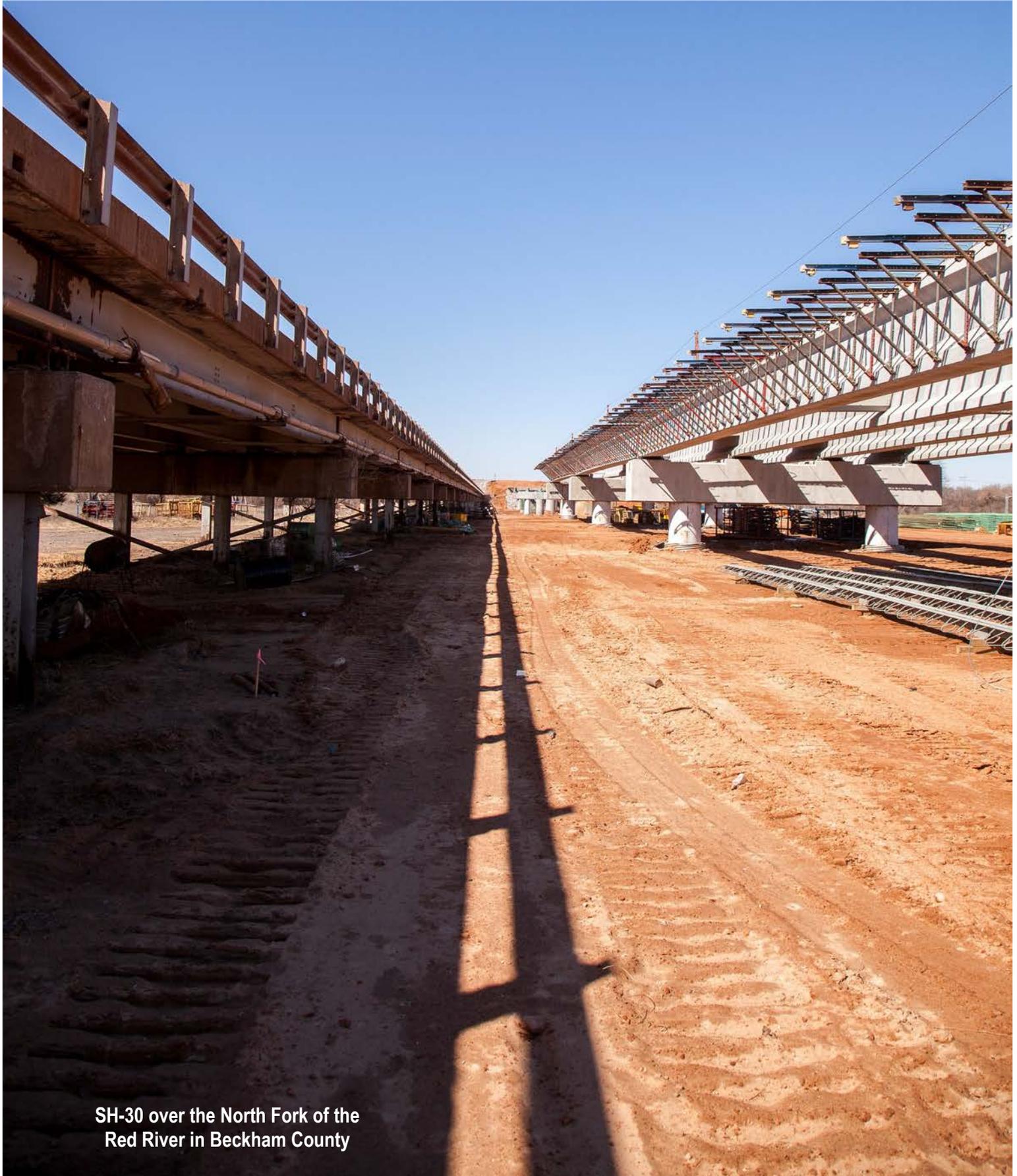


Update on Oklahoma Bridges and Highways

Oklahoma Department of Transportation

November 2015



SH-30 over the North Fork of the Red River in Beckham County

Oklahoma

Bridges and Highways

Oklahoma's State Highway Transportation Infrastructure

Preface

The state owned highway system in Oklahoma is comprised of the State numbered route highways, the US numbered route highways and the Interstate Highway System. The state system of highways encompasses 12,264 centerline miles as measured in one direction along the dividing stripe of two lane facilities and in one direction along the general median of multilane facilities. Transportation on our highways is also facilitated by over 6,800 bridge structures that span major rivers and lakes, named and unnamed perennial streams and creeks, other roads and highways and railroads. On the average, passenger vehicles, buses and trucks traveled more than 68.8 million vehicle miles each day (daily vehicle miles traveled or DVMT) in 2014 on the state owned highway system (not including toll roads).

Oklahoma's highway system bridge and pavement problems are readily recognized and are a direct result of many years of "deferred maintenance" due to a lack of state funding. From 1985 to 2005 transportation investments were flat and, as a result, the condition of the infrastructure experienced a consistent, downward spiral and decline that will take many years of committed, focused and dedicated resources to correct. During that time highway pavements were deteriorating at a rate beyond the available funding to repair, let alone perform necessary rehabilitation and reconstruction. More than 1,500 of our highway bridges were structurally deficient or functionally obsolete including 137 structures across Oklahoma that were posted as unable to carry a legally loaded truck.

Understanding that a world class transportation system is the cornerstone of a vibrant economy and a leading factor in growing and attracting new business, the Oklahoma Legislature clearly decided that investing in transportation infrastructure should be a priority of state government. In 2005, these policy makers set about the important business of reversing the trend of the previous 20 years and several pieces of landmark transportation legislation were subsequently crafted and passed. These transportation funding initiatives have introduced new state resources reserved for the construction, care and maintenance of our transportation infrastructure.

If these trends are sustained and enhanced, these growing revenue streams represent the true turning point for the future of Oklahoma's transportation assets. Today, the Department is afforded the opportunity to develop an investment strategy and direct a multi-faceted plan that wisely and transparently dedicates the available state transportation resources in a balanced manner. This strategy represents the beginning of a monumental effort to return Oklahoma's bridges and highways to a system in a state of good repair and safety and keep it that way for our citizens in the future.

Please enjoy the progress described in this update, understand the challenges that lie ahead and most importantly, accept our deepest appreciation for your interest in and support for Oklahoma's transportation system.



I-244 in Tulsa County

Oklahoma Bridges

Oklahoma's Transportation Infrastructure

Condition and Needs Summary

Oklahoma's bridge problem is well recognized. Of the over 6,800 bridges on the state highway system, 916 are either too narrow to support today's traffic or have structural deficiencies, or both. Over the last several decades, Oklahoma consistently ranked at or near the bottom of the list of states with the nation's worst bridge conditions. Crumbling transportation infrastructure and deficient bridges have a detrimental impact on Oklahoma commerce, job creation and economic growth and can even endanger our citizens.

The Oklahoma Department of Transportation has accelerated bridge replacement efforts through a focused and concerted effort made possible by additional state funding provided by the Legislature. This effort has allowed the Department to replace or rehab 1,072 bridges since January 2006. Even with this progress and our best efforts to gain control of the bridge infrastructure deterioration curve, the conditional problems caused by 20 years of flat transportation funding continue. An evaluation of the most recent bridge inspection cycle and April 1, 2015 reporting reveals that an estimated 372 structurally deficient bridges were still identified. The current 2016-2023 Construction Work Plan includes the replacement or major rehabilitation of 913 bridges.

