corridor between Oklahoma City and South Texas. The study awarded to the Texas Department of Transportation (TxDOT) by an FY 2010 FRA HSIPR planning grant is scheduled to be completed by the end of 2015 after the completion of a service-level Environmental Impact Statement and a Service Development Plan.

Other projects such as the ACOG sponsored Oklahoma City–Edmond, Oklahoma City–Norman and Oklahoma City–Midwest City corridor studies are in the alternative analysis phase and cost estimates have not been completed. INCOG completed a 25 year Tulsa Regional Transit System Plan in the year 2011, and identified circulator, commuter and urban corridors for further analysis, some of which may be appropriate for passenger rail technology in the long term.



### 8.3 Summary of Passenger Rail Needs and Estimated Costs

Passenger rail is viewed as a needed option by some, for people who wish to travel and are not able to drive or fly. Quantifying the magnitude or intensity of need is difficult not only in Oklahoma but also in other states. The Federal Rail Administration (FRA) is initiating work on software that will aid in the development of ridership estimates and performance information, but this is still in the early phases of development. Thus, this Plan document simply states that there is an interest in passenger rail service in Oklahoma, and the level of need cannot be quantified at this time.

The 2015-2040 passenger rail cost estimates below are based on information provided by the Oklahoma Department of Transportation Rail Program Division, previous studies, and the Oklahoma Statewide Freight and Passenger Rail Plan. **Table 8-1** summarizes the passenger rail cost estimates for the identified projects, amounting to a total of **\$509 million**.<sup>26</sup> This total cost includes maintenance of existing service and possible new service. As indicated in the preceding section, further refinement of the needs and costs are anticipated as a part of ongoing and additional work by ODOT and the metropolitan planning organizations.

**Table 8-1: Passenger Rail Concepts and Related Costs, 2015-2040**

Project	Cost Estimate (millions)
Continuation of Amtrak Heartland Flyer service from Oklahoma City to Ft. Worth, operating subsidy	\$80.31
Extend Heartland Flyer to Newton, beginning service in year 2035 (capital cost \$60M; operating subsidy \$13M)	\$73.00
New Daytime Service Kansas City– Oklahoma City–Fort Worth (incremental increase after completion of Heartland Flyer to Newton route construction and improvements, anticipated post- 2040; \$107M est)	
Tulsa - Oklahoma City Intercity Passenger Rail	\$355.70
<b>Total</b>	<b>\$509.01</b>

Source: Oklahoma Statewide Freight and Passenger Rail Plan, Chapter 17, May 2012



# Oklahoma Long Range TRANSPORTATION PLAN

## 9. PUBLIC TRANSPORTATION

### 9.1 Description

Oklahoma has 20 rural public transportation providers<sup>27</sup> and five urban public transit providers. Federal Transit Administration (FTA) provides federal funding for public transportation, and it is supplemented with state, local, and contract for service funding. The type of public transportation service (fixed route, demand response, and paratransit) that each agency provides varies, but most agencies provide some combination of the three types of service.

- **Fixed route transit** offers services on a fixed schedule on a specific route with vehicles stopping at specific locations along the route.
- **Demand response transit** is a service provided on an as-needed (or demand) basis, where the user calls the transit operator to dispatch a vehicle or pick up the passenger. Small buses and vans are frequently used to transport passengers.
- **Paratransit** is a flexible means of passenger transportation with wheelchair accessible vehicles that can include demand response shared ride taxis, and carpooling.

The rural transit providers operate in 73 of the 77 counties in the State. The urban public transportation providers serve the Lawton, Tulsa, and Oklahoma City metropolitan areas.

Oklahoma has 39 tribes and 14 tribal transit providers. Thirty-two tribes prepared a Tribal Transportation Program related to roads, safety, trails, and transit improvements. Additionally, Oklahoma is served by two intercity private bus companies, Greyhound Lines and Jefferson Bus Lines.

The past decade has seen an increased growth in national transit ridership and the same trend also occurred in Oklahoma. Urban transit ridership grew at a rate of 4.4 percent between 2009 and 2013 (**Table 9-1**). In that same time frame, rural transit ridership increased by 8.7 percent (**Table 9-2**). Comparative data for tribal transit ridership are unavailable. **Appendix G** provides some additional background and inputs used to determine the public transportation needs.



**Table 9-1: Urban Transit Ridership**

Fiscal Year	Urban Entity	Revenue Miles	Passenger Miles	Passenger Trips Total
2009	Lawton Transit	687,022	1,902,579	429,408
	Edmond Citylink	142,450	NA	68,159
	Norman/OU CART	566,346	2,998,254	1,319,972
	OKC Embark	3,333,554	15,352,588	2,743,675
	Tulsa Transit	4,769,938	17,208,715	2,920,946
	<b>Urban Total</b>	<b>9,499,310</b>		<b>7,482,160</b>
2013	Lawton Transit	707,619	1,929,648	440,503
	Edmond Citylink	290,222	NA	265,000
	Norman/OU CART	594,114	NA	1,043,261
	OKC Embark	3,128,777	15,765,738	2,905,657
	Tulsa Transit	3,994,994	17,923,512	3,155,745
	<b>Urban Total</b>	<b>8,715,726</b>		<b>7,810,166</b>
<b>2009-2013</b>				<b>328,006</b>
<b>Percent Change</b>				<b>4.4%</b>

**Table 9-2: Rural Transit Ridership**

Fiscal Year	Revenue Miles	Passenger Miles	Elderly and Disabled Trips	All Passenger Trips
2009	16,637,072	23,998,381	764,800	2,992,136
2010	17,140,708	24,555,801	790,202	3,028,528
2011	18,269,479	31,876,436	841,108	3,102,450
2012	19,312,311	31,665,168	787,422	3,177,994
2013	19,690,886	32,733,738	941,329	3,251,559
<b>Total</b>	<b>91,050,456</b>	<b>144,829,524</b>	<b>4,124,861</b>	<b>15,552,667</b>
<b>2009-2013</b>	3,053,814	8,735,357	176,529	259,423
<b>Percent Change</b>	18.4%	36.4%	23.1%	<b>8.7%</b>

Source: ODOT Transit Programs



## 9.2 Public Transportation Needs

The following section discusses the 25-year public transportation needs in Oklahoma. The 2015-2040 public transportation needs include capital improvements, operations, and administration/planning services for rural, urban, and tribal transit system in Oklahoma. Because ODOT is responsible for administering the rural transit program, this document's coverage on rural transit needs is more comprehensive. Some information is provided regarding urban and tribal programs; however as entities are responsible for the administration and operation of its programs, this discussion is at a sketch plan level and should be supplemented with information directly available from the urban and tribal transit providers.

The analysis includes general public transit needs based on existing services and future needs identified by public input, information from individual transit providers, feedback from the local Council of Governments (COGs), and needs identified in the following:

- Rural Transit 5311 Data 2009-2013, ODOT Transit Programs Division;
- Lawton MPO 2035 Long Range Transportation Plan;
- ACOG (OKC Area) MPO Long Range Transportation Plan 2035; and
- INCOG (Tulsa Area) 2035 Regional Transportation Plan.

