

# Update on Oklahoma Bridges and Highways

Oklahoma Department of Transportation

November 2014



# Oklahoma

# Bridges and Highways

## Oklahoma's State Highway Transportation Infrastructure

### Preface

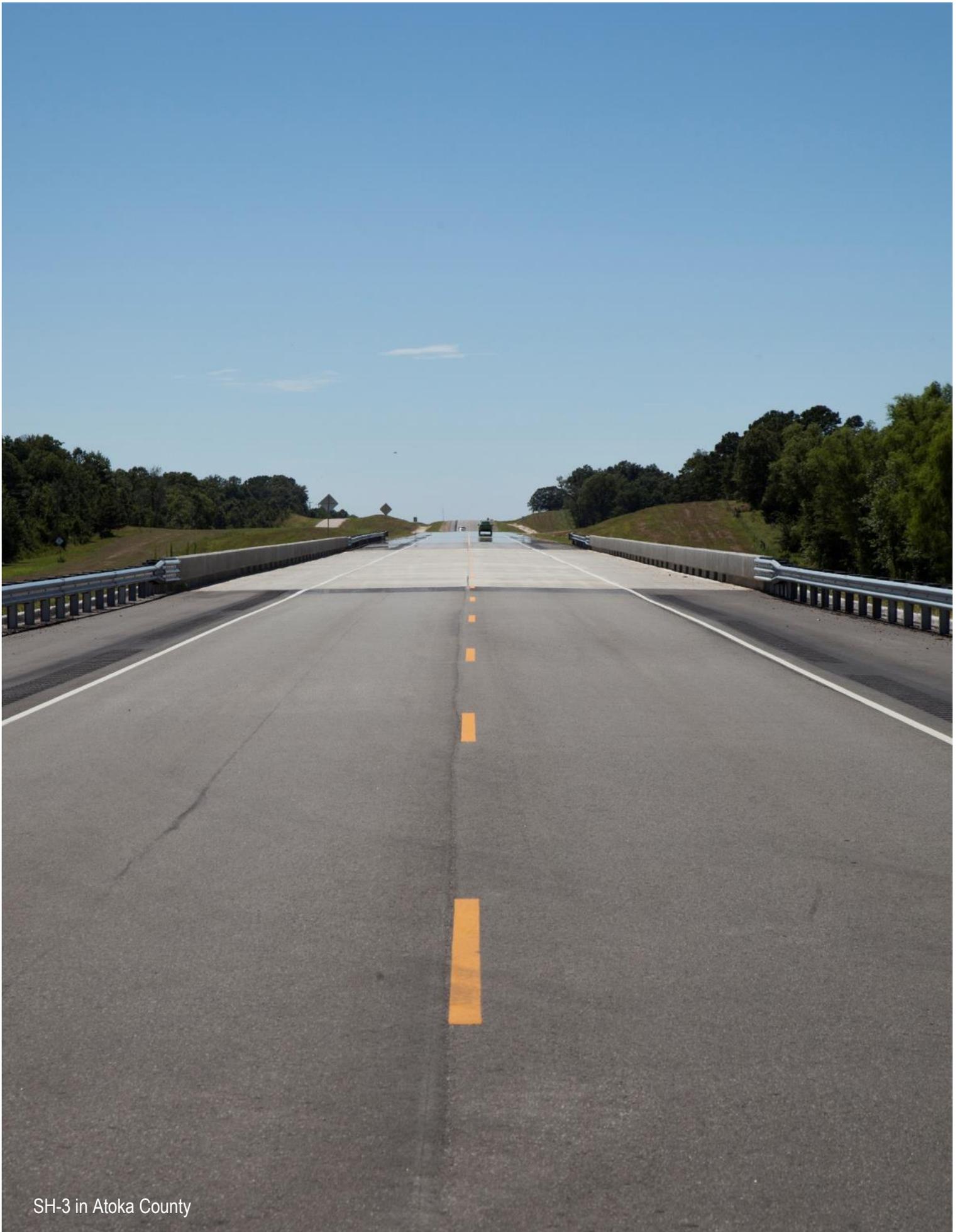
The State owned highway system in Oklahoma is comprised of the state numbered route highways, the US numbered route highways and the interstate highway system. The state system of highways encompasses 12,264 centerline miles as measured in one direction along the dividing stripe of two lane facilities 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, highways and railroads. On average, passenger vehicles, buses and trucks traveled more than 67 million vehicle miles each day (daily vehicle miles traveled or DVMT) in 2013 on the state owned highway system.

While improvements are occurring, 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 investment was quite simply flat. 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. Prior to 2005 the problem was quickly becoming overwhelming with no viable solution. At that time highway pavements were deteriorating at a rate beyond the available funding to repair, let alone reconstruct and more than 1,500 of our highway bridges were structurally deficient or functionally obsolete. 137 of those bridge structures across Oklahoma were posted as unable to carry a legally loaded truck.

Understanding that a world class transportation system is the cornerstone of a vibrant economy, 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 policymakers 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, the 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 safe system in a state of good repair 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.



SH-3 in Atoka 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, 1,009 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 rehabilitate 945 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, 2014 reporting reveals that an estimated 468 structurally deficient bridges remain identified.

### **Proposed bridge replacements / major rehabilitations in the 8 Year Construction Work Plan .....935**

- **All identified structurally deficient bridges are included in either the 2015-2022 Construction Work Plan or the 2015-2018 Asset Preservation Plan.**

The Department has always envisioned the development of an aggressive bridge rehabilitation program formulated to affect 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.