Proposed bridge replacements / major rehabilitations in the 8 Year Construction Work Plan913

- **All identified structurally deficient bridges are included in either the 2016-2023 Construction Work Plan or the 2016-2019 Asset Preservation Plan.**

The Department has always envisioned the development of an aggressive bridge rehabilitation program formulated to effect badly needed improvements on marginal bridges, but never possessed the resources required to launch a meaningful initiative. The Department has instituted a bridge specific program designed to be flexible and reactive. This bridge rehabilitation program allows the Department to stretch our scarce regular maintenance dollars farther. At the same time, the program has proven effective in slowing or stemming further deterioration or functional decline of the bridge infrastructure and enhances the ability to manage these transportation assets in a manner that maximizes their life cycle.

Annual investment in bridge rehabilitation.....\$40 M

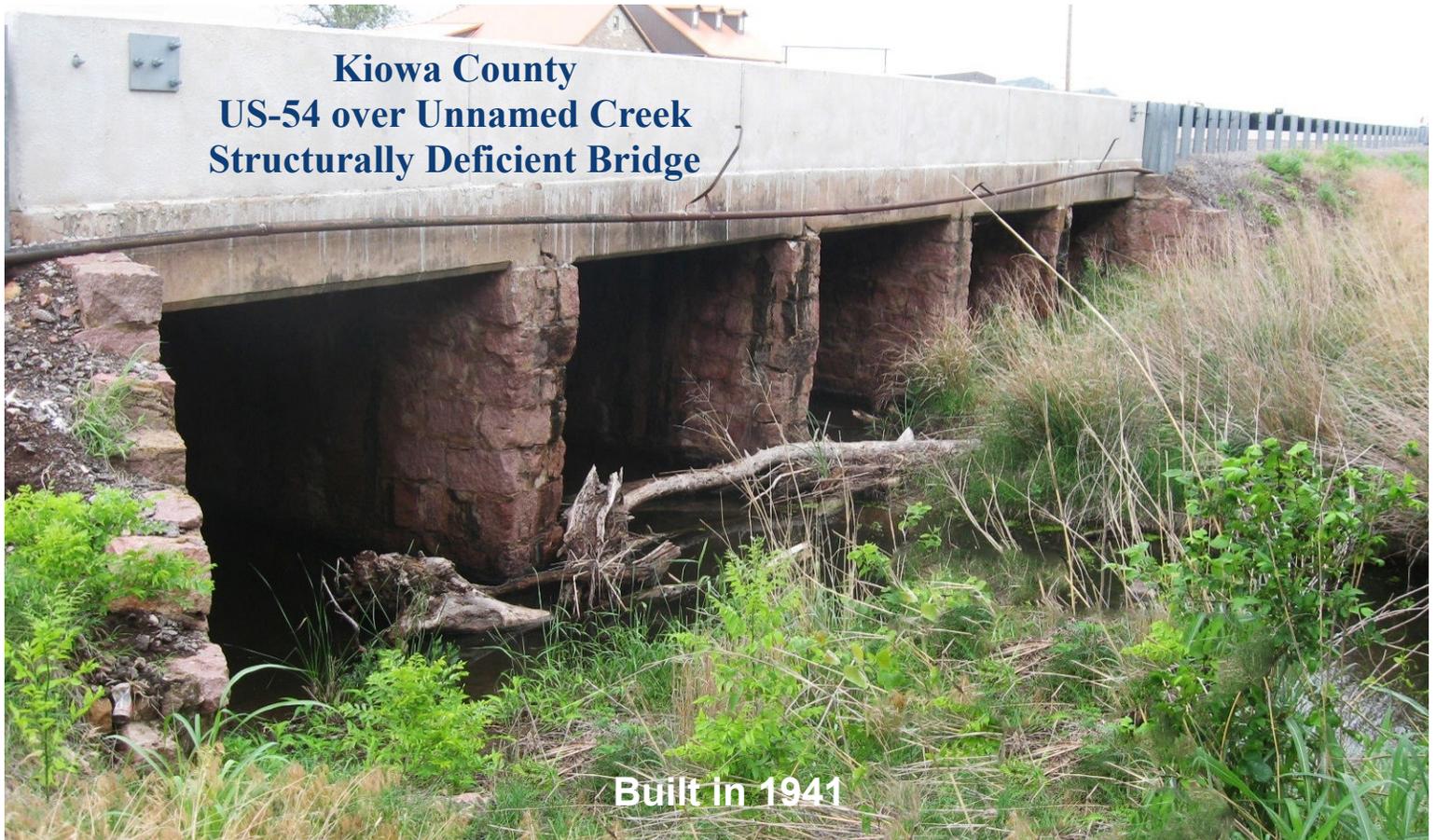
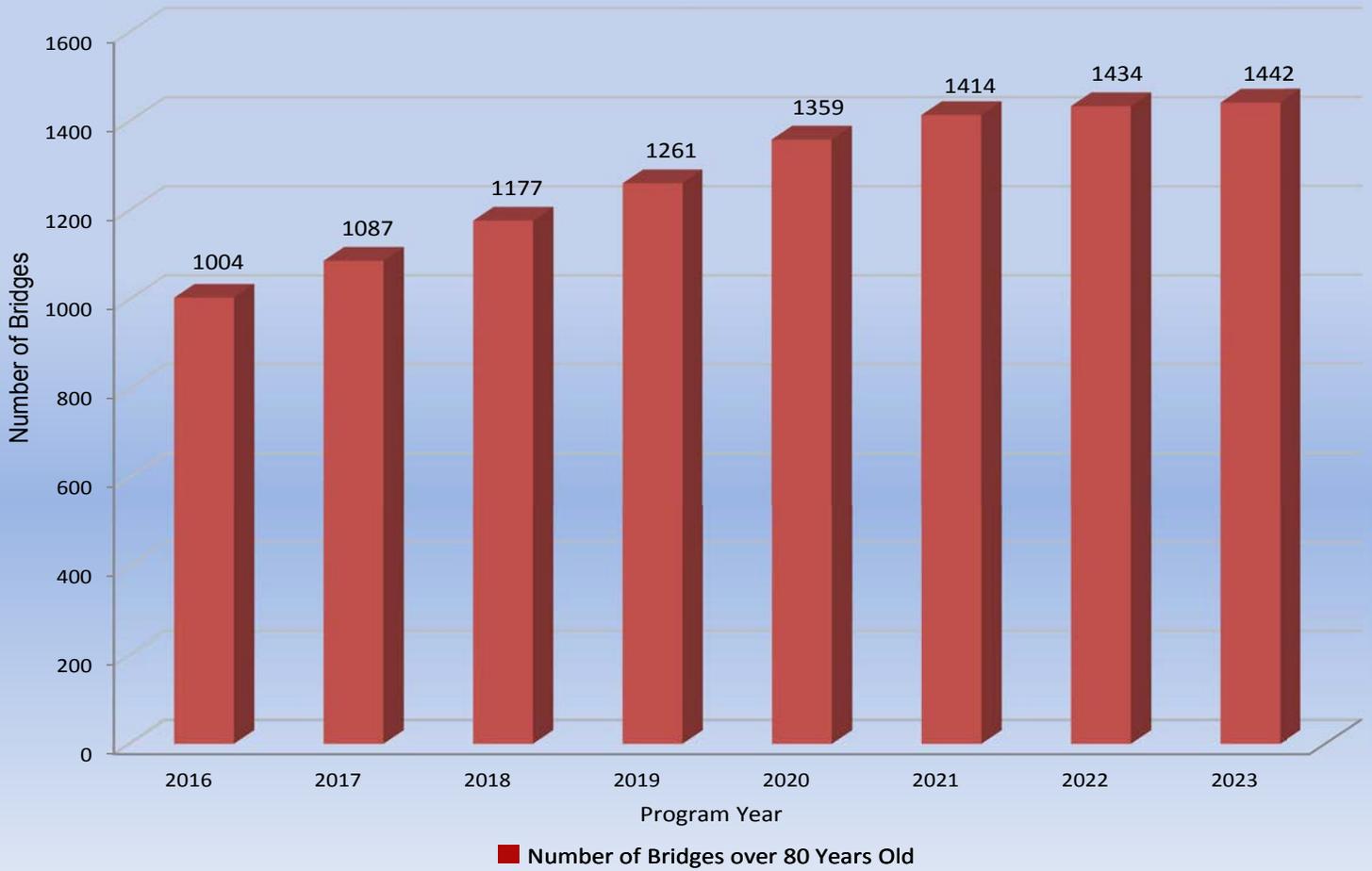
While these efforts exemplify the wise investment of the available resources, today we must consider that a continuing long term annual bridge replacement commitment will be required to keep pace with the projected aging and deterioration rates of our current inventory