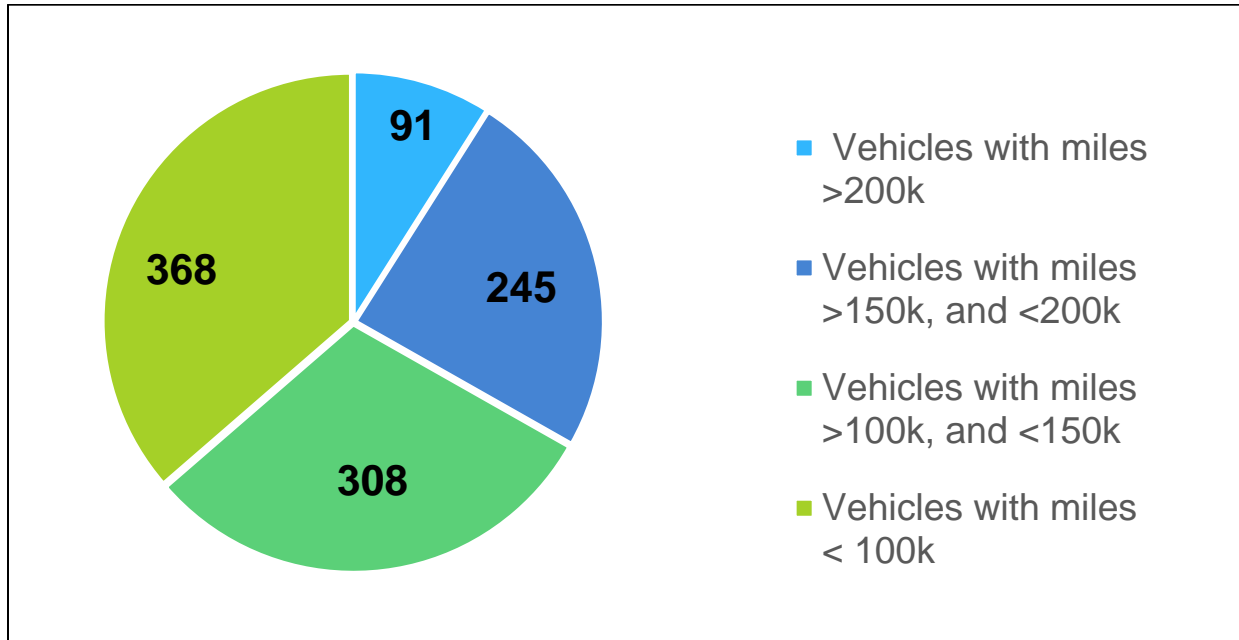
### 9.2.1 Rural Public Transit Needs Analysis

State and federal funds are processed through the ODOT Transit Programs Division and provided to each rural provider. The rural transit program is instrumental in providing needed transportation to Oklahoma citizens all across the state. Local residents use the service to access work, healthcare, and retail centers. Table 9-2 summarizes the ridership information for the rural transit services. Over the past five years, the revenue miles increased by 18 percent and passenger trips increased by 8.7 percent. Approximately one-quarter of the trips in the last five years were made by elderly and/or disabled passengers.

An analysis of the rural transit fleet data revealed that 65 percent of the system's current fleet (1,012 vehicles) has more than 100,000 miles, with 33 percent of the fleet having more than 150,000 miles. Consequently, the entire fleet will need to be replaced over the next 25-years. The capital cost to replace all 1,012 transit vehicles total \$165.7 million. **Figure 9-1** graphically shows the condition of rural transit fleet.



**Figure 9-1: Rural Transit Fleet Condition**



Source: ODOT Transit Program

#### 9.2.1.1 Rural Transit Needs Expressed by Public

Comments received through the LRTP public involvement phase indicated a strong concern for unmet rural transit needs. People noted that public transit in rural areas is a vital service to people who cannot drive or do not own a car.

Service providers commented that there are fewer federal dollars available for rural transit systems than 10 years ago. All rural transit providers are operating vehicles with high mileage. One suggestion was that perhaps there would be a savings in tax dollars if smaller systems merged and consolidated transit service with other regional transit providers.

Residents pointed out that transit (need) trends will only increase with the growing number of baby boomers who no longer want to drive or are able to drive. Previous routes tailored to provide journey-to-work rides have ended and/or service hours have been reduced. The declining investment in public transportation over the previous decade directly affects the ability of citizens to remain healthy, age in place, and seek employment across town or into another community where there are employment opportunities.

The LRTP Personal Travel Advisory Committee spoke also raised the issue of the need for better communication, coordination and connections between rural, urban, tribal and intercity bus and train services.



9.2.1.2 Rural Transit Needs and Related Cost Estimates

Rural residents in Oklahoma need transit services to assist them in reaching vital services such as health care, education, employment, and social and recreational services. As the population ages, The ability of many rural Oklahomans to live independently is a function of available transportation services to help them meet their daily needs; so as the population ages, needs are expected to increase. In terms of capital needs, 90 vehicles (of the rural transit programs' 1,012 vehicles) have mileage that exceeds 200,000 miles and over 300 additional vehicles will meet that threshold in the next three years. Vehicle replacement is a major challenge for rural transit providers.

ODOT's Transit Programs Division is responsible for administering the FTA's Non-urbanized Area Formula Grant Program (Section 5311). Actual costs, based on outlays the transit systems expended to conduct business annually, were utilized in developing the 25-year cost estimates for rural transit systems. To calculate the long-term rural transit, capital, administration, and operating cost - components of actual (vs. budgeted) costs for the years 2009 through 2013 were averaged and then projected over the next 25-years. This cost was also added to the capital cost to replace the entire rural transit fleet, as mentioned earlier.

As shown in Table 9-3, rural transit capital, administration, and operating costs total an estimated \$909 million.

Table 9-3: Rural Transit Needs and Cost Estimate

Category	FY 2016-2040 Cost (millions)
Capital	\$166.5
Administration	\$62.5
Operating	\$680.0
<b>Total</b>	<b>\$909.0</b>

Source: CDM Smith analysis of ODOT Transit Programs Data

9.2.2 Urban Public Transit

Urban public transportation systems serve communities with populations of 50,000 or more. In Oklahoma, urban transit providers serve the Lawton region, the Tulsa metropolitan area, and the Oklahoma City metropolitan area in Central Oklahoma. Providers in all three areas offer transport for the general public and specialized services for elderly and persons with disabilities.

9.2.2.1 Urban Transit Needs Expressed by the Public

A call for increased hours and more routes for urban bus services was heard frequently during the LRTP public involvement phase as residents voiced concerns and needs. Urban fixed-route bus service is needed in the evenings and on weekends for riders who work late, attend church social functions, access recreation activities and retail shopping areas.





ACOG and INCOG are reaching beyond the time and financial constraints of the 20-year regional plan and seeking a wider, longer and broader vision for transit. The Tulsa *Fast Forward Study* and the Oklahoma City *Regional Transit Dialogue* are groups that were initiated around 2008 to study more options for technology and governance. These urban study groups are also currently exploring options such as Bus Rapid Transit (BRT), rail transit streetcars, as well as methods of financing these new transit concepts. Additional details on these options will be further explored and defined in future transit and regional transportation plans in these urban areas.

The section below provides the needs for each of the urban transit providers based on the most recently approved regional transportation plan. For certain areas, needs were less defined as a result of unavailability of information.

9.2.2.2 Lawton Region

The Lawton Area Transit (LATS) provides fixed route transit and complementary paratransit services throughout the Lawton region in southwest Oklahoma. The system provides services to Ft. Sill, major shopping areas, medical facilities, Cameron University, and a number of Lawton Public Schools.

To calculate the long-term transit needs, the total cost of programmed transit projects in Lawton MPO’s *2035 Long Range Transportation Plan* was reviewed. Capital, operating and administration/planning cost components were derived by applying the following percentages to the total transit program cost:

- Capital – 30 percent;
- Operating – 68 percent;
- Administration/Planning – 2 percent.

As shown in **Table 9-4**, the estimated cost of Lawton area capital, administration/planning, and operating transit needs from 2015-2040 is **\$82 million**. These costs are associated to implementing the projects identified in the 2035 LRTP. The Lawton-Fort Sill region has a current fleet of 19 buses, four mini-vans and two pickups. The entire fleet will need to be replaced over the next 25years.