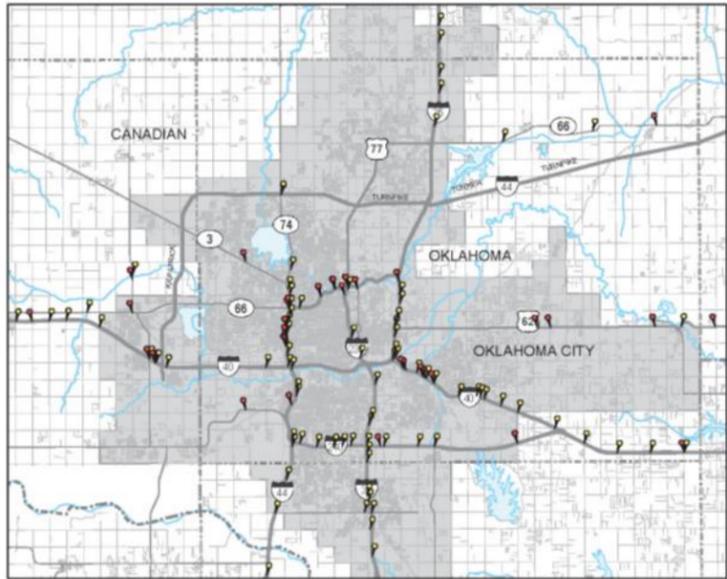
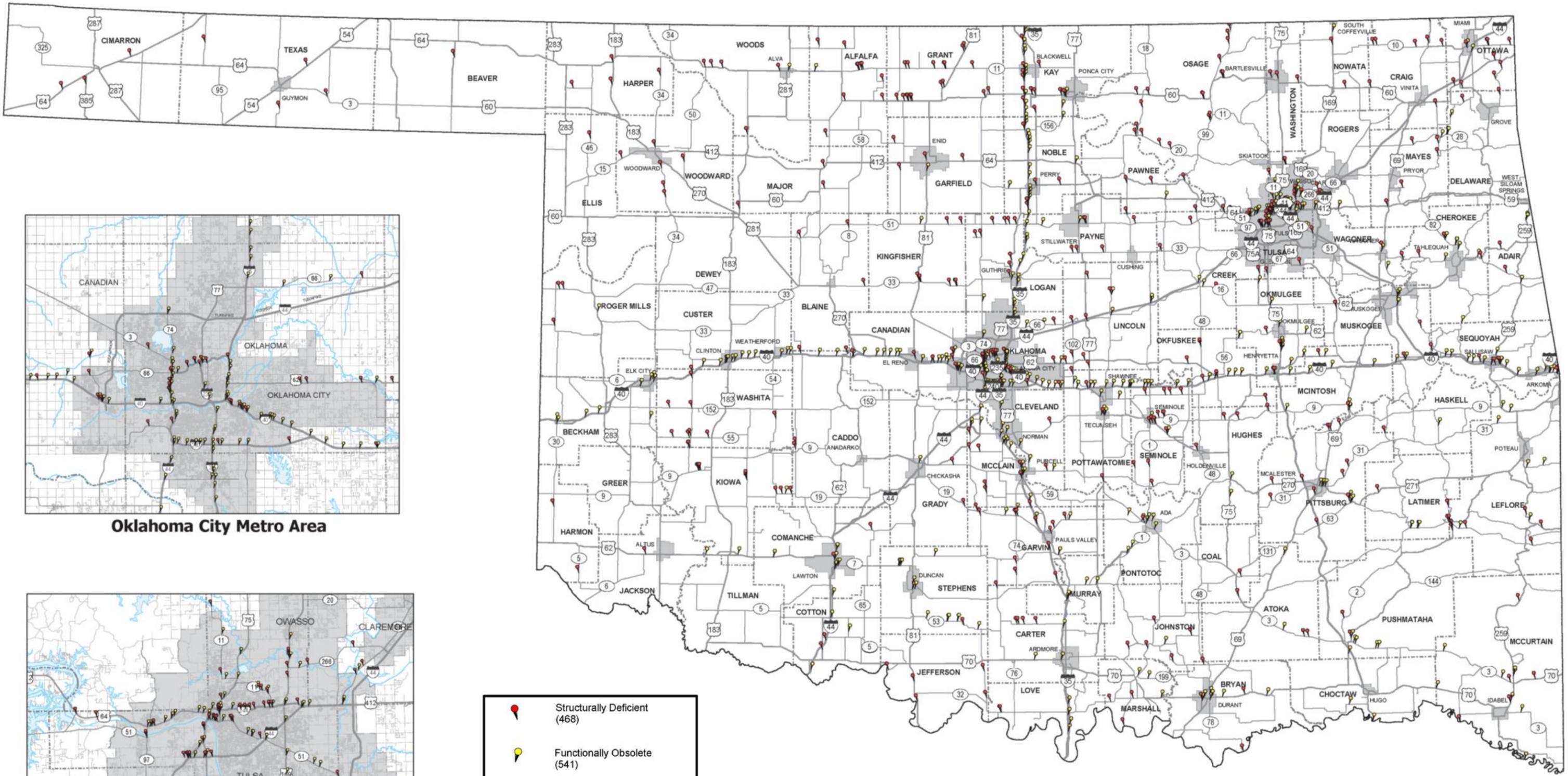
### **Bridge Condition Definitions**