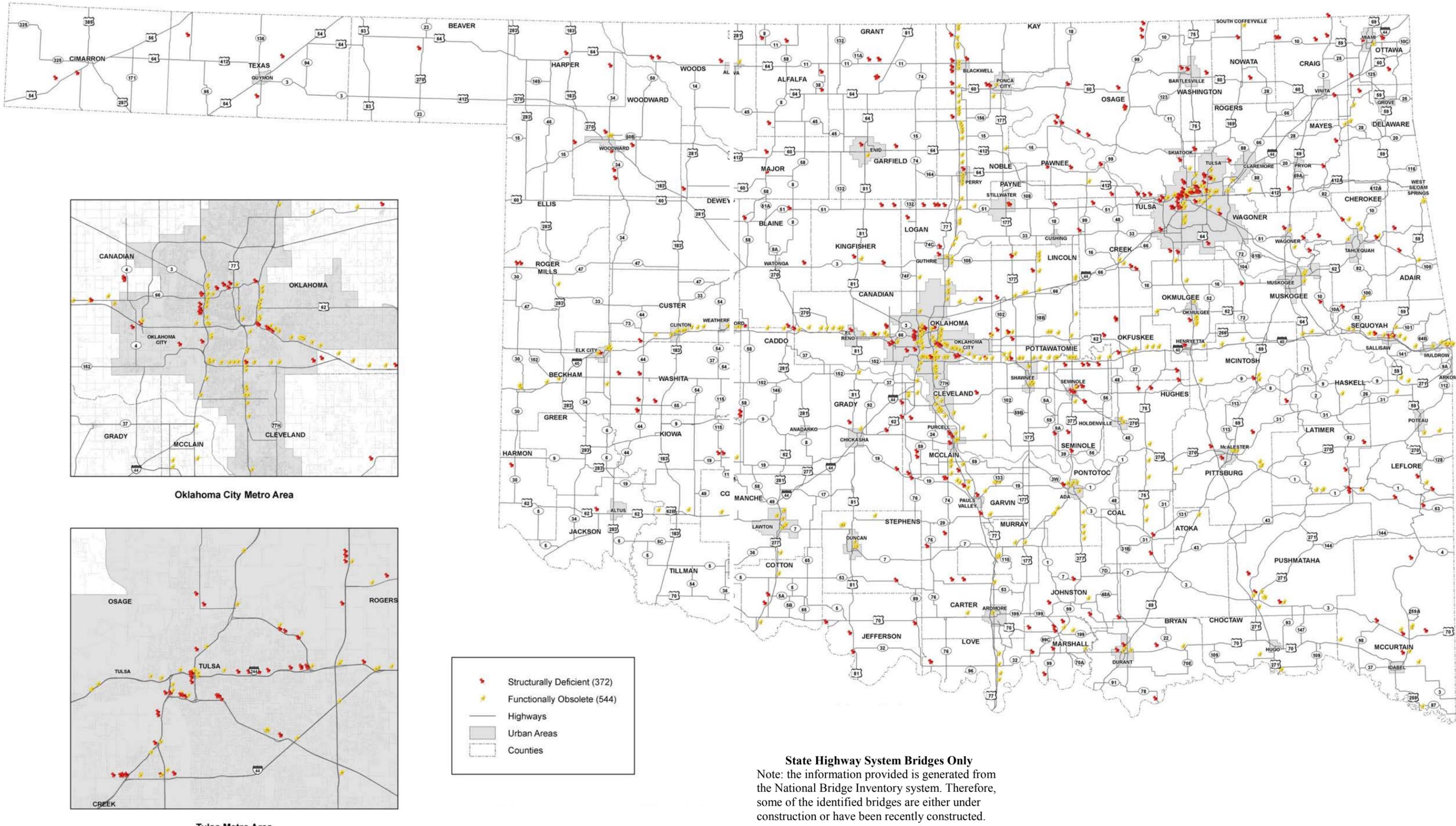
Bridge Condition Definitions

Functionally Obsolete: A bridge term used when any of the geometric properties of a bridge are deficient such as being too narrow or load posted; any restriction of strength or weight.