**Table 9-4: Lawton Transit Estimated Costs, 2015-2040**

Category	Cost (Millions)
Capital Cost	\$25
Operating Cost	\$55
Administration/Planning Cost	\$2
<b>Total</b>	<b>\$82</b>

Source: CDM Smith analysis of Lawton MPO 2035 Long Range Transportation Plan



9.2.2.3 Fort Smith Region

The Frontier MPO is responsible for transportation planning for the Fort Smith region which encompasses municipalities and unincorporated portions of counties in Arkansas and Oklahoma; and as such, includes needs from geography outside of the state of Oklahoma. Fort Smith Transit is the only urban transit system operating in Frontier MPO which is located in Ft. Smith, Arkansas. KI BOIS Area Transit System, an Oklahoma rural transit provider, established in 1983 to help meet the transportation needs for southeast Oklahoma’s communities. Frontier MPO coordinates with KI BOIS area transit system to access rural transit services in the Oklahoma segment of the MPO region. These costs are included in the rural transit needs and costs illustrated in Table 9-3.

9.2.2.4 Tulsa Metropolitan Area

The Metropolitan Tulsa Transit Authority (Tulsa Transit) was formed, in the late 1960s as a public trust of the City of Tulsa. In 1998 Tulsa Transit opened the Denver Avenue Station located at 4th and Denver in downtown Tulsa. In July 2001, as transit ridership continued to climb, the Memorial Midtown Station was opened at 33rd & Memorial to facilitate better crosstown passenger movement. In the past 10years, passenger ridership demand has continued to grow. Reasons include traffic congestion, air quality issues, and an aging population. Tulsa Transit has an operating service area of over 261 square miles and operates 25 fixed-routes in the metropolitan area.

As shown in Table 9-5, the cost to address the 25-year urban transit needs (at an existing level of service) in the Tulsa metropolitan area totals \$451 million. These costs were derived from the region’s long range transportation plan – Connections 2035 Regional Transportation Plan.

Table 9-5: Tulsa Metropolitan Area Transit Estimated Costs, 2015-2040

Category	Cost (Millions)
Capital Cost	\$396
Operating and Maintenance Cost	\$55
<b>Total</b>	<b>\$451</b>

Source: INCOG, Connections 2035 Regional Transportation Plan, p.63

9.2.2.5 Central Oklahoma Region

Transit services in the Oklahoma City Area Regional Transportation Study (OCARTS) area are operated and funded by the following:

- EMBARK, Oklahoma City Transit Services (formerly COTPA). EMBARK, the City of Oklahoma’s City bus service operates the largest public bus service in Central Oklahoma and serves Oklahoma City some of its suburbs. EMBARK operates 21 fixed routes Monday through Friday, and provides limited service on Saturdays.



- University of Oklahoma (OU) Transit Services Division (also known as Cleveland County Area Rapid Transit or CART) using Urbanized Area Program funds provided to the Oklahoma City and Norman Urbanized Areas, provides services in the Norman OK Area. CART operates nine local routes and a commuter route between Oklahoma City and Norman.
- The City of Edmond’s transit service, CityLink, operated by McDonald Transit, provides service in the Edmond OK area. CityLink has four local routes and an express route between Oklahoma City and Norman.
- The Elderly and Persons with Disabilities Program, is administered by the Department of Human Services, Aging Services Division.
- The Rural Transit Program, administered by the Oklahoma Department of Transportation, Transit Programs Division, provides some service in the rural parts of the Oklahoma City metropolitan area.

The cost of Central Oklahoma’s rural transit program is included in Table 8-3. The following services are provided in the OCARTS region. Each of these federal programs is funded through the FTA and local matching funds.

- Local fixed bus routes;
- Paratransit routes, frequently demand response services; and
- A variety of transit services for elderly and mobility impaired persons.

As shown in **Table 9-6**, the estimated cost of 25-year urban transit needs in the Central Oklahoma metropolitan area total **\$816 million**, which were identified in the region’s long range transportation plan – *Encompass 2035*.

**Table 9-6: Central Oklahoma Metropolitan Area Estimated Costs, 2015-2040**

Category	Cost (Millions)
EMBARK (OKC Transit)	\$669
CART	\$92
CityLink	\$24
Other***	\$31
<b>Total</b>	<b>\$816</b>
<i>Source: ACOG, Encompass 2035</i>	
<i>** Other includes special jobs access routes and Elderly &amp; Disabled Program cost</i>	

9.2.2.1 Summary of Urban Transit Needs and Related Costs

Residents of urban areas identified needs for greater service frequency, longer hours of service, weekend service, as well as more routes to serve employment and retail hubs. The demand for transit service is evidenced by a 1 percent average annual increase in Oklahoma’s metropolitan areas over the past four years.



The estimated cost of meeting public transportation needs for the Lawton, Tulsa, and Oklahoma City urban areas over the next 25 years totals **\$1,349 million**.

### 9.2.3 Tribal Transit

Several tribal transit services have been initiated since 2006 using federal funds from the FTA's Tribal Transit Program, Section 5311(c), which helps promote public transportation in tribal communities. The 14 tribal transit providers in the state of Oklahoma include the following:

- Grand Gateway EDA/ Pelivan
- KiBois Community Action Foundation, Inc.
- Muskogee County Transit Authority
- The Chickasaw Nation
- Choctaw Nation Transit
- Citizen Potawatomi Nation
- Comanche Nation
- Kiowa Tribe of Oklahoma
- Muscogee (Creek) Nation
- Ponca Tribe of Oklahoma
- Seminole Nation of Oklahoma
- United Keetoowah Band of Cherokee Indians in Oklahoma
- Cheyenne and Arapaho Tribes
- Delaware Nation

Comments received through the LRTP public involvement phase indicated a strong concern for unmet transit needs. People said that tribal transit in rural areas is a vital service to people who cannot drive or do not own a car. Transit service is needed to reach educational, medical, and social services.

Funding from FTA's Tribal Transit program for years 2009 through 2014 was used as the basis for estimating tribal funding needs for the life of this plan. Extrapolating from the past five year's transit use and costs, estimated cost of the 25-year tribal transit needs is estimated at **\$162.7 million**.

### 9.2.4 Other Transit and Passenger Issues

The Department's transit gap report – *Oklahoma Transit System Overview and Gap Analysis* – utilized surveys and the results indicate the need for the following:

- A coordination service or "mobility manager" to assist transit users in navigating among Oklahoma's transit systems and other passenger transportation modes;
- Highly visible, secure bulletin boards to post transportation information which includes the updated version of both sides of ODOT's Oklahoma Passenger Service Map; and
- Contact information for local taxi services, airport shuttles, and transit services.



LRTP Personal Travel Advisory Committee members highlighted several emerging trends and research that will impact future travel. Each of these could have implications for safety, funding, privacy/security, and intermodal operation of the transportation system. Following are some of the concepts discussed.

- A transportation network where cars and trucks no longer need drivers. (Carnegie Mellon University and automakers are researching and testing autonomous vehicle technology);
- Vehicles that communicate with each other (connected vehicles);
- Increased use of Uber, Lyft, and other technology based car-sharing services; and
- Bike sharing services.

### **9.3 Summary of Public Transit Needs and Estimated Costs**

The summary of public transit needs and estimated costs reflects an appraisal of rural transit needs within the context of limited resources. The rural providers already fund their programs with a percent of local match that is almost double the required amount. Thus, as the LRTP process unfolded, the stated needs were somewhat tempered by what the stakeholders and rural transit service providers experienced as being affordable.