**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.

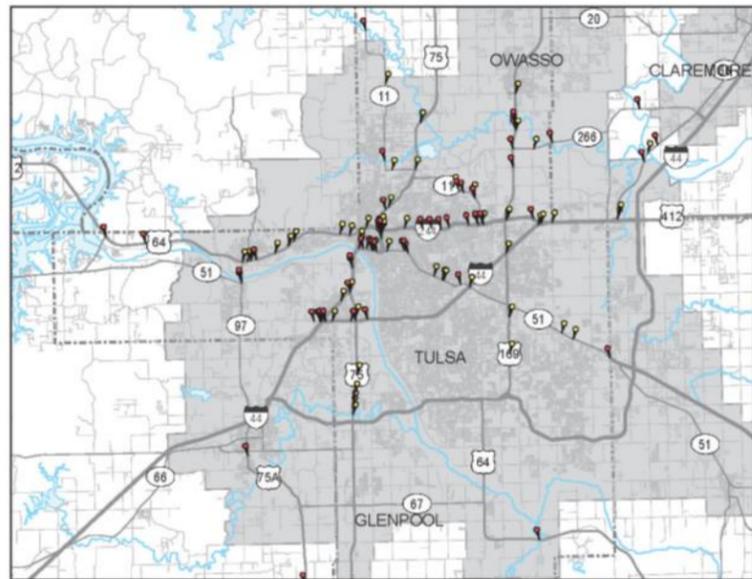
**Structurally Deficient:** A bridge term used when the physical condition of any of the bridge elements are lacking. These properties have a major bearing in qualifying a bridge for federal bridge replacement or rehabilitation funds.



US-64 in Sequoyah County



Oklahoma City Metro Area



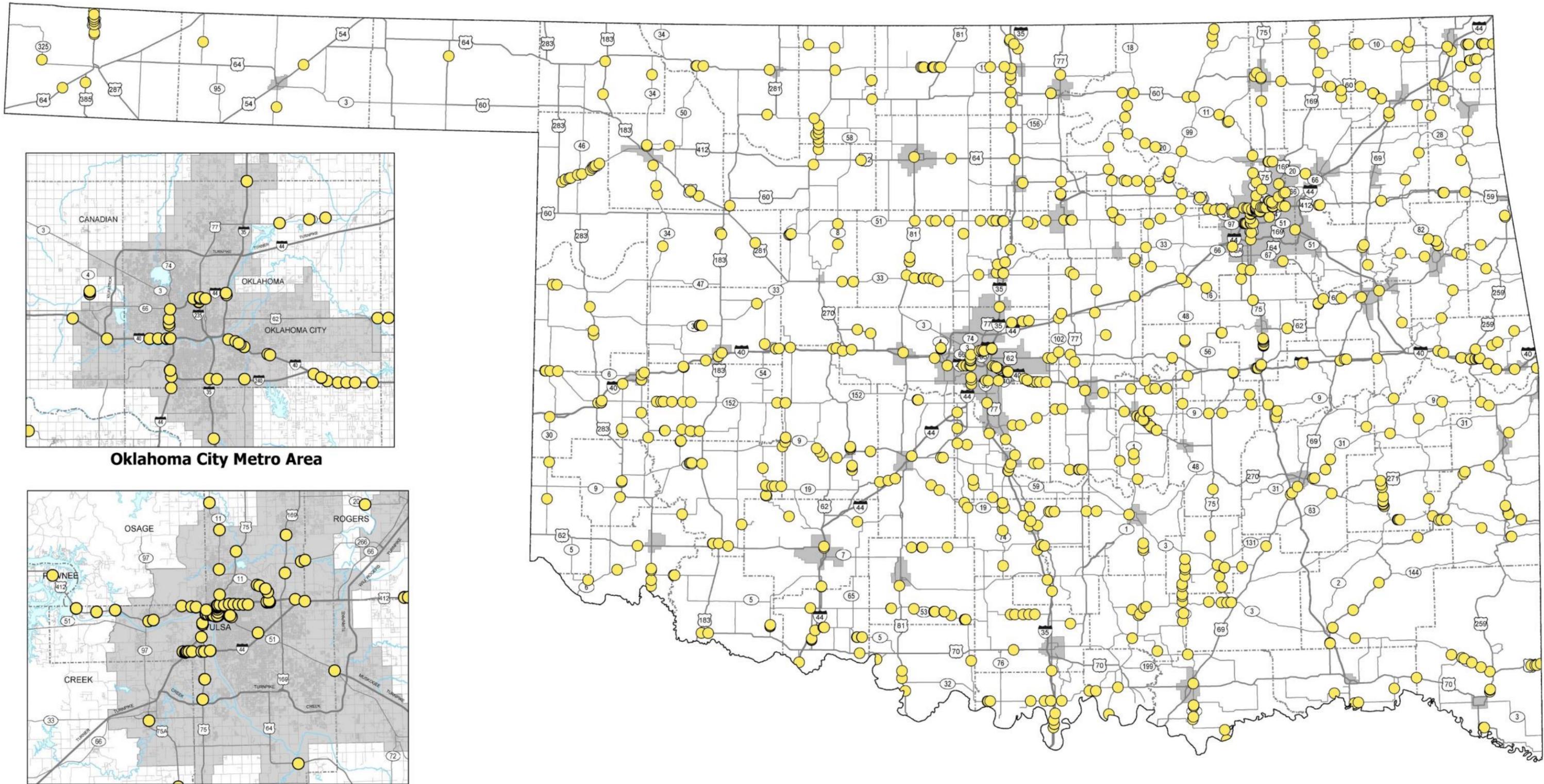
Tulsa Metro Area

	Structurally Deficient (468)
	Functionally Obsolete (541)
	County Line
	2010 Urban 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.