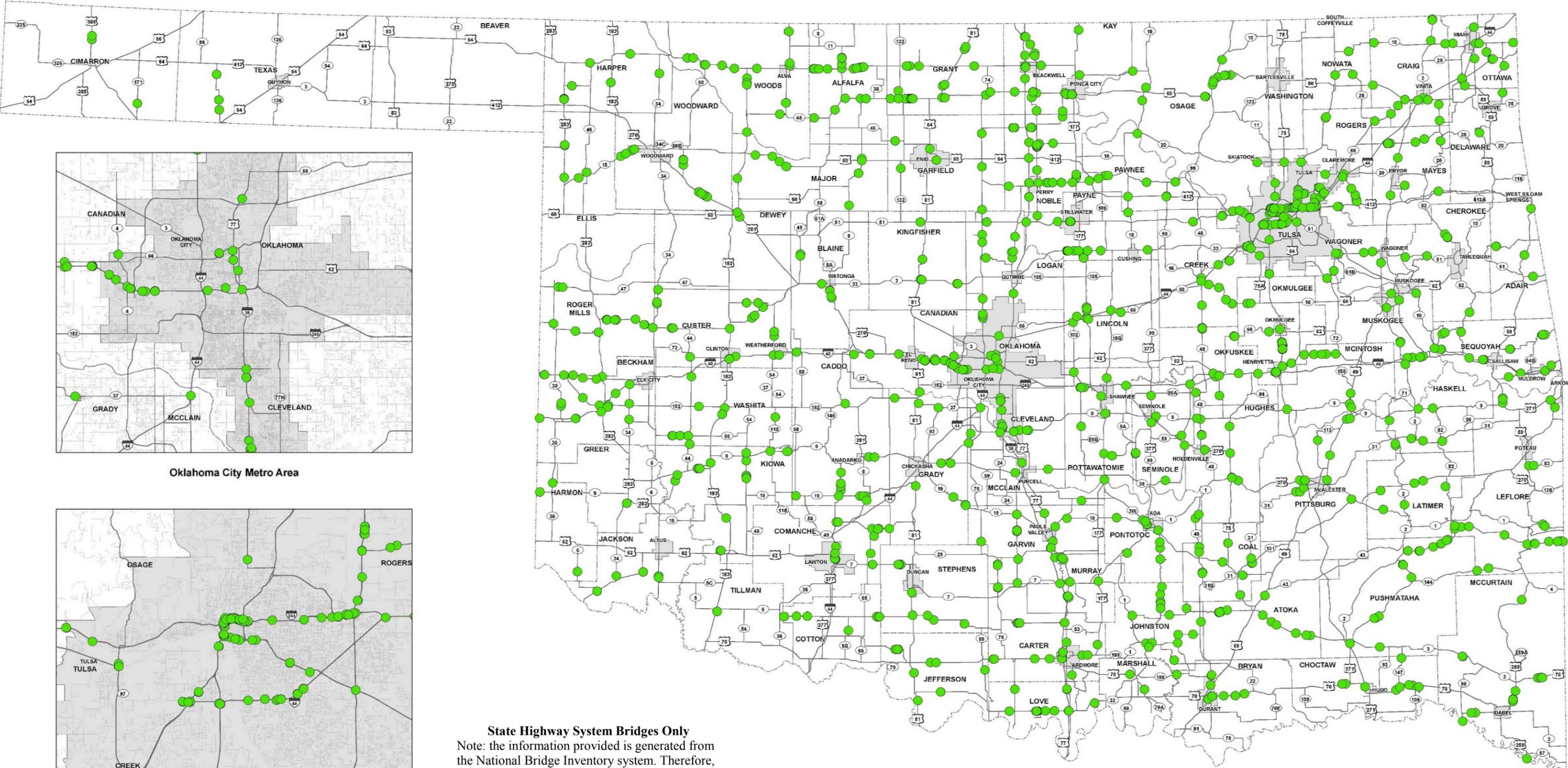
Structurally Deficient: A bridge term used when the physical condition of any of the bridge elements are lacking. These properties have a major bearing in qualifying a bridge for federal bridge replacement or rehabilitation funds.

Bridge Aging





Structurally Deficient and Functionally Obsolete Bridges

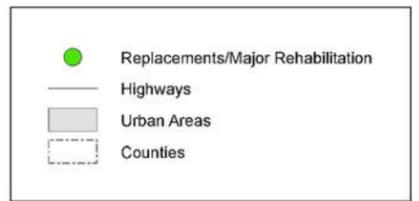


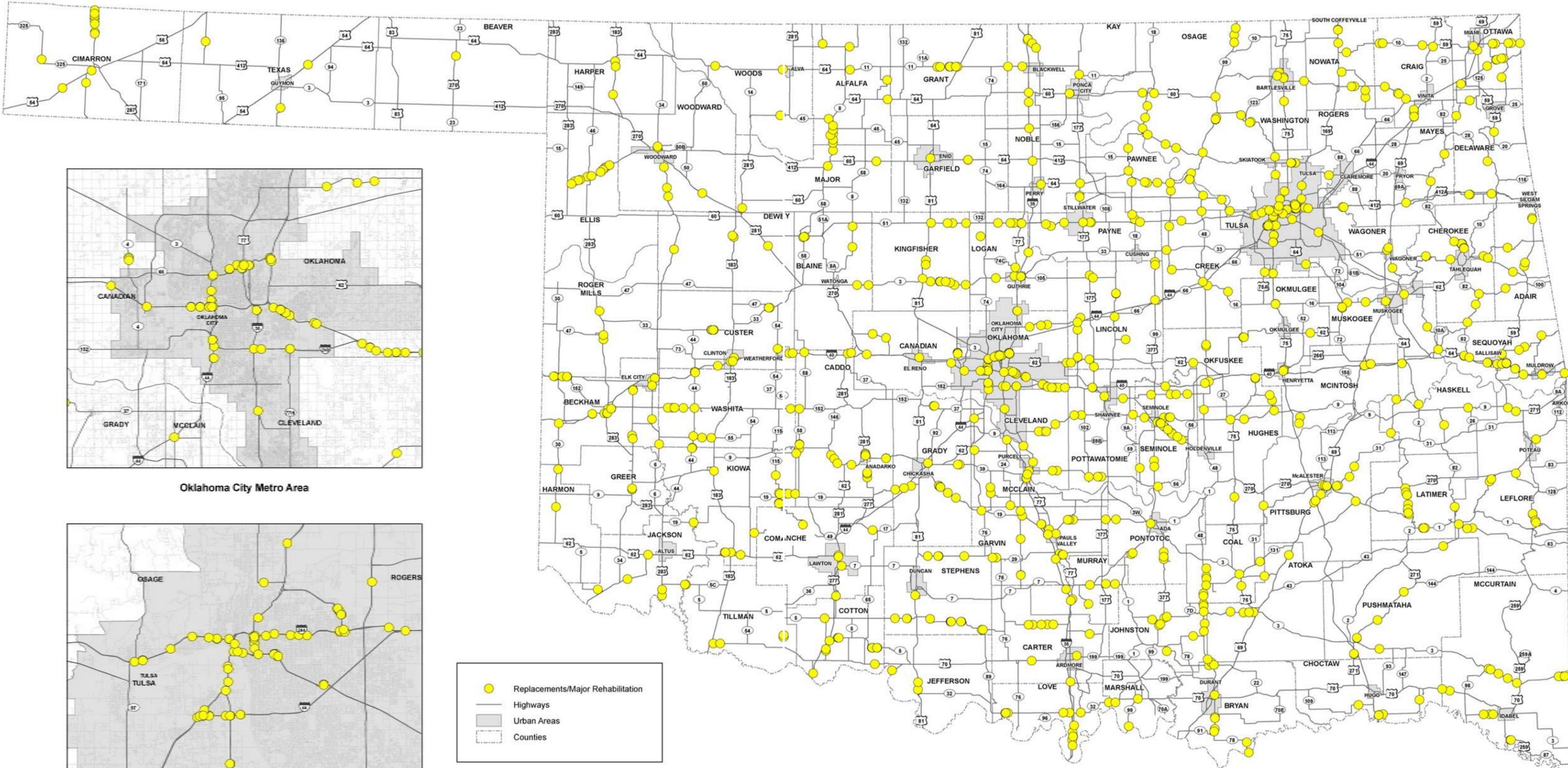
Oklahoma City Metro Area

Tulsa Metro Area

State Highway System Bridges Only
 Note: the information provided is generated from the National Bridge Inventory system. Therefore, some of the identified bridges are either under construction or have been recently constructed.