Urban transit needs are largely planned and met within the context of metropolitan area transit services and metropolitan planning areas. What is reflected in the previous section of this chapter is an overview of what is contained in the metropolitan areas (fiscally constrained) long range transportation plans. These plans are currently in the process of being updated, so the information in this document should be reviewed alongside updated metropolitan area plans. Additionally, there may be local government transit needs that are not included in the regional transportation plans.

Finally, the tribal transit programs are the newest participants in the transit service process. While tribal participation in the transit process has grown in the last five years, further growth and refinement of the needs assessment and planning process is anticipated in the future.

A summary of estimated costs of urban, rural, and tribal transit improvements and service needs is described in **Table 9-7**.



**Table 9-7: Transit Improvement Needs and Estimated Costs, 2015-2040**

Estimated Cost of Transit Improvements, 2015-2040 (Millions)					
	Capital	O&M	Plg/Admin	Subtotal	Total
Urban Transit					\$1,349.00
Lawton Region	\$25.00	\$55.00	\$2.00	\$82.00	
Central Oklahoma Metropolitan Area	NA	NA	NA	\$816.00	
Tulsa Metropolitan Area	\$396.00	\$55.00		\$451.00	
Rural Transit	\$166.50	\$680.00	\$62.50		\$909.00
Tribal Transit	NA	NA	NA		\$162.70
<b>Total</b>					<b>\$2,420.70</b>



# Oklahoma Long Range TRANSPORTATION PLAN

## 10. INTERMODAL NEEDS

### 10.1 Description of Intermodal Facilities

An intermodal transportation hub or facility is a place where passengers and/or cargo are exchanged between vehicles or between transport modes. Intermodal public transport hubs include passenger rail stations, transit stations, bus stops, airports and ferry slips. Freight transportation hubs include airports, rail classification yards, rail and waterway connection infrastructure and truck terminals, or combinations of these. The Oklahoma City area intermodal passenger transportation, hub which is planned to be situated at the Santa Fe Depot on E.K. Gaylord Boulevard in downtown Oklahoma City, is expected to serve as the centerpiece of the future regional transit system and accomplish multiple goals for multiple client groups.

### 10.2 Intermodal Facility Needs

The need for intermodal transportation hubs has been expressed by various governmental and private entities, along with stakeholders within the state of Oklahoma.

#### 10.2.1 Central Oklahoma Intermodal Passenger Transportation Hub

The Oklahoma City area MPO developed a plan for a repurposed transportation center and a new gateway for the Central Oklahoma region. The concept of an updated and enhanced Santa Fe Depot to promote mobility, enhance the image of public transportation, and create a catalyst for economic development is a vision that is shared by the MPO, the City of Oklahoma City, and the Oklahoma Department of Transportation.<sup>28</sup> The proposed transportation hub will provide connectivity between existing and future transit modes, and will provide passengers with amenities such as enclosed waiting and ticketing, restrooms and access to mixed use development. The total project cost of the transit hub is estimated at \$123 million.<sup>29</sup>

The project is anticipated to be completed in phases, with the initial work on property acquisition, station renovation, new ticketing and passenger waiting areas, added streetscape and bicycle and pedestrian facilities, and improved modal connectivity, to be funded through a 2013 TIGER grant<sup>30</sup> additional financial support is provided from the City of Oklahoma City, designated city sales tax revenue, and ODOT. Cost estimate for Phase I is \$28.4 million; so approximately **\$94.5 million** is needed to complete the improvements recommended by the Hub Study.

#### 10.2.2 Tulsa Area Intermodal Passenger Transportation Hub

In its most recent Long Range Transportation Plan, *Connections 2035*,<sup>31</sup> INCOG stated its long term intent to pursue funding for an intermodal passenger facility. This facility is still in the conceptual planning phase, and no cost estimate has been developed.



### 10.2.3 Intermodal and Transload Freight Facilities

As reported in the Oklahoma Freight Study,<sup>32</sup> intermodal traffic has increased recently, not only for high value goods, but also for bulk commodities such as agricultural product destined for export. *Intermodal freight facilities* handle containerized traffic that moves on the road, rail, and sometimes waterway systems. Businesses in Oklahoma have expressed interest in intermodal rail terminals; however the prospects for intermodal developments in Oklahoma for the near future are uncertain. In 2005, BNSF closed its intermodal terminal near Oklahoma City due to lack of demand. Since then Oklahoma rail shippers have moved containers by truck to terminals in other states. Dallas-Fort Worth, Kansas City, and Denver each have terminals operated by BNSF and UP.

Tulsa and INCOG have expressed interest in locating an intermodal facility in Tulsa that would serve northeast Oklahoma, southwest Missouri and southern Kansas. For many Oklahoma manufacturers, it is necessary to transport goods by truck to destinations, or by truck to the Dallas/Ft. Worth metroplex, or to Kansas City, for transfer to rail. An intermodal freight facility in the Tulsa Region could connect several freight modes including rail, truck, and air. The concept that is being explored would include relocating a rail yard located just north of the Tulsa central business district to a location adjacent to the Tulsa International Airport where it could be utilized as an intermodal trans load facility. The concept is in the preliminary discussion phase with various stakeholders.

Transloading is a term describing transportation that typically involves the transfer of non-containerized freight from one mode to another. Transload facilities are concentrated in the central and eastern part of the state; and the need for this type of facility to allow interaction between freight modes is present in the western part of the state as well. Development of industrial parks or transload facilities would provide assistance to customers that do not have the volume to support a unit train facility (110+ cars).

## 10.3 Intermodal Facility Needs and Estimated Cost

The State of Oklahoma is in the early stages of exploring intermodal facilities. While the passenger intermodal facility in Central Oklahoma is currently under construction, intermodal freight facilities are equally important.

Capitalizing on Oklahoma's central location, intermodal freight facilities could be developed to benefit the different industrial sectors. These sectors include agricultural commodity processing, industrial livestock production, aerospace and electronics manufacturing, and warehouse and distribution. Intermodal and inter-state coordination should be considered as part of the process of developing and advancing viable options intermodal facilities.





At present, only one intermodal facility in Oklahoma had progressed to the stage of construction. That facility, under the jurisdiction of the City of Oklahoma City is the OKC Intermodal Transit Hub. Estimated cost for full-phase construction is \$123 million. Approximately \$94.5 million is needed to complete the improvements recommended by the Hub Study.



# Oklahoma Long Range TRANSPORTATION PLAN

## 11. PORTS AND WATERWAYS

### 11.1 Description of Ports and Waterways

The McClellan-Kerr Arkansas River Navigation System (MKARNS) is the nation's most inland waterway and Oklahoma's primary navigable waterway originating from the Tulsa Port of Catoosa and flowing southeast through Arkansas to the Mississippi River. The MKARNS was completed at a cost of \$1.2 billion and dedicated in 1971 by President Richard Nixon. The waterway contains 18 locks and dams to traverse the 445 mile trip, with an elevation change of 420 feet from Tulsa to the Mississippi River. Transporting products by barge is the most economical, safe and environmentally friendly way of shipping bulk and oversize cargo. The entire MKARNS shipped 12.1 million tons of commodities with a value of \$3.85 billion in 2013.<sup>33</sup>

The Ports of Muskogee and Catoosa are the state's two public ports, and both are designated as Foreign Trade Zones. In addition, there are several other private port operations along the MKARNS. Oakley's Port 33 (formerly Johnston's Port 33), is a large privately owned port facility located south of the Port of Catoosa adjacent to US-412 near Inola. There are 31 terminal facilities along the waterway within Oklahoma and most of these facilities are clustered along the Ports of Catoosa and Muskogee. Both of the public ports have rail access in and out of their industrial parks where industries lease property from the ports and often ship liquid and bulk materials and project cargo from across the world. In 2013, the Oklahoma ports registered a total inbound/outbound shipping of approximately 6.2 million tons of cargo.