# Structurally Deficient and Functionally Obsolete Bridges

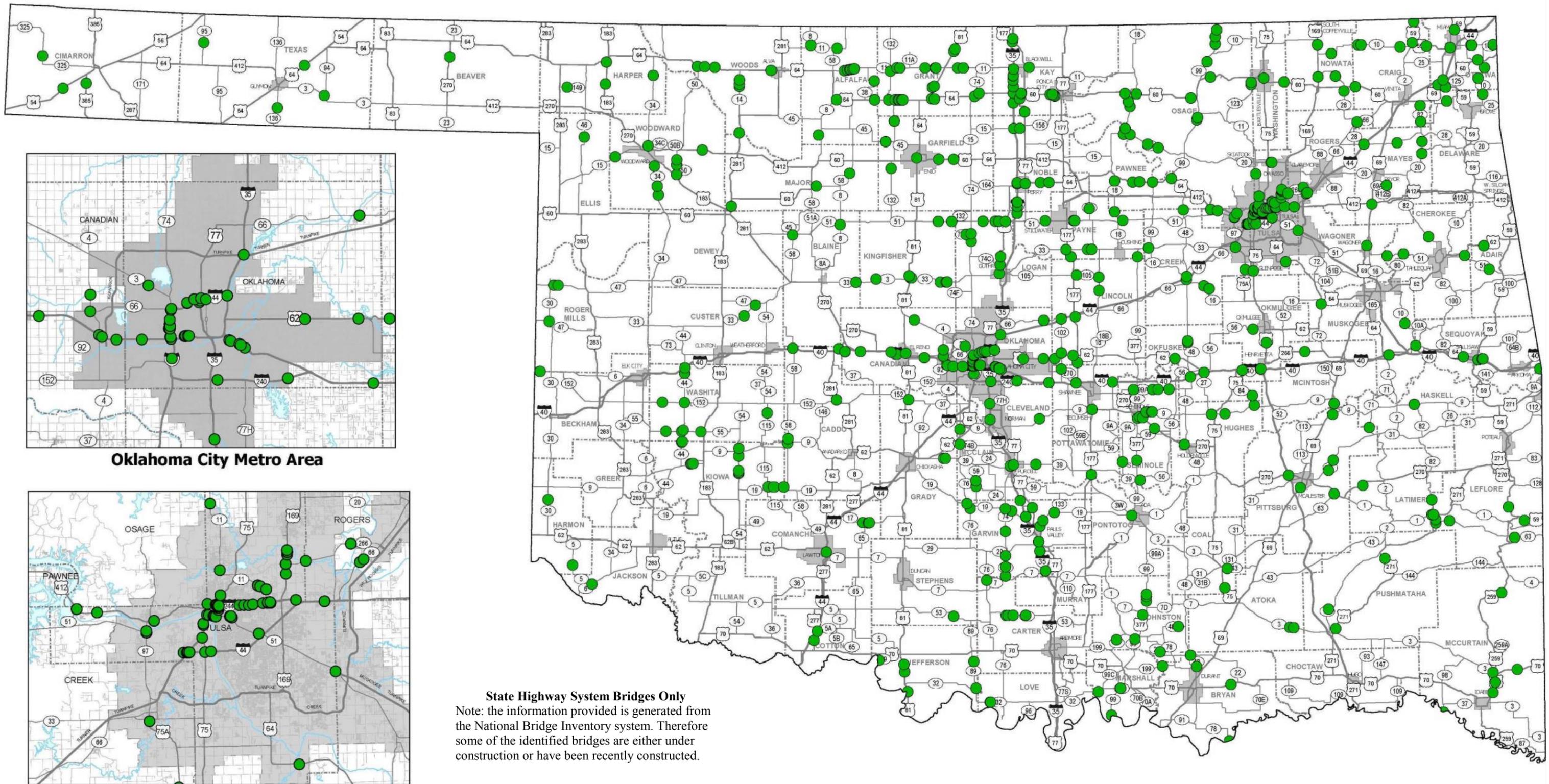




**Oklahoma City Metro Area**

**Tulsa Metro Area**

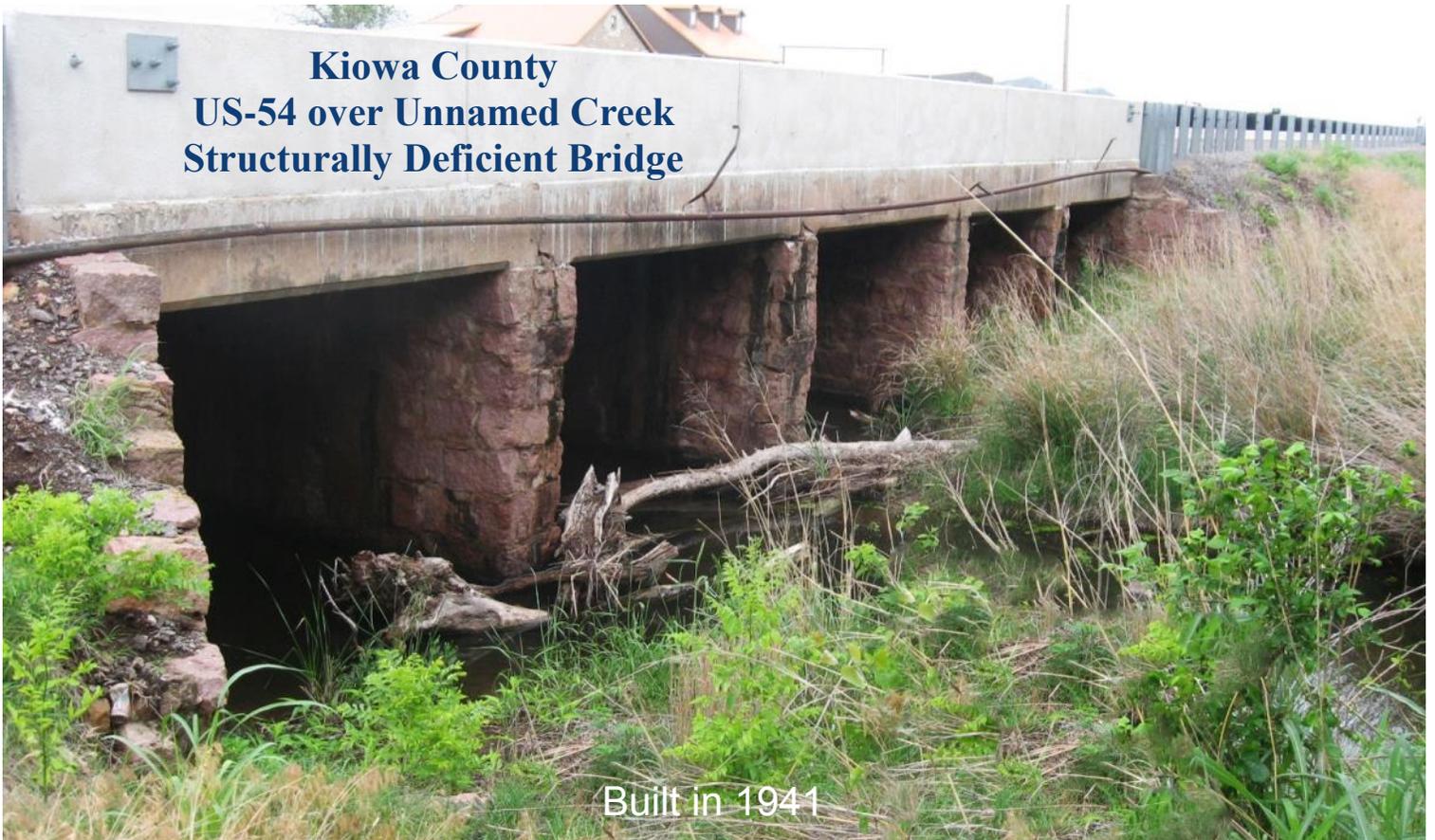