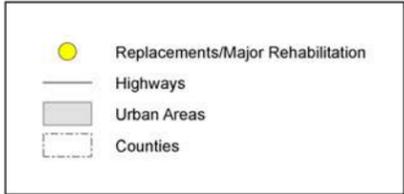
1,072 Bridge Replacement and Major Rehabilitation Projects Under Construction or Completed Between January 2006 and October 2015





Oklahoma City Metro Area

Tulsa Metro Area

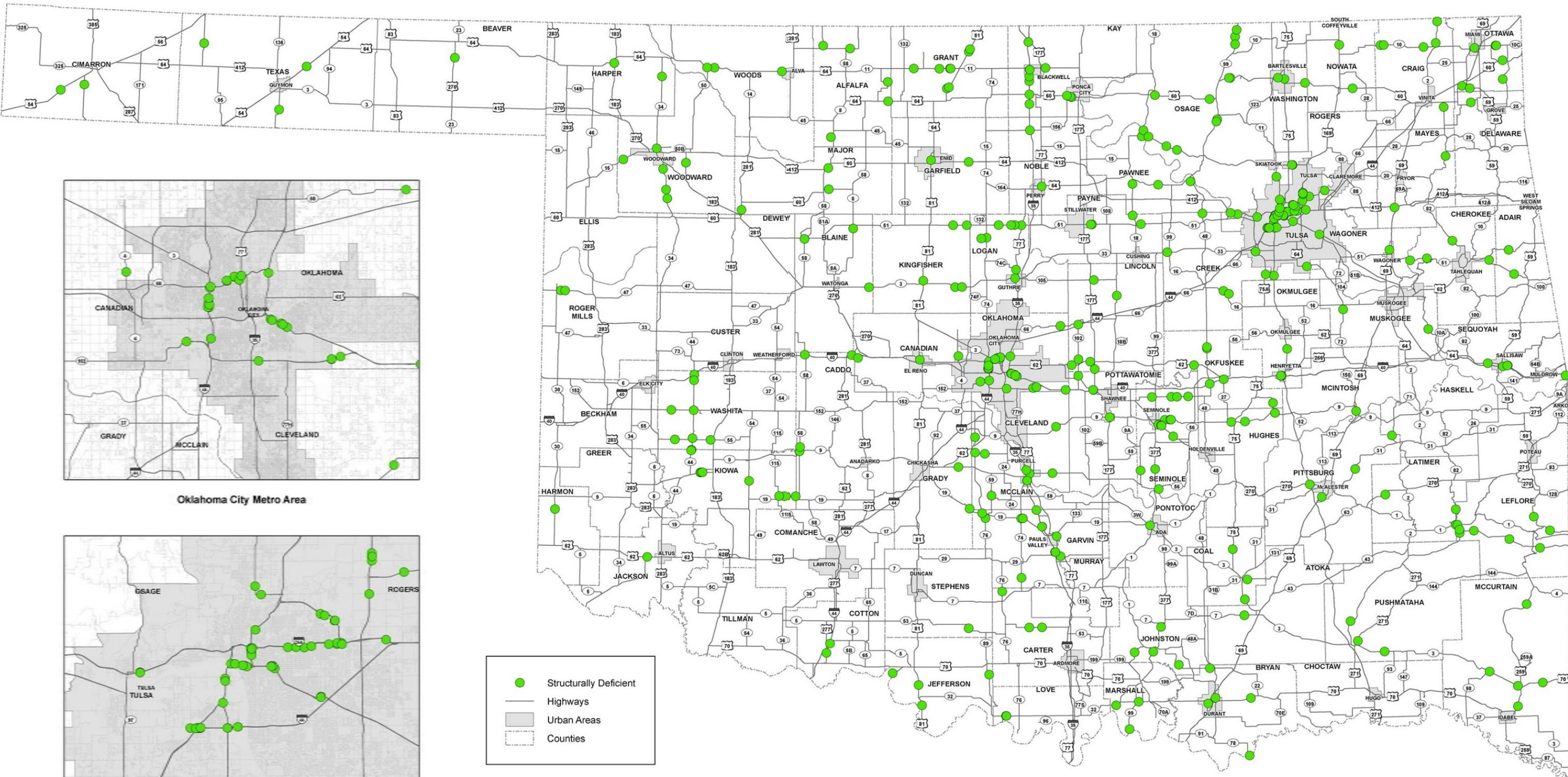


State Highway System Bridges Only
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8 Year Construction Work Plan

913 Bridge Replacement and Major Rehabilitation Projects

Fiscal Years 2016 - 2023



372 Structurally Deficient Bridges

As reported at the end of 2014

All are in the 2016-2023 Construction Work Plan

State Highway System Bridges Only
 Note: the information provided is generated from the National Bridge Inventory system. Therefore some of the identified bridges are either under construction or have been recently constructed.

Highways & Safety

Oklahoma's Transportation Infrastructure

Condition and Needs Summary

Oklahoma's rural nature and historically agricultural and energy based economy has witnessed the conversion of many farm-to-market roads and bridges into highways. While these roads were ideal for transporting livestock and crops to market 70 years ago, they are less than adequate when supporting today's heavier trucks, increased traffic demands and higher operating speeds. Almost 4,600 miles of Oklahoma highways are two-lane facilities without paved shoulders.

Shoulders and roadway improvements to two-lane highways without paved shoulders in the 8 Year Construction Work Plan.....714 miles

Traffic on our major highways has increased dramatically in the past two decades and freight traffic is expected to continue to compound for the foreseeable future. The daily vehicle miles traveled on facilities with more than two lanes in 2014 was 49.03 million miles (71.3% of total miles travelled). Improvements to these facilities are often our most expensive and resource consuming projects, but also yield high returns and have an immediate impact on regional traffic patterns. Over 340 miles of our 673 miles of interstate pavement have experienced significant rehabilitation or reconstruction since 2003 and an additional 268 miles are included in the Federal Fiscal Year 2016 through 2023 8 Year Construction Work Plan (CWP).

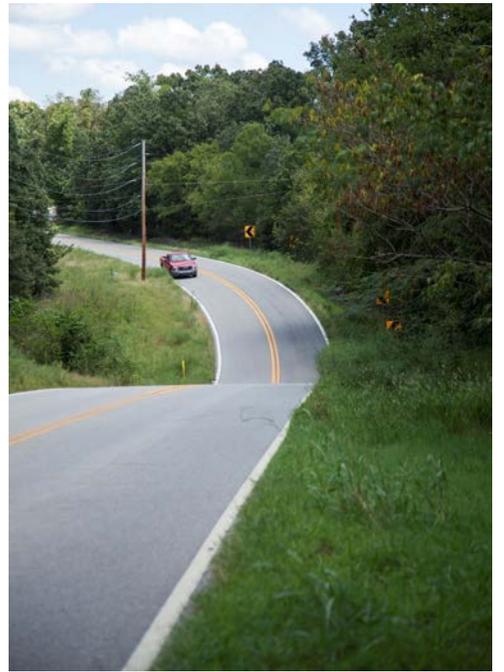
Surface, operational and capacity improvements to high-volume major highways in the 8 Year Construction Work Plan (estimated total investment).....\$2.47 B