The MKARNS has been designated the M-40 Marine Highway. It was recently updated from "connector" (minor feeder route) to "corridor" (larger contributing route) status, indicating the growing importance of its freight support to the Mississippi River. An application to the U.S. DOT Maritime Administration (MARAD) has been submitted by the Arkansas Waterways Commission and the ODOT Waterways Branch to upgrade the designation of the M-40 Marine Highway from "connector" to "corridor" status. The new designation by the U.S. DOT Maritime Administration (MARAD) will allow for submission of additional federal grant applications.

#### 11.1.1 Impact of Panama Canal Expansion

One of the major factors affecting the efficiency, distribution and competitiveness of goods transportation is the expansion of the Panama Canal. Since sea freight is growing, the number and size of vessels that are able to use the Canal will increase after the expansion is completed.



The direct impact of the expansion to Oklahoma ports is not yet known, however, the expansion will provide opportunities to increase the export of dry bulk commodities such as grains, agricultural products, petroleum products, and steel.

## **11.2 Ports and Waterway Needs**

### **11.2.1 McClellan-Kerr Arkansas River Navigation System (MKARNS)**

There are a number of initiatives that would be helpful in advancing the capabilities of the Oklahoma waterways. There is a backlog of critical maintenance of approximately \$100 million needed on the 100 percent federally funded navigation features of the system.<sup>34</sup> The U.S. Army Corps of Engineers is responsible for the operation and maintenance of the system and defines “critical maintenance” projects as having a 50 percent or greater probability of failure within the next five years. The available funding has not kept pace with the demand over the years, and locks that are over 40 years old are experiencing increasing wear and tear.

Funding from USACE’s Operations and Maintenance allocations for years 2007 through 2016 was reviewed and used as the basis for estimating projected revenue available for future maintenance activities. Extrapolating from the ten years of operation and maintenance cost, the projected revenue for performing maintenance activities over the 25-year period of this plan is estimated at \$72.4 million.

The deepening of the MKARNS channel to 12 feet (current navigable draft is 9 feet draft) is another need of the inland waterway system. Congressional authorization to deepen the channel was received in the Energy and Water Development Act of 2004, H.R. 2754, but funds have not been appropriated by Congress. The cost to deepen the entire 445-mile long channel totals \$183 million;<sup>35</sup> however channel deepening could be completed incrementally at a cost of \$10 million per 24-mile segment. Out of the total cost, approximately \$91 million will be required to deepen the Oklahoma side of the channel.

Deepening the MKARNS channel to a 12 foot draft would allow barges to carry increased weights thereby saving shipper costs and making the system more competitive with similar waterway systems and other modes of transportation. Increased tonnage on the system would decrease the burden placed on railroads and highways, thereby reducing pavement deterioration and potentially improving air quality.

As the Arkansas River flows east, it comes to a confluence with the White, and Mississippi Rivers in southeast Arkansas. The merging of these rivers, complicated by land use and geology changes over many years, has become problematic in that the river(s) departs from its banks and the area experiences periodic flooding. The continuation or expansion of this flooding and related damage could cause a serious breach to the navigation system.<sup>36</sup> Additionally there is concern for the surrounding area that is also home to a wildlife refuge and over 100,000 acres hardwoods.<sup>37</sup>



Obtaining a permanent fix for the flood-prone end of the navigation channel at the confluence of the Arkansas, White, and Mississippi Rivers, is a priority for maintaining and improving the MKARNS system. Finally, adding tow haulage to the locks has been identified as another improvement that is needed in the next 25 years. No cost estimates are available for these two items.

Several options have been proposed for financing these improvements, each with a set of advantages and disadvantages. Options include but are not limited to: federal funding, contributions from public and private the stakeholders, lockage fee per barge, and/or an increase in diesel fuel tax.

### 11.2.2 Comments from the Public about Waterway Needs

Public expressed the importance of relieving highway system from carrying very heavy loads. It was noted that the industrial parks in Catoosa and Muskogee have space available and provide excellent multi modal access. Interest was expressed to explore public-private partnership as a way to finance the required port improvements.

### 11.2.3 Access to Ports

As an indicator of ODOT's commitment to support the state's ports, the Department has programmed 63 highway projects totaling \$276.4 million in the FY 2015-2022 Eight Year Construction Work Plan. These improvements are within a 10 mile radius of the Port of Catoosa and Oakley's Port 33, and will be completed by 2022. The Department has 19 projects totaling over \$102 million also scheduled for award by the Department in the years 2015 through 2022, in the area close to the Port of Muskogee. Projects designated in these areas include road and bridge improvement, as well as right-of-way acquisition and utility relocation.

## 11.3 Ports and Waterways Needs and Estimated Cost

The primary needs for the MKARNS are: proceeding with critical maintenance, deepening the channel to 12 feet, and addressing the navigation channel overflow issue at the confluence of the Arkansas, White, and Mississippi Rivers, and adding tow haulage to the locks.

As shown in **Table 11-1**, the estimated cost of meeting the 25-year ports and waterway needs for critical maintenance and capacity expansion totals **\$191 million**. This is another example of a transportation mode, or intermodal facility location, where the Oklahoma Department of Transportation is a partner (ODOT maintains bridge and highway access to the Ports), but other entities (the US Army Corps of Engineers, the City of Tulsa – Rogers County, and the Muskogee City County Port Authority) provide the leadership, direction and fiscal responsibility for the transportation infrastructure.



**Table 11-1: Port and Waterway Needs and Cost Estimate**

<b>Category</b>	<b>Cost (Millions)</b>
Maintenance	\$100
Capacity Expansion	\$91
<b>Total</b>	<b>\$191</b>

*Source: US Army Corps of Engineers, 2012*



# Oklahoma Long Range TRANSPORTATION PLAN

## 12. BICYCLE AND PEDESTRIAN

### 12.1 Description of Bicycle and Pedestrian Facilities

Bicycle and pedestrian facilities throughout Oklahoma consist of multi-use trails, bicycle routes, and sidewalks. The planning and implementation of bicycle and pedestrian improvements are typically completed at the local government level, and/or through a Metropolitan Planning Organization (MPO). Funding for these bicycle and pedestrian improvements is almost always from a combination of federal, local, and private and/or non-profit sources. The 2015-2040 LRTP process incorporates an assessment of bicycle and pedestrian facility needs and acknowledges ODOT's participation in meeting bicycle and pedestrian needs. The Department views its primary responsibility as collaborating with local governments to address needs on the state highway system. This Plan does not claim to include an exhaustive list of all bicycle and pedestrian facility needs in the state.

Statewide initiatives for bicycle and pedestrian facilities have been implemented through the federal Transportation Enhancement Program – TE Funding (TEA-21 and SAFETEA-LU), and subsequently through the MAP-21 Transportation Alternatives Program (TAP). ODOT solicits applications for Recreational Trails<sup>38</sup> and TAP funds on a biennial basis. These funds offer communities a dedicated source of revenue to expand transportation options including bike and pedestrian facilities.

Some local governments elect to work independently on the development, funding, and implementation of bike-pedestrian projects. As another option, ODOT works in cooperation with local sponsors to integrate bicycle and pedestrian facilities into adjacent highway projects. The Department expects to adopt Design Guidelines for bicycle facilities in the current update of the Design Manual. Also, ODOT has recently added a bicycle pedestrian coordinator position in the Local Government Division. The bicycle pedestrian coordinator has been charged as the facilitator of the newly developed Statewide Bicycle and Pedestrian Advisory Committee (BPAC).