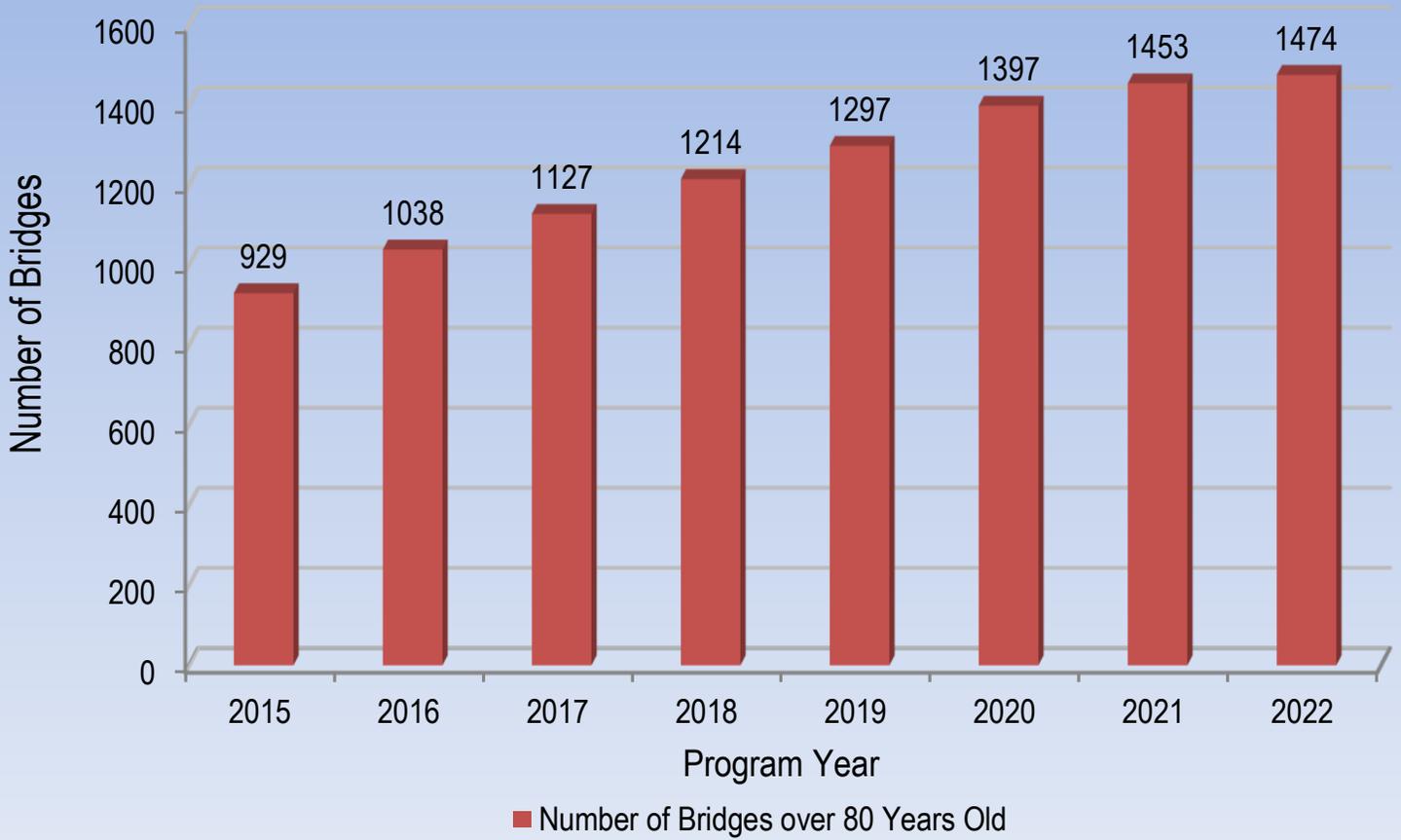
8 Year Construction Work Plan  
 935 Bridge Replacement and Major Rehabilitation Projects  
 Fiscal Years 2015 - 2022