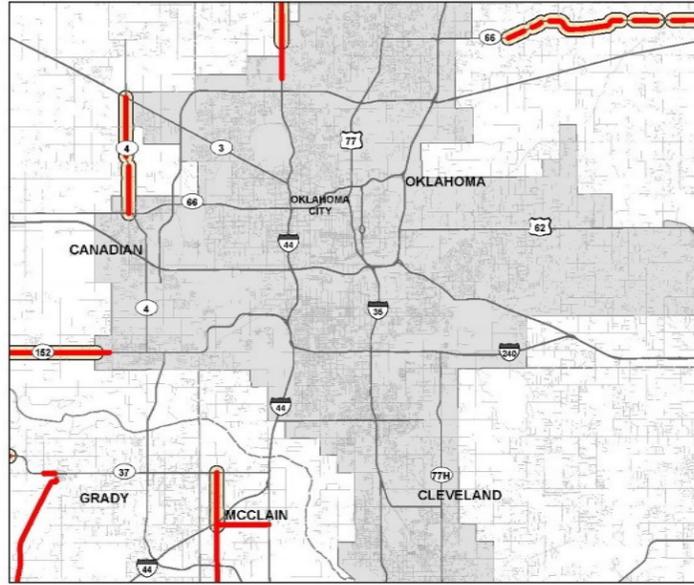
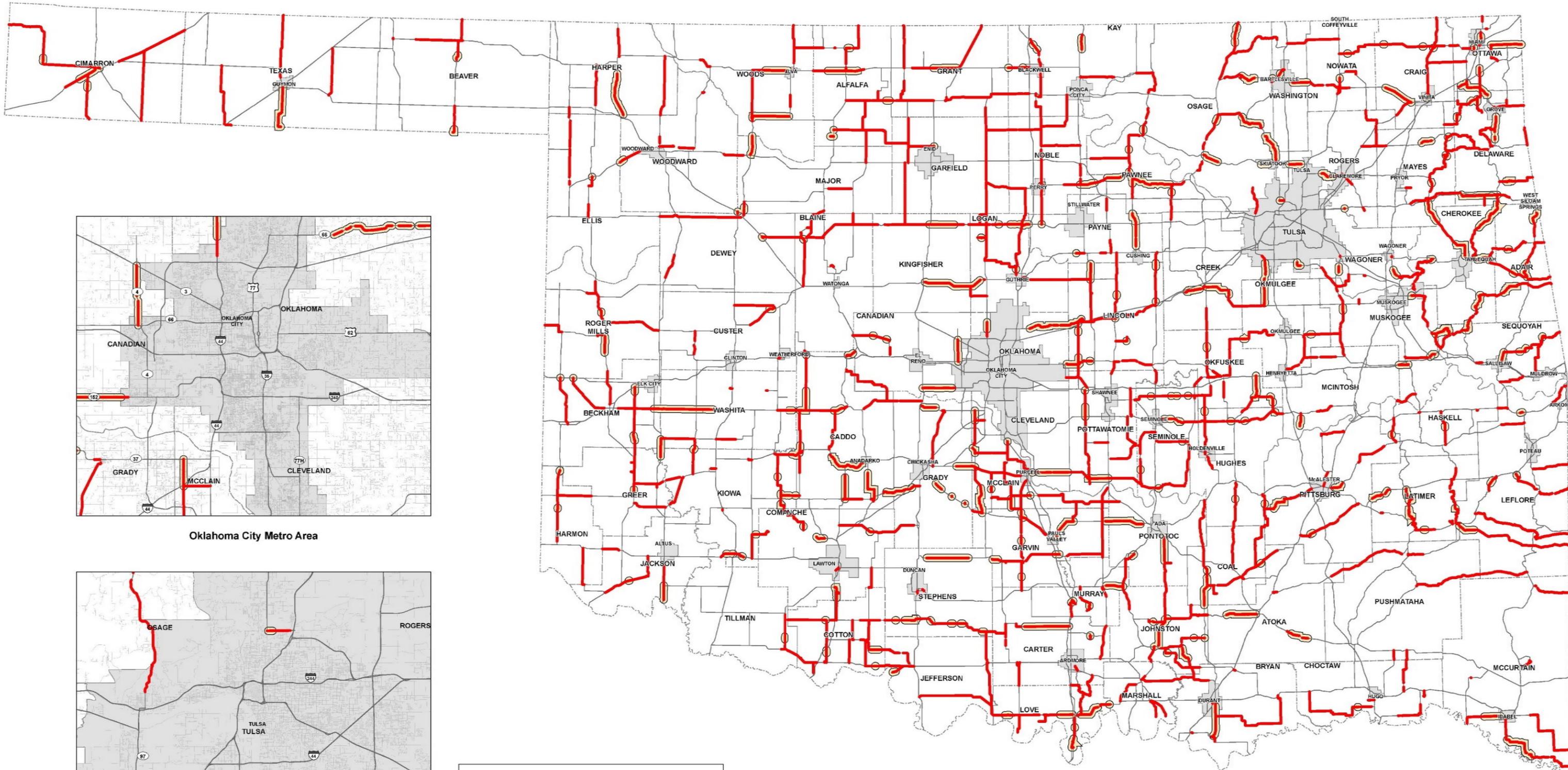
Much like our bridges, our pavement surfaces require systematic preservation in order to maximize the life cycle of our highways. Until recently, it has been impossible for the Department to afford the consideration of such initiatives. As budgetary conditions improve ODOT can invest in and develop a timely surface preservation program with a focus on extending the life of our pavements.

Annual investment in surface preservation.....\$75 M

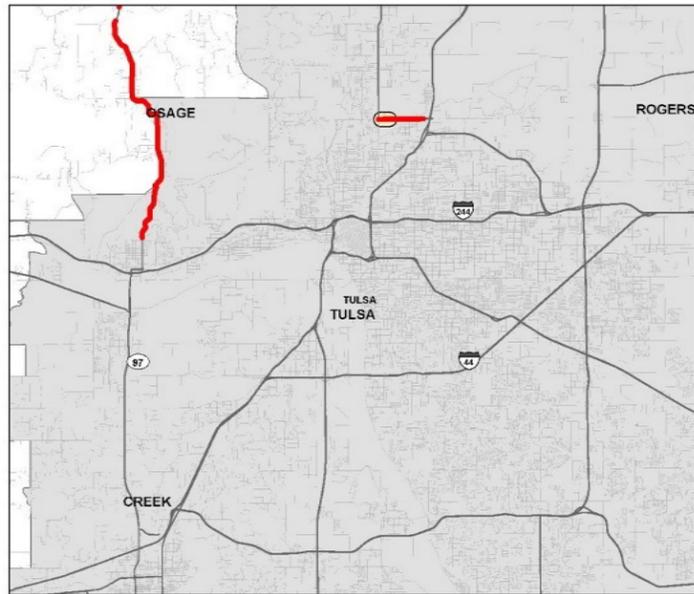
Based on an evaluation of pavement conditions and safety features such as passing opportunities, adequate sight distances, existence of paved shoulders, recovery areas for errant vehicles, and the severity of hills and curves about 28% or approximately 3,466 of our 12,264 miles of highway rate as critical or inadequate which includes 2,858 miles of two-lane highway. Even with the improvements scheduled in the current 8-Year Construction Work Plan over 2,799 miles of inadequate highway will remain unaddressed. To put this distance in the proper perspective, that is the equivalent of driving all the way across the United States from the Pacific Ocean in San Diego, California through Oklahoma City, Oklahoma to the Atlantic Ocean in Atlantic City, New Jersey on roadways with deteriorated pavement or sharp curves, no shoulders, steep hills, blind intersections or high traffic volumes. The safety of our transportation system and the traveling public is paramount to our mission and always has our full attention, but many highway safety improvements that could prevent property damage, personal injuries and the tragic loss of life will remain unattended.