### 12.2 Bicycle and Pedestrian Needs

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 Long Range Transportation Plans of the four metropolitan organizations. The section below provides a summary of the bicycle/pedestrian plans currently envisioned by each MPO and the cities and towns in rural Oklahoma. The MPO long range plans are updated every five years, so the information provided below is evolving and changing. Bicycle and pedestrian needs for rural communities were assessed based on public input, communication with the rural Councils of Government, and on historical needs and implemented projects.



*Appendix H* provides capital cost assumptions used to determine bicycle and pedestrian needs.

### 12.2.1 Public and Committee Comments on Bicycle and Pedestrian Transport

The public's appetite for bicycle and pedestrian facilities has sharpened in Oklahoma and elsewhere. Bicycle and pedestrian facilities are important for public health and environmental reasons. Interest for being part of the bicycle and pedestrian project development process was expressed. A need for preparing design guidelines for bicycle and pedestrian facilities and a statewide bicycle/pedestrian coordinator was identified. Several commenters indicated they would like more information about bicycle, and pedestrian crashes to be made available to the public.

### 12.2.2 Oklahoma City Metropolitan Area

As the designated Metropolitan Planning Organization for Central Oklahoma, ACOG coordinates all regional transportation planning efforts within the metropolitan region. The following two plans were used to identify bicycle and pedestrian projects and needs in the Oklahoma City metropolitan area:

- Encompass 2035 Plan; and
- ACOG Regional Bicycle Master Plan.

The Oklahoma City Area Regional Transportation Study (OCARTS) *Encompass 2035 Plan* adopted in May 2012 discusses the issues, concerns, needs, and estimated costs of planned bicycle and pedestrian facilities.

The *Regional Bicycle Master Plan* identified the following bicycle and pedestrian issues and concerns:

- Need for additional trails;
- Need for trails to link communities and support of multi-use trails; and
- Need for sidewalks and safe crosswalks.

The *Regional Bicycle Master Plan* identified the following four objectives:

- Gather baseline data and annual data;
- Increase number of riders by 50 percent in 5-years, toward a 30-year increase of 300 percent;
- Increase the number of miles of safe, low-stress facilities by 50 percent in 5 years, with an overall increase of 300 percent in 30-years; and
- Decrease bicycle crash rate by 50 percent with a zero fatality rate.

As shown in **Table 12-1**, the 25-year ACOG bicycle and pedestrian needs total **\$329 million**. This includes funding for an estimated 430 miles of bike lanes and trails, 380 miles of signed bicycle routes, and 800 miles of sidewalks



Table 12-1: Oklahoma City Area Estimated Costs of Planned Bicycle and Pedestrian Improvements, 2015 - 2040

Facility Type	Planned Miles	Estimated Cost (Millions)
Bike Lanes and Trails	430	\$187
Signed Bike Routes	380	
Sidewalks	800	\$142
<b>Total</b>	<b>1,610</b>	<b>\$329</b>

Source: Encompass 2035, Long Range Transportation Plan

12.2.3 Tulsa Metropolitan Area

The Indian Nations Council of Governments (INCOG) has a long standing commitment to planning for bicycle and pedestrian improvements in the Tulsa metropolitan area. INCOG is in the process of developing a Bicycle and Pedestrian Master Plan called GO Plan, which will provide a comprehensive regional plan for pedestrian and bicycle improvements. The plan is in its technical analysis/network assessment phase and it is scheduled to be adopted in 2015.

As shown in Table 12-2, the 25-year INCOG bicycle and pedestrian needs as identified in the connections 2035 regional transportation plan total \$108 million. This cost estimate covers 111 miles of multi-use trails and 100 miles of on- street bicycle lanes.

Table 12-2: Tulsa Area Estimated Costs of Planned Bicycle and Pedestrian Improvements, 2015 - 2040

Facility Type	Planned Miles	Estimated Cost (Millions)
Multi-Use Trail	111	\$83
On-Street Bikeway/Bike Lanes	100	\$3
Other Equipment	N/A	\$22
<b>Total</b>	<b>211</b>	<b>\$108</b>

Source: Connections 2035 Regional Transportation Plan

12.2.4 Lawton Metropolitan Area

As shown in Table 12-3, the 25-year Lawton bicycle and pedestrian needs total \$39 million, which includes 24 miles of multi-use trails and 79 miles of on street bicycle lanes. The Lawton MPO adopted its first Bicycle and Pedestrian Plan in 2008.





Table 12-3: Lawton Area Estimated Costs of Planned Bicycle and Pedestrian Improvements, 2015 - 2040

Facility Type	Planned Miles	Estimated Cost (Millions)
Multi-Use Trails	24	\$19
On-Street Bike Lanes	79	\$9
Other Equipment	N/A	\$11
<b>Total</b>	<b>103</b>	<b>\$39</b>

Source: Lawton MPO

12.2.5 Fort Smith Metropolitan Area

The Fort Smith Trails and Greenway Plan developed in 2004 identified 22 potential corridors to add 50 miles of multi-trails. The 25-year Fort Smith bicycle and pedestrian needs total \$15 million. The cost estimate for this effort is not included in the Oklahoma LRTP as the mileage is in the city limits of Ft. Smith, Arkansas.

12.2.6 Small Towns and Counties

Bicycle and pedestrian needs for other smaller towns and counties were estimated from ODOT data. Small towns and counties submit requests for funding to ODOT annually to address some of their bike and pedestrian needs. Based on data from previous requests for funding assistance, annual requests/needs are anticipated to be approximately \$15 million.

Thus, over the next 25-years, it is estimated that funds for bicycle and pedestrian facilities totaling \$375 million will be requested to address bicycle and pedestrian needs for rural and small communities throughout Oklahoma. Table 12-4 summarizes the cost for the facilities.

Table 12-4: Small Towns and Counties Estimated Costs of Planned Bicycle and Pedestrian Improvements, 2015 - 2040

Facility Type	Miles	Estimated Cost (Millions)
Multi-Use Trails	900	\$225
Sidewalks	300	\$150
<b>Total</b>	<b>1,200</b>	<b>\$375</b>

Source: ODOT Local Government Division, Transportation Alternatives Branch



### 12.3 Statewide Bicycle and Pedestrian Needs and Related Cost Estimate

Oklahoma residents need to have opportunities to travel in their communities by walking and bicycling on safe facilities. Trails and pathways that are of adequate width, well lit, and accessible are viewed as an important addition to quality of life for individuals and communities in the state.

The estimated cost of addressing the bicycle and pedestrian needs in Oklahoma as stated above, is **\$851 million**, and is summarized in **Table 12-5**. As previously discussed, this assessment reflects an evaluation that examines ODOT’s attention to addressing bicycle and pedestrian needs, which focuses primarily on the state highway system. It is not intended to convey that this description is a comprehensive view of all of Oklahoma’s bicycle and pedestrian needs.

**Table 12-5: Estimated Costs of Planned Bicycle and Pedestrian Improvements, 2015 - 2040**

Estimated Cost of Bicycle & Pedestrian Facilities, 2015-2040 (Millions)					
	Trails	Signed Bike Routes/Lanes	Sidewalks	Other	Total
Urban	\$102	\$199	\$142	\$33	\$476
Lawton Region	\$19	\$9		\$11	\$39
Central Oklahoma Metropolitan Area		\$187	\$142		\$329
Tulsa Metropolitan Area	\$83	\$3		\$22	\$108
Rural	\$225		\$150		\$375
<b>Total</b>	<b>\$327</b>	<b>\$199</b>	<b>\$292</b>	<b>\$33</b>	<b>\$851</b>



# Oklahoma Long Range TRANSPORTATION PLAN

## 13. AIRPORT ACCESS

### 13.1 Description of Airports

Three major airports serve Oklahoma — Will Rogers World Airport in Oklahoma City, Tulsa International Airport in Tulsa, and Lawton-Ft. Sill Airport in Lawton.<sup>39</sup> These airports serve the vast majority of state passenger traffic; and all cargo activity is processed through Will Rogers and Tulsa. Lawton Airport has a great deal of use by military personnel. In addition, Oklahoma has 122 general aviation airports that serve public and private aircraft.