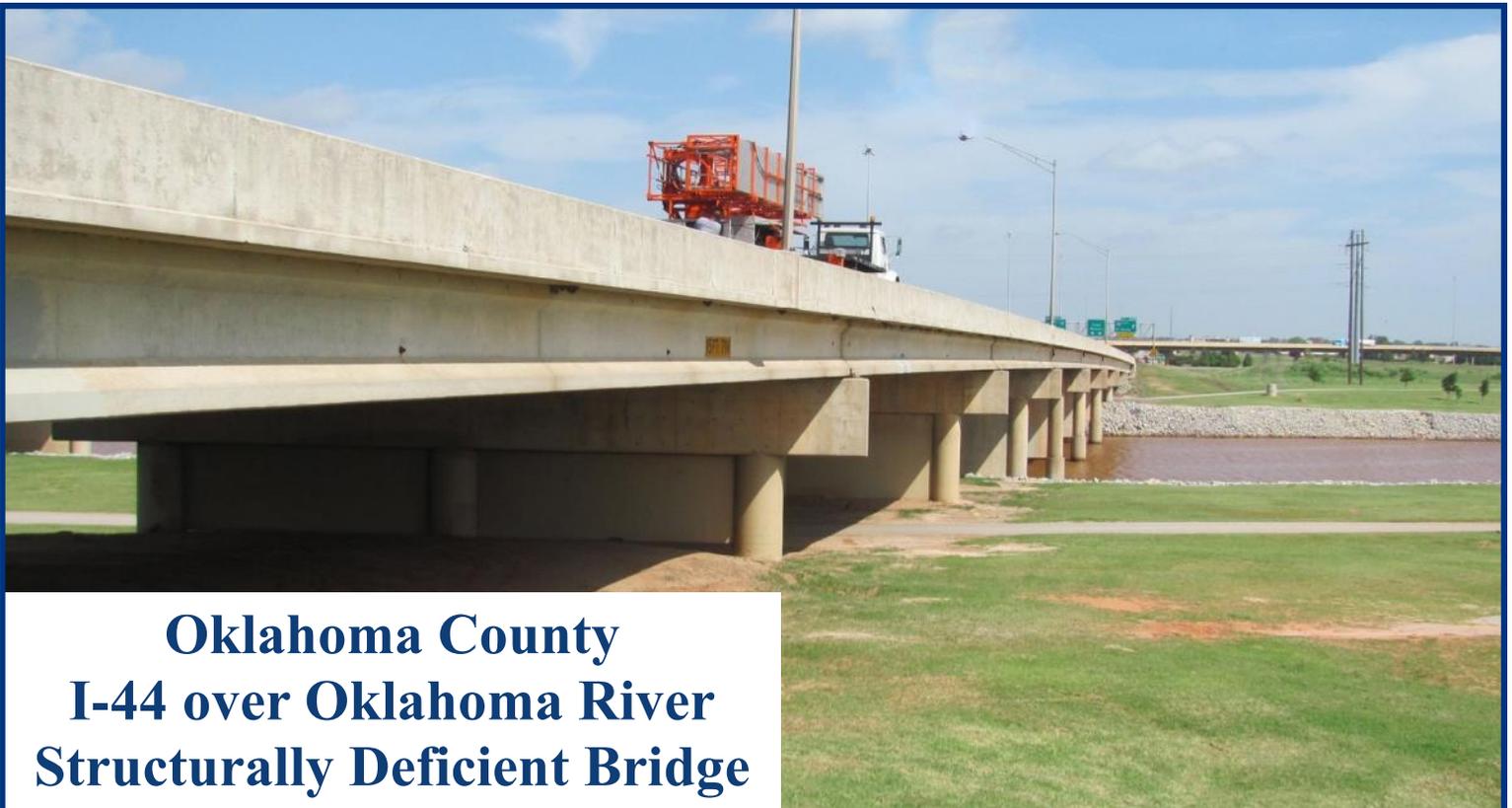


**State Highway System Bridges Only**  
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468 Structurally Deficient Bridges  
 As reported at the end of 2013  
 All are in the 2015-2022 Construction Work Plan

# Bridge Aging





**Oklahoma County  
I-44 over Oklahoma River  
Structurally Deficient Bridge**





**Latimer County  
SH-2 over  
Fourche Maline Creek  
Structurally Deficient Bridge**



**Choctaw County  
US-271 over the Red River  
Structurally Deficient Bridge**



# 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 to support 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.....583 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 2013 was 48.08 million miles (71.4% of total miles traveled). 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 319 miles of our 673 miles of interstate pavement have experienced significant rehabilitation or reconstruction since 2003 and an additional 221 miles are included in the Construction Work Plan.