Remaining inadequate highways with no improvements scheduled (not included in the 8 CWP).....2,799 miles

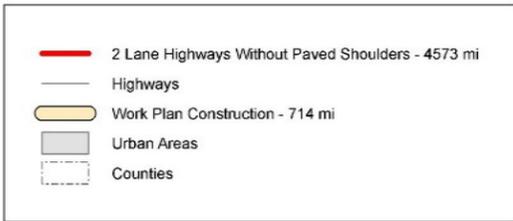




Oklahoma City Metro Area



Tulsa Metro Area



Two Lane Highways Without Paved Shoulders

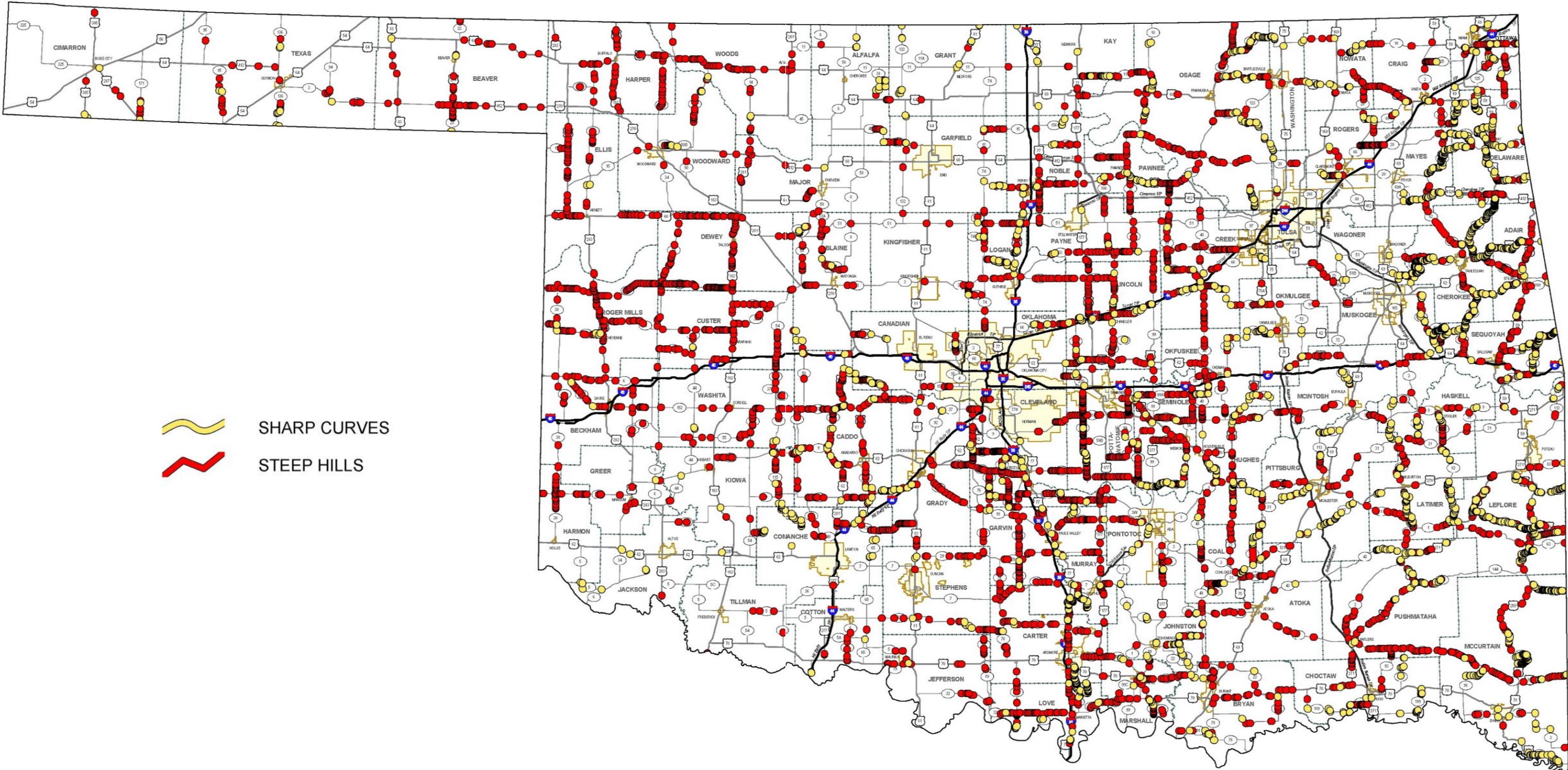


**US-75 in Tulsa between
Creek Turnpike & I-44
53,500 Annual Average Daily Traffic**





**I-35/I-240 Interchange
in Oklahoma City**
103,900 Annual Average Daily Traffic



 SHARP CURVES
 STEEP HILLS

Steep Hills and Sharp Curves

Progress Summary

Performance management, asset management, investment strategy, system analysis, and transparent reporting are primary terms often used in developing and managing business. Today, these primary terms are becoming more and more ingrained in governmental agencies and their operations. The intent is to better understand and measure the outcomes associated with the expenditure and investment of public funds. However, identifying the right measures to consistently and accurately collect the necessary data and then communicate the progress of government to the public in an understandable and meaningful manner can be quite difficult. Additionally, when effective measures are established and widely accepted, the nature of quantifying any gains or losses can be highly complex and difficult to concisely explain.

The Department of Transportation understands the needs of our transportation assets and monitors the effectiveness of our investment strategies on a daily basis. The data collection and analysis necessary to manage the transportation system is indeed extensive, complex, voluminous and, due to changing collection and reporting criterion, occasionally inconsistent. With thoughtful consideration of these complexities, the Department has selected important and meaningful measures for the purpose of providing a brief progress summary in the context of Oklahoma's bridges and highways. It is anticipated that in the coming years this progress summary will evolve to become a concise snapshot of the progress of the highway and bridge investment strategy.

Interstate System

The Interstate System in Oklahoma is the highest class of highway and is designed to be the critical transportation link that is the viaduct of national commerce which facilitates the movement of goods and services within the state, across the nation and abroad. While the 673 miles of interstate account for only 5.5% on the centerline miles of our state system, it carries 33.6% of daily miles travelled. Since 2003 more than \$2.9 billion has been invested resurfacing, rehabilitating or reconstructing the non-toll interstate system including pavements, bridges, interchanges and necessary property acquisitions and utility relocations. These improvements represent the scheduled work accomplished as part of ODOT's Asset Preservation Plan and the 8 Year Construction Work Plan.