### 13.2 Airport Access Needs

The various cities, town, and counties in Oklahoma which have public airports within their political boundaries work with the Oklahoma Aeronautics Commission and the Federal Aviation Administration to ensure that the aviation needs of commerce and communities across Oklahoma are met. The 2015 - 2040 LRTP acknowledges airport access needs and the importance of connectivity of the surface transportation system to public airports. As the manufacturing base shifts to high value and high tech products, the importance of efficiency and reliability in transportation has increased to support just-in-time supply chains. Airport services are integral to this component of the freight supply chain. Quality airport service and convenient access, is also important to local residents and businesses.

#### 13.2.1 Comments from Public and Committees

The public expressed the importance of providing access to the airport by transit. It was understood that good surrounding infrastructure is vital for personal and business travel. The access to airports and surrounding infrastructure is important for quality of life, tourism, and commerce.

#### 13.2.2 Support for Access to Airports

Projects in the Eight Year Construction Work Plan support airport access for passenger and freight aviation by means of highway, bridge, interchange and rail improvements in close proximity to airports.

In addition to nearly 36 miles of expected highway improvements, (see **Appendix I**) additional projects are also identified in the 2015 – 2022 Eight Year Construction Work Plan. Costs associated with airport access improvements are included in the highway and bridge cost estimates discussed in Sections 3 and 4 of this report.



## Oklahoma Long Range TRANSPORTATION PLAN

### 14. LOCALLY OWNED FEDERAL AID SYSTEM NEEDS

As noted earlier, ODOT is charged with the planning, designing, construction, operation, and maintenance of state highway system, which includes 12,265 miles of highways and 6,828 bridges. The state highway system does not include all federal aid highway miles in Oklahoma; and these roads are locally owned by counties, cities and towns, or occasionally another public agency.

In total, federal aid miles under the jurisdiction of cities, towns, and counties in Oklahoma sum to nearly 19,000 miles.<sup>40</sup> To help address local government owned federal aid system improvement needs, ODOT provides annual funding to counties, cities, and the ACOG and INCOG MPOs. The projected 25-year federal funding that ODOT will pass through to local governments to address locally owned federal aid highways totals **\$1.5 billion**. This funding is used as an *indicator* of local needs; however ODOT is aware that the need is greater than the revenue available. Other state, and local funds help to meet many of the city, town, and county transportation needs, and some needs remain unmet.



## Oklahoma Long Range TRANSPORTATION PLAN

### 15. CONGESTION MITIGATION AND AIR QUALITY NEEDS

The Congestion Mitigation and Air Quality Improvement (CMAQ) Program was implemented by FHWA and FTA to support surface transportation projects and other related efforts that contribute air quality improvements and provide congestion relief. Federal CMAQ funding is provided to areas in nonattainment or maintenance for ozone, carbon monoxide, and/or particulate matter. Since Oklahoma does not have any nonattainment or maintenance areas, ODOT receives a minimum apportionment of CMAQ funding for congestion mitigation, air quality improvement projects, or other flexible spending.

ODOT provides a portion of the CMAQ funding to the Lawton, ACOG and INCOG metropolitan planning organizations to help combat air quality and congestion problems. Funding is used to promote carpools, transit ridership, bicycle and pedestrian transportation, and the use of clean fuels. Additionally some funds are used for funding capital projects such as intersection improvements that minimize congestion /excessive idling and thus reduce problematic vehicle emissions. The need to address congestion and related air quality threats is expected to continue over the life of the Plan.

Over the next 25 years, ODOT's federal funding that will be passed through to metropolitan areas to assist with air quality improvements and congestion relief is projected at approximately **\$30.5 million**. As is the case with funding for the locally owned federal aid system, this amount is used as an *indicator* of local needs; however ODOT is aware that the need is greater than the revenue available. Other funds help to meet many of the state's congestion and transportation related air quality needs.



# Oklahoma Long Range TRANSPORTATION PLAN

## 16. SUMMARY

Oklahoma's 25-year multimodal transportation needs total **\$37.4 billion** (2013\$) and it includes needs that are ODOT's responsibility as well as needs and costs addressed by partnering federal, state, and local agencies and private railroads:

- ODOT Responsibility
  - State highway system – bridges
  - State highway system – highways
  - State highway system – interchanges
  - Transportation appurtenances
    - Safety
    - Maintenance
    - Ports of Entry
    - Weigh stations and rest areas
    - Intelligent Transportation Systems (ITS)
    - State freight rail
  
- Partner Programs
  - Private freight rail
  - Passenger rail operations
  - Public transportation
    - Urban
    - Rural
    - Tribal
  - Intermodal facilities
  - Ports and waterways
  - Bicycle and pedestrian
  - Locally owned federal aid system
  - Congestion management

The estimated cost of improvements identified under the categories of ODOT's responsibility over the 2015-2040 time period is **\$32.2 billion**. The estimated cost of improvements related to transportation programs and functions under the jurisdiction of other public agencies is **\$5.2 billion**. (ODOT's share of estimated costs related to transportation improvements under the jurisdiction of other public partners totals \$2.4 billion.)



To be successful, Oklahoma's federal, state, and local partners must coordinate and collaborate to ensure the transportation challenges of today and tomorrow are addressed through strategic policies and adequate funding levels. The process of developing the long range transportation needs resulted from considerable coordination among a variety of statewide stakeholders. ODOT is committed to continuing these planning efforts and expanding this coordination to meet the future transportation needs in Oklahoma.



# Oklahoma Long Range TRANSPORTATION PLAN

## 17. ENDNOTES

<sup>1</sup> Multimodal transportation is defined here as a transportation situation where the passengers or goods have multiple options to travel modes from origin to destination. For example, on a multimodal street or highway, passengers may have the option to travel via automobile, bicycle, walking or bus.

<sup>2</sup> Partner entities include: Amtrak Heartland Flyer and private passenger rail operators; ACOG, INCOG and Lawton MPOs; Oklahoma cities, towns and counties; Oklahoma rural, urban, and tribal transit providers; and the US Army Corps of Engineers.

<sup>3</sup> The Oklahoma Highway System or "State Highway System" refers to Interstate, U.S., and Oklahoma (State) highways within the State of Oklahoma. It also includes non-toll turnpikes.

<sup>4</sup> Transportation appurtenances include the following functions and improvements within the ODOT ROW: intelligent transportation systems, maintenance, ports of entry, rest areas, safety, state owned railroads and at grade highway-railroad crossings, and weigh stations.

<sup>5</sup> Historic Highway Performance Monitoring System (HPMS) data from Oklahoma and 2012-2032 Growth forecasted by ODOT Strategic Asset and Performance Management Division were analyzed to develop planning level forecasts for the 2015-2040 LRTP. Forecasts indicate a compound annual growth rate of 1.08%, which equates to an average annual growth rate of 1.24%.

<sup>6</sup> The AASHTO 2015 Bottom Line report indicates travel growth of 1.0 percent per year in vehicle miles of travel represents the likely impacts of both population growth and economic recovery. Between 1991 and 2011, both highway vehicle miles of travel and transit passenger miles of travel increased at a long term average annual rate of 1.6 percent. Highway travel declined during the recession and its aftermath, and has slowly resumed growth since 2011. <http://bottomline.transportation.org/Documents/Bottom Line 2015 Executive Version FINAL.pdf>

<sup>7</sup> Private Class I and Class III railroads play an important part in the State's economy and mobility. The LRTP process involved communication and coordination with the private rail companies; however because of proprietary rights, the full array of information was not available. Additionally, it should be noted that summaries of LRTP costs and revenues do not include calculations for privately owned transportation infrastructure.