**Surface, operational and capacity improvements to high-volume major highways in the 8 Year Construction Work Plan (estimated total investment).....\$2.36 B**

Much like our bridges, pavement surfaces require systematic rehabilitation 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 we can invest in and develop a timely surface rehabilitation program with a focus on extending the life of our pavements.

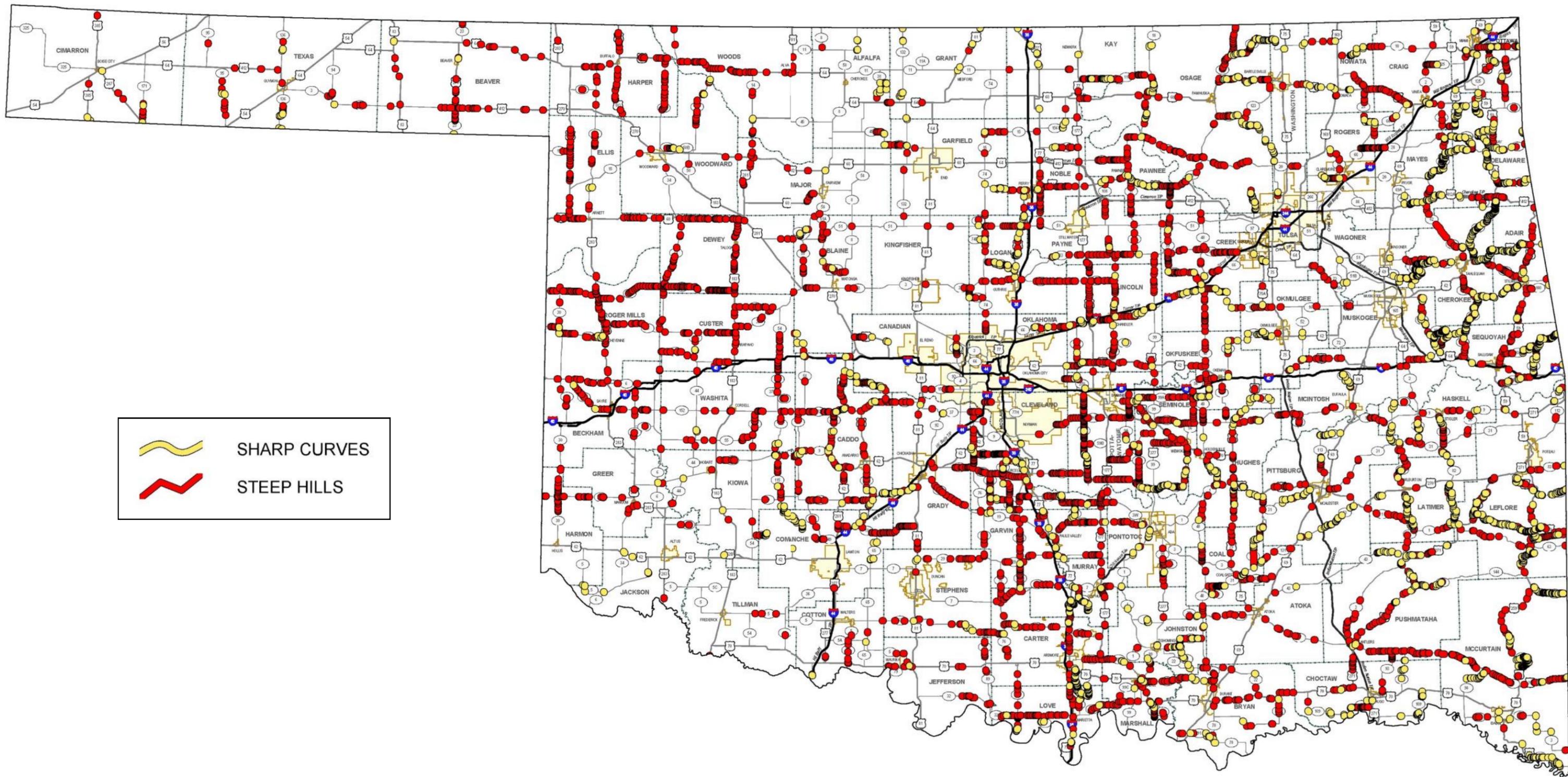
**Annual investment in surface rehabilitation.....\$75 M**

Based on an evaluation of pavement conditions and safety features such as passing opportunities, adequate sight distances, paved shoulders, recovery areas for errant vehicles, and the severity of hills and curves about 31% or approximately 3,867 of our 12,264 miles of highway rate as critical or inadequate which includes 3,364 miles of two-lane highway. Even with the improvements scheduled in the current 8-Year Construction Work Plan over 3,130 miles of inadequate highway will remain unaddressed. To put this distance in the proper perspective, that is the equivalent of driving from Tulsa to Santa Barbara, California and back on a highway with deteriorated pavement or sharp curves, no shoulders, steep hills, blind intersections or high traffic volumes. The safety of our transportation system for 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.....3,130 miles**