Non-interstate Highways

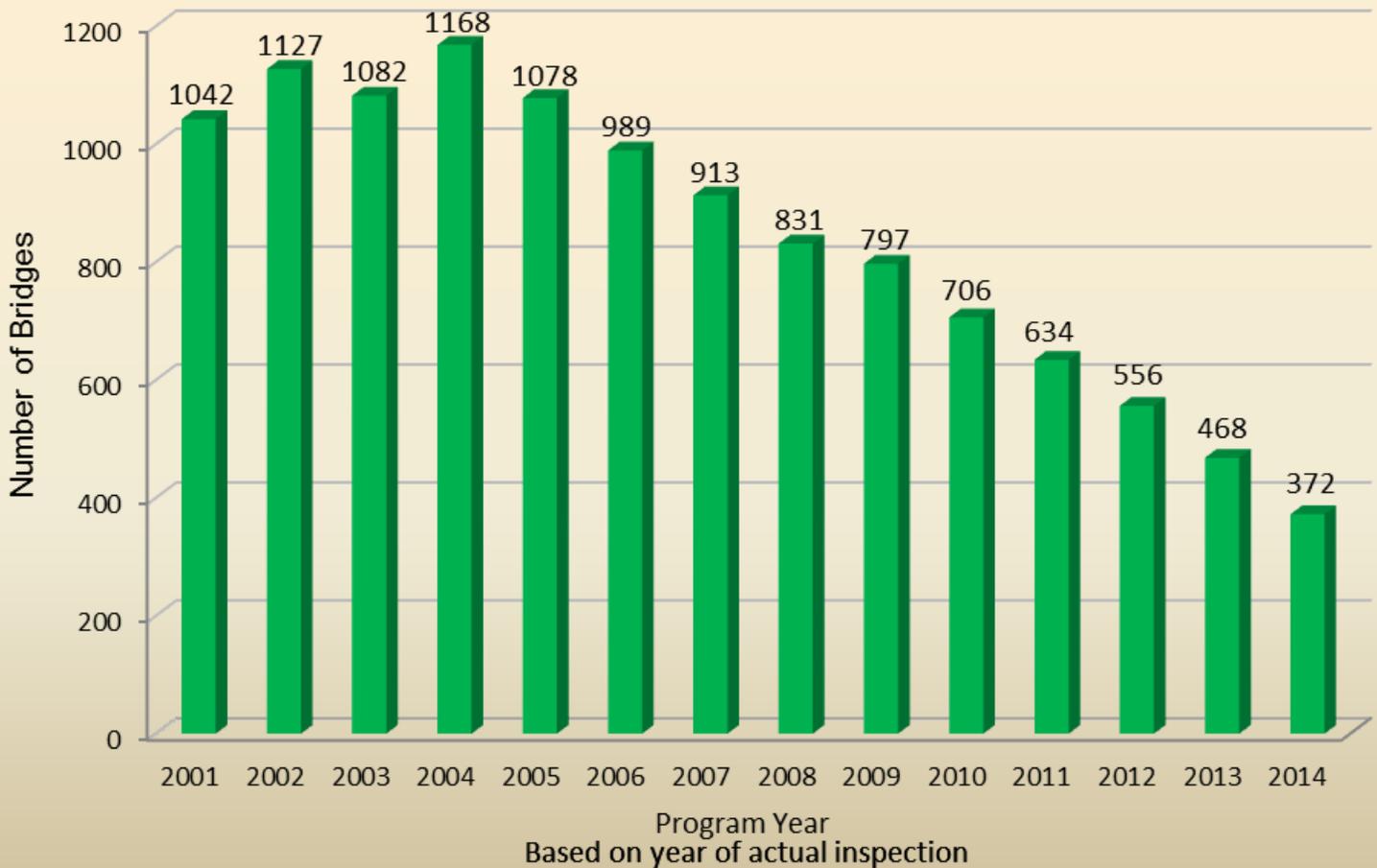
The needs of the state transportation infrastructure are constantly assessed and appropriate maintenance, rehabilitation and reconstruction activities are planned and implemented in a fully integrated and systematic manner. Regular maintenance extends the lifecycle of the transportation facilities and timely rehabilitation and reconstruction activities as encompassed in the Construction Work Plan and Asset Preservation Plan are necessary to leverage those maintenance resources so the efforts are restorative and preventative in nature. The timing of these investments is critical, as resources being directed to infrastructure and facilities that are beyond useful repair does not constitute effective maintenance and will not prevent the eventual, inevitable and costly failure of those elements.

In the context of the 2003 to current Asset Preservation and Construction Work Plan investment strategies, the Department has resurfaced, rehabilitated, constructed or reconstructed non-interstate highway pavements and bridges totaling an infrastructure investment value of more than \$5.5 billion including necessary property acquisitions and utility relocations.



I-35 at the South Canadian River in Cleveland County

On System Structurally Deficient Bridges



Structurally Deficient Bridges

The conditional issues that manifest in our bridge infrastructure are well known. Since the year 2000, Oklahoma has consistently ranked as one of the worst states on the national list of structurally deficient bridges. At the most recent peak as reported in December of 2004, 1,168 bridges, or a full 17% of all highway system bridges, were classified as structurally deficient. By comparison, that same year Texas ranked near the best in the nation with less than 2% of their more than 32,000 bridges classified as structurally deficient.

The Department has placed a priority and focused available resources on this chronic problem in earnest since 2003. With the passage of House Bill 1078 in 2005, which initiated the Rebuilding Oklahoma Access and Driver Safety (ROADS) fund, a more diverse funding pool has been brought to bear. This publication of the Update on Oklahoma Highways and Bridges showcases the culmination of a bold and visionary plan unveiled by Governor Mary Fallin that will virtually eliminate Oklahoma's bridge structural deficiencies. Governor Fallin challenged the Department to prepare an aggressive investment strategy to alleviate the condition of these bridges within an eight year window and then worked with the Legislature to insure a funding solution was in place.

As a result, our structurally deficient bridge numbers are expected to drop to less than 1% by the end of the decade. Oklahoma's focus and progress is evident with the December of 2014 annual bridge inspection reports revealing that the 706 structurally deficient bridges recorded in 2010 have been reduced to 372 marking a 47.3% reduction in structurally deficient bridges.



SH-15 in Woodward County



SH-18 at the Arkansas Red River in Pawnee/Osage Counties

Safety

The safety of the traveling public, regardless of vehicle type or highway system classification, is of paramount concern for the Department. Safety strategies are developed based on an analysis of key contributing factors such as crash data, highway inventories, traffic volumes, and highway configurations such as geometric challenges. When undesirable patterns become evident, specific countermeasures are identified based on a more in depth and detailed analysis of crash locations and causes. The most effective safety strategies employed always involve and consider the “3 E’s” as follows:

- Engineering – Design safe facilities and implement improvements with demonstrated effectiveness.
- Enforcement – Enforce existing traffic laws and speed limits and tailor enforcement activities for locations and time periods with high concentrations of targeted crash types. A well-trained, adequately staffed and highly visible enforcement presence on the highways is necessary to facilitate safe travel and enhance incident response times.
- Education – Educate operators and drivers to make sure that the responsibility and dangerous nature of operating motor vehicles is understood and they are properly prepared for safe travel.

Of the many indicators that provide insight into the safety of the transportation system, year-to-date fatalities is the most commonly referenced. Motor vehicle crashes are the number one cause of death and also disabling injuries for young Americans under the age of 21. In Oklahoma, on-highway fatalities have generally trended down from a high of 515 in 2007 to a most recent 423 recorded in 2014. The many variables that effect fatality trends can be as simple as winter weather or as complex as increasing motorcycle usage and driver behaviors such as distracted driving. While ODOT’s design and construction processes aim to increase safety on Oklahoma highways and bridges, many of the factors that lead to fatalities are difficult to address. It is agreed that year-to-date fatalities should be regarded as an important indicator, but not necessarily as a reflection of the totality of the highway system safety health.

Even when effective countermeasures can be deployed for specific crash types, the results may take years to materialize. For example, in 2001 the Department began an initiative to test cable median barrier on divided highways. Based on the outcome of this test, ODOT installed over 700 miles of cable median barrier on divided highways and are witnessing a dramatic reduction in fatalities from cross-over type crashes. Fatalities resulting from cross-over accidents on State highways have been reduced from 39 in 2007 to 12 in 2014. Unfortunately, few available countermeasures meet with such definitive success.

Motorcycle Safety

From 2004-2008 Oklahoma experienced an average of 78 motorcycle fatalities annually, which increased to an average of 92 annually from 2009-2013 with a peak of 106 in 2009. In 2014, motorcycle fatalities fell sharply to only 57, a number which likely will be exceeded again in 2015. Increased motorcycle rider education may have played a role in the stabilization of the upward fatality trend.

ONE FATALITY IS ONE TOO MANY