<sup>8</sup> 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. Some intermodal connections are as simple as a bus stop or a parking lot.

<sup>9</sup> Commercial vehicle freight growth in VMT is expected to outpace personal vehicle VMT growth rates. <http://bottomline.transportation.org/Documents/Bottom Line 2015 Executive Version FINAL.pdf>  
<http://www.okladot.state.ok.us/newsmedia/pdfs/freight-goods-movement.pdf>

<sup>10</sup> The National Railroad Passenger Corporation, doing business as Amtrak, is a publicly funded railroad service, operated and managed as a for-profit corporation, which began operations in 1971, to provide intercity passenger train service in the United States. Amtrak receives annual appropriations from federal and state governments to supplement operating and capital programs. The name "Amtrak" is the blending of the words "America" and "track."

<sup>11</sup> The 445-mile long McClellan-Kerr Arkansas River Navigation System (MKARNS) consists of 18 locks and dams, and provides 9-foot depth inland navigation from the Mississippi River to Catoosa, Oklahoma. <http://www.okhistory.org/publications/enc/entry.php?entryname=McCLELLAN-KERR%20ARKANSAS%20RIVER%20NAVIGATION%20SYSTEM>





<sup>12</sup> The Tulsa Area Civil Works Branch of the US Army Corps of Engineers provided 10 years of historical information on (non-routine maintenance) capital improvement costs for the MKARNS. This was used to project a "reasonable" Corps revenue forecast amount for the MKARNS over the next 25 years. Correspondence date: May 2015

<sup>13</sup> HPMS provides data on the condition and performance of all federal-aid eligible roadways in the state.

<sup>14</sup> An interchange is defined by AASHTO as a system of interconnecting roadways in conjunction with one or more grade separations that provides for the movement of traffic between two or more roadways or highways on different levels. The 2009 Oklahoma MUTCD Supplement defines a simple or minor interchange as an interchange where traffic is very light, and connection is between a high volume and a local or land service access road. Diamond interchanges are the simplest type of interchange. The 2009 Oklahoma MUTCD supplement defines a major or complex interchange as an interchange with another freeway or expressway, or an interchange with a high-volume multi-lane highway, principal urban arterial, or major rural route where the interchanging traffic is heavy. Full cloverleaf, or directional interchanges are typically considered as complex or major interchanges.

<sup>15</sup> The information on improvement needs and estimated costs for interchange projects were provided by Oklahoma Department of Transportation's Project Management and Programs Divisions.

<sup>16</sup> ODOT completed two Ports of Entry between 2010 and 2014. They are located near the State's borders at I-35 in Kay County (near Kansas), and at I-40 in Beckham County at the Texas stateline.

<sup>17</sup> Information from ODOT's Programs Division for JP No. 23783(04) and JP No. 20340(06), dated May 12, 2015.

<sup>18</sup> Transportation Tracking and Communications System used by the U.S. DOE for hazardous materials monitoring.

<sup>19</sup> Oklahoma Department of Transportation, Freight and Goods Movement, January 2014.

<sup>20</sup> Association of American Railroads, National Rail Freight Infrastructure Capacity and Investment Study, September 2007.

<sup>21</sup> Oklahoma Department of Transportation, prepared by Cambridge Systematics Inc., Oklahoma Freight Study, June 2014.

<sup>22</sup> <https://www.aar.org/policy/positive-train-control>

<sup>23</sup> Oklahoma Department of Transportation, prepared by Parsons Brinckerhoff, Oklahoma Statewide Freight and Passenger Rail Plan, May 2012

<sup>24</sup> Kansas Department of Transportation, by Parsons Brinckerhoff, Kansas City Wichita Oklahoma City Fort Worth Corridor Passenger Rail Service Development Plan, 2001.  
[http://ksdot.org/PDF\\_Files/PDF-Passenger-Rail-SDP.pdf](http://ksdot.org/PDF_Files/PDF-Passenger-Rail-SDP.pdf)

<sup>25</sup> The Sooner Subdivision rail line (Sooner Sub) originates about 15 miles southwest of downtown Tulsa in northeast Oklahoma, and terminates approximately six miles east of downtown Oklahoma City. (Oklahoma City is located in central Oklahoma.) Currently, freight rail connections are made from the suburban locations mentioned above to Tulsa and Oklahoma City respectively by the Burlington Northern Santa Fe Railway (BNSF) and Union Pacific Railroad (UP). The Sooner Sub line was purchased from the BNSF by the State of Oklahoma in 1998. Pursuant to a directive from the State Legislature, the State of Oklahoma, through the Department of Transportation, solicited bids from the private sector and sold the line in 2014 to Stillwater Central Railroad LL

<sup>26</sup> Oklahoma Department of Transportation, prepared by Parsons Brinckerhoff Inc., Oklahoma Freight and Passenger Rail Plan, May 2012

<sup>27</sup> <http://www.okladot.state.ok.us/transit/s5311/index.htm>



<sup>28</sup> Association of Central Oklahoma Governments, Oklahoma City, OK, Intermodal Transportation Hub Master Plan, June 2011.

<sup>29</sup> In partnership with COTPA, the City of Oklahoma City, and the Oklahoma Department of Transportation, ACOG led an intermodal transportation hub study, prepared by a local consultant, and completed in June 2011. <http://www.acogok.org/hub-study>

<sup>30</sup> Oklahoma City, Metropolitan Area Projects 3, "(Oklahoma City) awarded \$13.6 million grant for downtown transit hub, 2012. <http://us2.campaign-archive2.com/?u=c067e0500e2a024737cbcd896&id=34958ab474&e=829c8e340c>

<sup>31</sup> Indian Nations Council of Governments, Connections 2035 Regional Transportation Plan, December 2012.

<sup>32</sup> Oklahoma Department of Transportation, prepared by Cambridge Systematics Inc., Oklahoma Freight Study, Chapter 3, June 2014.

<sup>33</sup> ODOT Waterways Branch, 2014 Inland Waterway Fact Sheet, 2014

<sup>34</sup> Waterways Status Update, ODOT, December 2014, <http://www.okladot.state.ok.us/waterway/pdfs/waterwaysweb.pdf>

<sup>35</sup> U.S Army Corps of Engineers, McClellan-Kerr Arkansas River Navigation System Fact Sheet, April 2012

<sup>36</sup> <http://newsok.com/study-of-arkansas-river-should-be-of-keen-interest-to-oklahoma-policy-makers/article/5414203>

<sup>37</sup> <http://www.swd.usace.army.mil/Portals/42/docs/FY13%20Three%20Rivers%20Study,%20AR.pdf>

<sup>38</sup> The Recreational Trails Program funds come from the Federal Highway Trust Fund, and represent a portion of the motor fuel excise tax collected from non-highway recreational fuel use: fuel used for off-highway recreation by snowmobiles, all-terrain vehicles, off-highway motorcycles, and off-highway light trucks. [http://www.fhwa.dot.gov/environment/recreational\\_trails/funding/](http://www.fhwa.dot.gov/environment/recreational_trails/funding/)

<sup>39</sup> [http://www.faa.gov/airports/planning\\_capacity/npas/reports/](http://www.faa.gov/airports/planning_capacity/npas/reports/)

<sup>40</sup> According to the 2013 "Federal Aid Highway, Miles by Ownership" publication, cities, towns, and counties in Oklahoma own 18,989 miles in the aggregate. <http://www.fhwa.dot.gov/policyinformation/statistics/2013/pdf/hm14.pdf>