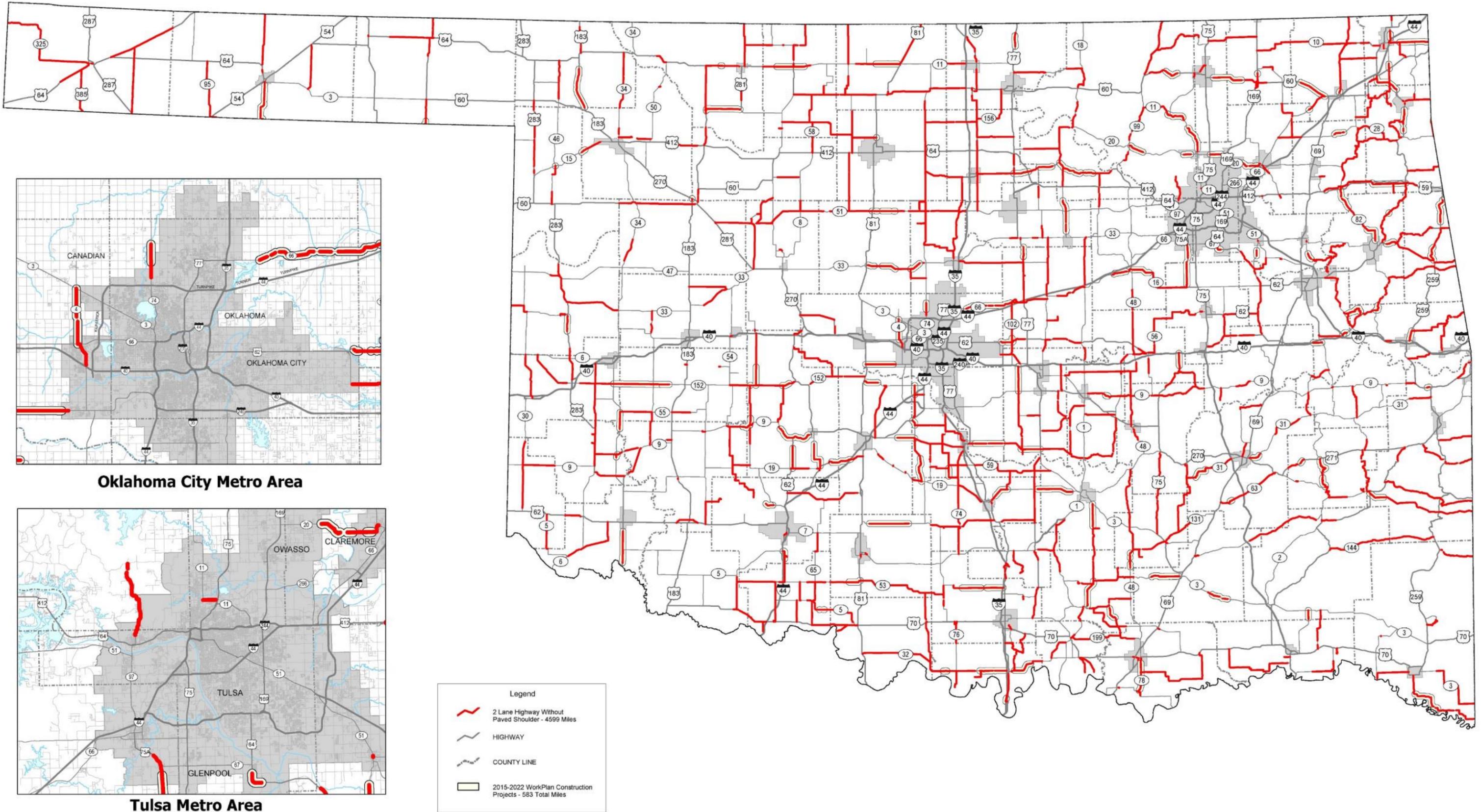
I-44 & 177th E. Avenue in Tulsa County



# Steep Hills and Sharp Curves







**Oklahoma City Metro Area**

**Tulsa Metro Area**

# Two Lane Highways Without Paved Shoulders



**US-75 in Tulsa between  
Creek Turnpike & I-44  
52,000 Annual Average Daily Traffic**





**I-35/I-240 Interchange  
in Oklahoma City**  
102,400 Annual Average Daily Traffic

# 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 government agencies and 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. Equally, when good 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 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 sometimes inconsistent due to changing collection and reporting criterion. 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.

## **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 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 ensure a funding solution was in place.

As a result, our structurally deficient bridge numbers are expected to drop to near zero by the end of the decade. Oklahoma's focus and progress is evident with the December of 2013 annual bridge inspection reports revealing that the 706 structurally deficient bridges recorded in 2010 have been reduced to 468 marking a 33.7% reduction in structurally deficient bridges.

## On System Structurally Deficient Bridges



### 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 33.5% of daily miles traveled. Since 2003 more than \$2.6 billion has been invested in 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 our Asset Preservation Plan and our 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 \$4.9 billion including necessary property acquisitions and utility relocations.

## **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 and highway inventories. 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 Es” 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 and free of distractions.

While there are many indicators that provide insight into the safety of the transportation system, year to date fatalities are 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, our on-highway fatalities have generally trended down from 515 in 2007 to a most recent 433 recorded in 2013. There are many variables that effect fatality trends and can be as simple as winter weather or as complex as increasing motorcycle usage and driver behaviors such as distracted driving. These issues are the most difficult to impact and are why year to date fatalities should be regarded as an important indicator, but cannot necessarily reflect 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, we have installed over 700 miles of cable median barrier on our 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 decreased from 39 in 2007 to 9 in 2013. Unfortunately, few available countermeasures have had such a significant impact in saving lives.

## **Motorcycle Safety**

Since 2006 Oklahoma has experienced a significant increase in motorcycle fatalities, from an average of 78 annually from 2004-2008 to an average of 92 annually from 2009-2013. This trend has caused great concern to both the Department of Transportation and the Department of Public Safety underscoring the need for continuing efforts in motorcycle safety education to assist riders in developing enhanced behaviors and skills.

**ONE FATALITY IS ONE TOO MANY**



